Semitropic Water Storage District
Groundwater Sustainability Agency
2020 Groundwater Sustainability Plan

References not available through other public websites.

Semitropic Groundwater Sustainability Agency
Final 2020 Groundwater Sustainability Plan

APPENDIX A – COMMENTS

Received public comments are included herein. Responses to comments are draft and subject to change.

Semitropic Water Storage District - GSA
Comment Matrix, Comments Received as of 11/28/2019
DRAFT as of Dec 11, 2019

Commentor	Ref #	Comment	Response
Central Valley Joint Venture	CV1	We hope future proposed allocations and management actions in Semitropic weigh the value of wetlands as beneficial users of groundwater and support their continued existence.	Agree that managed wetlands have value, and there is nothing in the GSP to the contrary. Will weigh the value and reasonable water needs of managed wetlands in relation to other beneficial uses of groundwater in preparing future water budgets.
California Waterfowl	CW1	The ET water budgets in the GSP are inadequate for continued operation of the managed wetlands. Without an affordable replacement water supply , the water budgets would lead to the complete eradication of managed wetlands in the Semitropic Water Storage District in 20 years.	Agree that managed wetlands have value, and there is nothing in the GSP to the contrary. Will weigh the value and reasonable water needs of managed wetlands in relation to other beneficial uses of groundwater in preparing future water budgets.
California Waterfowl	CW2	… recommends that ET allocations for managed wetlands be set on par with agricultural and other users atr 4.2 acre-feet for five years or until a sufficient data on ET rates for managed wetlands becomes available.	Acknowledge the data gap with respect to ET of managed wetlands. Will be including a MA for the continued refinement of ET on managed wetlands. Will adjust the initial water budget for managed wetlands to 4.2 acre-feet with the approriate ramp-down over the implementation period
California Waterfowl	CW3	Unless a surface water supply can be found to make up the difference between the proposed groundwater budget for managed wetlands, the water budget should be increased to a minimum of 4.2 acre-feet per acre. The cost of surface water should not exceed the cost of pumping groundwater ...	Will adjust the initial water budget for managed wetlands to 4.2 acre-feet with the appropriate ramp-down over the implementation period.
California Waterfowl	CW4	How can a surface water supply be provided? … allow flood flows in the Tulare Lake Basin to be used on managed wetlands. … provide access to State Water Project supplies to augment groundwater pumping.	Will consider joint projects for development of Poso Creek flood flows. Will consider access to SWP conveyance capacity for supplemental water supplies, including but not limited to water transfers. These will be included and considered in the development of individual projects and management actions.
California Waterfowl	CW5	The total number of acres in managed wetlands …is very small in comparison to the number of acres in trees and other crops. An increase in the water budget will have a small effect on the groundwater available to agriculture.	All lands will be treated equally with respect to access to native yield and proportionate participation in District programs.
Rancho Visalia	RV1	**The Et Estimates Are Seriously Flawed** The first and most obvious conclusion from the above is that the Et estimates for Rancho Visalia are nowhere near accurate, both as to its undeveloped land and its flooded wetland ponds. This may be because the methodology used to determine the Et works well for agricultural land but does not work for natural, undeveloped land, wetlands or ponds. This is not surprising given that ag land loses water through the much higher Et rates associated with growing and exporting crops whereas duck clubs are composed of only natural, undeveloped land or flooded ponds/wetlands.	ET for undeveloped land is assumed to equal precipitation and therefore there is no net demand for undeveloped properties. Acknowledge the data gap with respect to ET of managed wetlands and duck clubs. Will be including a MA for the continued refinement of ET on managed wetlands. ET is a measurement of consumptive use, not applied water.
Rancho Visalia	RV2	**Restricted Water Budgets for Duck Clubs Will Cause Significant and Irreversible Environmental Harm** Imposing duck club water budgets of 1.5 af/ac/yr, as is proposed for the year 2020 in the draft Groundwater Sustainability Plan, will severely impede those clubs' ability to maintain year -round or even seasonal wetlands. Allowing the clubs to only extract .5 af/ac/yr, or worse, just the .15 af/ac/yr Native Yield, when the proposed GSP is fully implemented in 2040, will all but eliminate those wetlands, even for clubs such as Rancho Visalia which only floods about one sixth of its Special GPSC land.	We acknowledge the values of managed wetlands and duck clubs, but are required under SGMA to sustainabily manage the Subbasin without altering the water rights of landowners. Accordingly, all lands are being treated equally with initial allocation of available native yield in the Subbasin.

Commentor	Ref #	Comment	Response
Rancho Visalia	RV3	**Any Over-Extraction by Duck Clubs Would Be Insignificant** ….duck club wetlands make up just 2 percent of the 140,000 acres of irrigated land and 1.3 percent of the total acreage within the SWSD. If duck clubs were allowed to extract the 3.5 af/ac/yr necessary to adequately flood their 2,800 acres of ponds, this would total just 9,800 af/yr. This is just .08 percent of the 123,900 af/yr reduction in groundwater pumping required under SGMA. In short, allowing the clubs to extract sufficient water to maintain their wetlands would have no measurable impact on the groundwater levels yet would avoid most of the environmental harm.	It is the expectation that a finite native yield will be developed for the entire Subbasin and that will be allocated among all lands equally. Providing some lands with higher native yields will require a reduction in the native yield allocated to other lands. Moreover, SGMA defines groundwater sustainablity in terms of the avoidance of six (6) defined undesirable results. Allocations of native yield are merely one tool (among many) to achieve sustainability within statutorily-mandated timeframes.
Rancho Visalia	RV4	**The finalized GSP Should Allow Duck Clubs to Extract Sufficient Groundwater to Sustain Year-round Wetlands on a Perpetual Basis.** **...** allowing duck clubs to extract sufficient water to adequately maintain their ponds would cause virtually no measurable groundwater reduction yet would avoid most of the environmental damage. For these reasons, the example duck club Water Budget should be modified so as to allow clubs to extract 3.5 af/ac/yr for their wetlands.	See Response to Comment RV2. The GSP is predicated on tracking consumptive use (ET), not applied water.
Larry Frey	LF1	Objection to the proposed District plan to not allow a farmer to carry-over from year to year, or a number of years, on a one-to-one basis without a fee the Incremental Pumping allowance portion of his yearly water right.	Comment to be considered through the development process of the Landowner Budgets Management Action.
Fresno Irrigation District	FID1	The project ("Tulare Lake") is fundamentally flawed, as Semitropic has not established that it has the right to export Kings River water to Kern County as the project requires.	The ultimate yield of the Tulare Lake Project will be determined pursuant to the water right proceeding now being conducted by the State Water Resources Control Board. Any water supply developed through the implementation of any of the projects identified in Table 5-1 will reduce the District's obligation to retire properties as identified in the third management action.
Kings River Water Association	KR1	The project ("Tulare Lake") is fundamentally flawed, as Semitropic has not established that I has the right to export Kings River water to Kern County as the project requires.	The ultimate yield of the Tulare Lake Project will be determined pursuant to the water right proceeding now being conducted by the State Water Resources Control Board. Any water supply developed through the implementation of any of the projects identified in Table 5-1 will reduce the District's obligation to retire properties as identified in the third management action.
North Kings Groundwater Sustainability Agency	NK1	The project ("Tulare Lake") is fundamentally flawed, as Semitropic has not established that I has the right to export Kings River water to Kern County as the project requires.	The ultimate yield of the Tulare Lake Project will be determined pursuant to the water right proceeding now being conducted by the State Water Resources Control Board. Any water supply developed through the implementation of any of the projects identified in Table 5-1 will reduce the District's obligation to retire properties as identified in the third management action.
Hancock Farmland Services	HF1	The GSP references native yield in terms of acre-feet per gross acre for water budget purposes. If referencing it this way is necessary, the GSP should clarify that these calculations are for initial water budget purposes ONLY, are non-precedent setting, and not a determination of individual landowner allocations or groundwater rights. Alternatively, native yield could be described only as a total volume of water, for example xxx,xxx acre-feet and not associated with a given gross or net area.	Agree that references to native yield are for initial water budget purposes only, are not precedent-setting, and are not a determination of the water rights of individual landowners or other water users.

Commentor	Ref #	Comment	Response
Hancock Farmland Services	HF2	GSAs and MAs must develop clear and understandable policies and conditions that protect existing groundwater banking and banked inventory and allow them to continue operating as they have been under their existing rules and regulations without interference. They must also incentivize additional investment, such as on-farm recharge by providing pumping credits and allow flexibility for recharged or banked water to be freely transferrable subject to the rights and conditions of use associated with the source water and the avoidance of undesirable results. They should develop incentives for public or private investment to expand recharge and banking capacity, as these facilities help to achieve multiple benefits (e.g., habitat, water quality, drinking water, etc.).	Agree that existing groundwater banking projects and banking inventory should be protected in accordance with contractual requirements and that incentives for additional recharge and banking projects should be developed.
Hancock Farmland Services	HF3	GSAs using remote sensing to calculate crop ET as a measurement of consumptive use of groundwater should develop methodologies and quality assurance elements to allow for grower-provided information to be included into the ET calculation and calibration.	Agree, Landowner information is important for validating the Et Measurements.
Westchester	W1	The GSP references native yield in terms of acre-feet per gross acre for water budget purposes. If referencing it this way is necessary, the GSP should clarify that these calculations are for initial water budget purposes ONLY, are non-precedent setting, and not a determination of individual landowner allocations or groundwater rights. Alternatively, native yield could be described only as a total volume of water, for example xxx,xxx acre-feet and not associated with a given gross or net area.	Agree that references to native yield are for initial water budget purposes only, are not precedent-setting, and are not a determination of the water rights of individual landowners or other water users.
Westchester	W2	… GSAs and MAs should implement pumping restrictions when supported by the best available data and appropriate analytical tools. Furthermore, if possible without creating undesirable results, pumping should be ramped down gradually over the implementation period to avoid a sudden disruption in economic activity.	To the extent pumping restrictions are adopted in the future, they will be implemented in accordance with SGMA (including but not limited to the requirement that water rights not be altered) and best available science.
Westchester	W3	As with native yield allocations, initial pumping allowances and ramp down schedules should be coordinated and consistent across the entire basin so that similarly situated pumpers in the basin are treated equitably regardless of their respective MA (some MAPs include a ramp down schedule for groundwater-only lands and others do not; this is a significant difference and should be reconciled).	To the extent pumping restrictions are adopted in the future, they will be implemented in accordance with SGMA (including but not limited to the requirement that water rights not be altered) and best available science.
Westchester	W4	GSAs and MAs must develop clear and understandable policies and conditions that protect existing groundwater banking and banked inventory and allow them to continue operating as they have been under their existing rules and regulations without interference. They must also incentivize additional investment, such as on-farm recharge by providing pumping credits and allow flexibility for recharged or banked water to be freely transferrable subject to the rights and conditions of use associated with the source water and the avoidance of undesirable results. They should develop incentives for public or private investment to expand recharge and banking capacity, as these facilities help to achieve multiple benefits (e.g., habitat, water quality, drinking water, etc.).	Same as Hancock HF2
Westchester	W5	GSAs should develop a coordinated basin-wide data management system (“DMS”) that is capable of tracking groundwater and surface water use at the landowner, field, or parcel level, and a coordinated methodology for measuring landowner-level use of groundwater.	Agree, this is contemplated as an item for coordination relative to all GSA's within the basin
Westchester	W6	GSAs using remote sensing to calculate crop ET as a measurement of consumptive use of groundwater should develop methodologies and quality assurance elements to allow for grower-provided information to be included into the ET calculation and calibration.	Same as Hancock HF3

Commentor	Ref #	Comment	Response
Wonderful Orchards	WO1	It is imperative that the final GSP properly address the quantification of native yield. The GSPs, management areas, and other planning units in the subbasin should utilize coordinated methods of determining supply sources for native yield, quantifying the native yield, and accounting for it in individual MAPs' water budgets. Unless there are specific hydrogeologic conditions that differentiate certain portions of the basin from the basin at-large (such as a fault line or barrier to groundwater flow), native yield should be considered a basin-wide resource.	The KGA has identified the "Study of Native Yield for the Kern Subbasin" as a management action that will include all GSAs in the Subbasin. This Management Action will work to develop a common and agreed to native yield value for the entire Subbasin and appropriate methodology for allocation of the native yield, in accordance with SGMA.
Wonderful Orchards	WO2	In addition to a clear definition of native yield, the final GSP must also include a thorough description of how to calculate the allocation of native yield. Currently, the GSP references native yield in terms of acre-feet per gross acre for water budget purposes. .... If referencing native yield this way is necessary, the GSP should clarify that it is for initial water budget purposes ONLY, is non-precedent setting, and is not a determination of individual landowner allocations or groundwater rights	Clarification regarding planning level water budget and native yield analysis can be added to the GSP. Agree that references to native yield are for initial water budget purposes only, are not precedent-setting, and are not a determination of the water rights of individual landowners or other water users.
Wonderful Orchards	WO3	Alternatively, in the 2020 plans subbasin native yield could be described as a total volume of water and not associated with a given gross acreage.	Agree with respect to GSA or Management Area; however, utilization of native yield at the landowner level requires an allocation. The initial policy direction is to allocate native yield equally to all acres within the Subbasin.
Wonderful Orchards	WO4	In addition, GSAs should initiate a stakeholder-driven process to develop a methodology for establishing landowner-level allocations of native yield that are coordinated across the subbasin.	Opportunities for stakeholder input will be provided during the planning and implementation of the Landowner Water Budget Management Action in early 2020.
Wonderful Orchards	WO5	An equal-per-gross acre approach to allocations is not likely to be consistent with established water rights doctrine, which must recognize many equitable considerations in addition to acreage owned, to determine a legally defensible allocation.	To the extent pumping restrictions are adopted in the future, they will be implemented in accordance with SGMA (including but not limited to the requirement that water rights not be altered) and best available science. The comment is unclear regarding what is meant by "equitable considerations."
Wonderful Orchards	WO6	Markets are essential in facilitating the highest and best use of a limited resource and in giving landowners the most flexibility to minimize the economic impacts of pumping restrictions. To enable a market that works for all landowners in the subbasin, it is imperative that all pumpers know exactly how much marketable water they have available for use or transfer. Unless it is deemed necessary to prevent undesirable results, markets should not place geographic or jurisdictional limitations on transfers within a subbasin and should allow for carry-over of allocations from one year to the next.	Water markets will be considered as potential future management actions.
Wonderful Orchards	WO7	GSAs or MAs should implement pumping restrictions when supported by the best available data and appropriate analytical tools. Furthermore, if possible, pumping should be ramped down gradually over the implementation period to avoid a sudden disruption in economic activity. ... As with native yield allocations, initial pumping allowances and ramp down schedules should be coordinated across the entire basin so that similarly situated pumpers in the basin are treated equitably regardless of their respective MA (some MAPs include a ramp down schedule for groundwater-only lands and others do not; this is a significant difference and should be reconciled)	Same as Westchester W2 Agreed - is reflected in the development of the IPA and gradual reduction of IPA to 0 by 2040 With regard to ramp-down schedules, not all lands are equal with respect to surface water supplies; therefore the sustainable yield for each property will vary across the Subbasin and accordingly the ramp-down schedules will vary.

Commentor	Ref #	Comment	Response
Wonderful Orchards	WO8	GSAs and MAs must develop clear and understandable policies and conditions that protect existing groundwater banking and banked inventory and allow them to continue operating as they have been under their existing rules and regulations without interference. They must also incentivize additional investment, such as on-farm recharge by providing pumping credits and allow flexibility for recharged or banked water to be freely transferrable subject to the rights and conditions of use associated with the source water and the avoidance of undesirable results. They should develop incentives for public or private investment to expand recharge and banking capacity, as these facilities help to achieve multiple benefits (e.g., habitat, water quality, drinking water, etc.).	Same as Hancock HF2 Agree and will continue to consider through implementation of projects and management action.
Wonderful Orchards	WO9	GSAs should develop a coordinated basin-wide data management system ("DMS") that is capable of tracking groundwater and surface water use at the landowner, field, or parcel level, and a coordinated methodology for measuring landowner-level use of groundwater. The DMS should also include, or be capable of interfacing with, a groundwater market platform that allows for individual users to conduct transactions.	Same as Westchester W5 1) Agree - however the level of detail (district vs landowner) many vary and will need to be discussed further. 2) Market interface will be considered as markets develop. Should not be limited to just groundwater.
Wonderful Orchards	WO10	GSAs using remote sensing to calculate crop evapotranspiration ("ET") as a measurement of consumptive use of groundwater should develop methodologies and quality assurance elements to allow for grower provided information to be included into the ET calculation and calibration. Additionally, GSAs should establish criteria and procedures to address any apparent inaccuracies in the ET calculations (e.g., if calculated ET is greater than applied water and precipitation).	Agree - all data needs to be verifiable and defensible at the District and landowner level.
Major Dhillon	MD1	The SGMA draft report(hereinafter as "Report") completely favors the farmers who are getting State water or contracting for surface water. They have access to surface and as well as to the well water, whereas land owners who have no access to surface water are at big disadvantage especially with the new allocation that Semitropic is using	See Section 5.2.3 for clarification. Additonal clarification to be provided in additional information developed through implementation of the Landowner Water Budget Management Action in early 2020.
Major Dhillon	MD2	The Semitropic water Storage District(hereinafter as "District") did not give any opportunity to land owners if they wish to participate in a program called "Developed land" where a landowner can also pay the water assessment of $137 + per acre. We the land owners who were not provided the opportunity to participate in the Developed land definition MUST BE PROVIDED AN OPPORTUNITY TO PARTICIPATE IF THEY WISH	Disagree - See Prop 218 for New Lands Surcharge
Major Dhillon	MD3	The District has given no consideration to properties which are enrolled in Williamson Act.	Under California law, lands enrolled in the Williamson Act are not exempt from the requirements of SGMA.
Maricopa Orchards	MO1	**Section 2.7.2** 1) Can properties not currently in the in-lieu program enroll? 2) What if growers pay for infrastructure to be part of the program? 3) I don't understand the terminology in the section labeled "Construct additional irrigation distribution systems". What does absorptive capacity and related priorities mean? 4) Water in storage by banking partners may help the groundwater levels generally but any of it can be called upon so should this be recognized? 5) How will the landowner pumping agreement be affected by SGMA? 6) Where is the surface water storage capacity located? 7) On Third Party Banking, how will SGMA affect the in-lieu banking program?	1) yes 2) will be considered 3) one on one discussion for clarification 4) Banked water is not water supply of the District, with the exception of the 10% leave behind. 5) no impact to a landowners Groundwater Pumping Agreement is expected relative to recovery of banked water via the agreement on behalf of the district for bankers. There could be an impact with respect to a landowners ability to wheel water due to compliance with the SGMA Sustainability Indicators 6) Temp storage at Goose Lake under agreement with Goose Lake Holding Co. and surcharge spresding facilities at Scofield. 7) Do not foresee an impact relatative to an existing bankers first priority recharge rights.

Commentor	Ref #	Comment	Response
Maricopa Orchards	MO2	**Section 3.3.1.1** Does this mean that upper zone pumping is unlimited for now and will just be monitored? How does this effect the Agua Via/WAP projects? There needs to be clear contract language re the assumption of risk for the service providers.	No - This is a data gap. MT and MO for the upper aquifer will be developed in the future
Maricopa Orchards	MO3	**Section 3.3.2 and 3.3.3** Seem not to address the issues for MOs/MTs -for example, doesn't SWSD need to monitor subsidence and, if below a specified level, then would require a management action?	The KGA and the District have identified the understanding of subsidence as a data gap and have committed to maintaing existing monitoring sites and establishing additonal sites to better understand the specific causes of subsidence in the subbasin. With this information we will establish MO & MT in the District.
Maricopa Orchards	MO4	**General, Water Budget** Allow Growers to determine their order of use. However, with the knowledge that you cannot roll over native yield. Allow Growers to decide if they want to manage their allocation year to year or if they want to opt into the average -How can SWSD guarantee the then current average SWP? Isn't that taking water from the basin to incrementally benefit SWP contract holders? What if contract holders want to bank their surplus water on their own account (either through the SWRU or via the new recharge program?) (Section 5.2.3.2) When will landowners be expected to start using the water budget? 2020 or 2021?	Good input - will consider when developing Landowner Water Budgets
Maricopa Orchards	MO5	**General** The GSP punts to a later 5-year update in many instances. This could be a red flag for DWR. Banking partners should be able to use or sell their banked water in SWSD to growers who have deficits without having to recover from SWSD wells. Query whether there should be a discount to the recovery charge per AF?	Noted
Maricopa Orchards	MO6	**General, Subsidence at the Aqueduct** Additional monitoring should be completed due to subsidence may not be directly linked to Semitropic.	Agree
Maricopa Orchards	MO7	**General, Expiration of Credits on Recharge** Semitropic should not have expiration dates or increasing leave behind factors on water stored via recharge or credit carryover. It will encourage pumping in an effort not to lose stored water.	Good input - will consider when developing Landowner Water Budgets
Maricopa Orchards	MO8	**5.2.3.2, Incremental Pumping Allowance** 1) We are pleased with this glide path approach. This gives growers the opportunity to plan and reach sustainability by 2040. 2) What if the IPA results in undesirable results? 3)Doesn't a larger IPA for non-contract growers reward those that have been benefitting from the overdraft?	1) Comment noted. 2) If IPA results in undesirable results it will require adaptive management. 3) Potentially in the short term, but IPA is reduced to zero by 2040.

Commentor	Ref #	Comment	Response
Maricopa Orchards	MO9	**Chapter 5** 1) Potentially add ASR as a project that growers/district can use as a tool for recharge. 2) Why is brackish water desalination limited to only 1,800 AF? 3) For Poso Creek MAR, would SWSD allow growers to take flood water and recharge in their own facilities? 4) For SWRU, what type of storage is referenced? 5) Will the pilot program for private recharge continue?	1) Considered as enhanced recharged 2) place holder for proposed project 3) Potentially 4) Primarily in-leu groundwater storage 5) likely yes
Maricopa Orchards	MO10	**Table 5-1** Various spelling errors.	Noted
Maricopa Orchards	MO11	**General, Landowner Classifications** Let landowners that have parcels that are paying a portion of the GPSC to opt in to pay the entirety.	Not at this time
Maricopa Orchards	MO12	**General, Water Markets** Allow basin-wide market and do coordination agreement with neighboring districts (regional).	Will be considered in the future as water market develop within and between districts in the Subbasin. Consideration will need to be given to location of groundwater extractions to avoid concentration of withdrawal and the potential for undesirable results
Maricopa Orchards	MO13	**Kings River Water/ State Water Project** 1) Has any assumption been made regarding there being less Kings River flood water? 2) Has any assumption been made regarding there being less SWP due to projections of long-term allocations being lowered given climate change and expected biological opinion limitations?	1) Planning level estimate. Project yield would reduce obligation to retire lands within the District (MA 3) 2) Currently using DWR provided delivery estimates for 2030 and 2070
Audobon	A1	The proposed consumptive use allocation for duck clubs will result in severe near-term and long-term declines in wetlands in the Semitropic GSA.	Currently, not enough data to make this determination. Additional analysis on consumptive use (ET) and fate of pumped groundwater is required.
Audobon	A2	The evapotranspiration (ET) of flooded wetlands and native uplands is currently poorly understood by Semitropic GSA and should be identified as a data gap. The Incremental Pumping Allowance for wetlands should be set to give an initial ET allocation of 4.2 acre-feet per acre, on par with other irrigated lands, while the ET data gap is addressed in the first five years of the GSP implementation.	Will Modify initial IPA for wetlands to allow up to 4.2AF/Ac of consumptive use Address ET data gap in ongoing ET refinement efforts as an MA
Audobon	A3	Recharge from imported surface water to Kern National Wildlife Refuge should be reflected in proposed water budgets for managed habitat. State and federal lands should be allocated native supply and Semitropic GSA should work with federal and state agencies to develop an appropriate trading system to support habitat *(accounting for recharge from Refuge water supplies)*	Clarification / refinements to the Landowner Water Budget Management Action will be considered as part of the process of approving the same for implementation.
Audobon	A4	P. i: Executive Summary, paragraph 2. The beneficial users of water in the Tulare Lake Region are described as “agricultural; municipal and domestic; industrial; and environmental.” In the proceeding sentence the environmental users are not included as being supported by groundwater. However groundwater in this region supports managed wetlands that are important migratory bird habitat, provide recreational opportunities, and contribute to the economic viability of local communities.	Agree to change the identified sentence to include managed wetlands
Audobon	A5	P 4. 1.4.1 Plan Area Setting. It is unclear if the “146,000 acres of irrigated lands” includes managed habitat and wetlands. Please clarify if managed wetlands, i.e. ‘duck clubs’, are included as irrigated lands	Comment noted - numbers ajusted in text
Audobon	A6	Additionally, clarification on how riparian versus native vegetation was classified is absent and would be helpful to understand why the “native vegetation” directly surrounding the Kern River Channel is not “riparian vegetation	Will provide clarification based on sources. I believe this data came from DWR and its their classification system.

Commentor	Ref #	Comment	Response
Audobon	A7	In Figure 1-2 approximately 1/3 of the area is identified as riparian and native vegetation. This should be noted in the description of land use in this section because of its significance.	Change made to the text to say "Land use within SWSD consists mainly of agricultural production and environmental land uses, as shown in Figure 1-2."
Audobon	A8	1-3 does not show any of the native and riparian vegetation areas from Figure 1-2, many of which are known to be GDEs, as identified by the DWR's Natural Communities Commonly Associated with Groundwater dataset (https://gis.water.ca.gov/app/NCDatasetViewer/) and the Nature Conservancy's GDE Pulse tool (https://gde.codefornature.org/#/home).	Figures have been update to properly reflect areas of the District that are groundwter dependent. No requirement to overlay habitats on that map.
Audobon	A9	P 8. L. Impacts on Groundwater Dependent Ecosystems. Within SWSD there are significant and important habitat areas supported by supplemental water and these managed wetlands heavily rely on pumped groundwater or applied surface water.	Our statement currently is: "There is the potential for Groundwater Dependent Ecosystems (GDE) in the western portion of the District and along Poso Creek. However, the presence of GDE's has not been verified. Section 2.3 of this GSP provides an overview of the available information regarding GDEs in the District. " GDEs are not the same as managed wetlands.
Audobon	A10	P 9. 1.5.2 Beneficial Uses and Users. DWR Bulletin 118 identifies beneficial uses and users that include the environment. Under the list for "Users of groundwater", "landowners" should include managed habitat and duck clubs, especially since "duck clubs" are identified under section 5.2.3.1 as a unique "Landowner Class" and an example water budget was created for duck clubs in see Figure 5.3.	The change has been made to the text: As required by Section 354.10(a) of the GSP emergency regulations, beneficial use and users in the District's portion of the Subbasin have been identified. The beneficial uses of groundwater in the Plan Area, consistent with the uses identified in DWR Bulletin 118, are: •Agricultural •Municipal and Industrial •Domestic •Environmental Users of groundwater have been identified as landowners, agricultural operations (including farms, dairies, and food processors), rural residents, managed wetlands and unincorporated
Audobon	A11	P 45. 2.2.7.2 Direct Recharge. It should be noted that percolation not only occurs from "applied water that passes below the crop roots zones, and unlined canals," but may also occur on managed wetlands within the SWSD service area. Managing wetlands to be multiple benefit may provide an opportunity to increase acreage of managed recharge in this region. Direct recharge on managed wetlands should be treated consistent with direct recharge on irrigated agricultural lands.	Noted change was made to the text.
Audobon	A12	P 46. 2.2.9 Sources and Point Delivery for Imported Water Supplies. It should be noted that the Kern National Wildlife Refuge receives water from the State Water Project through agreements with the Bureau of Reclamation, the State, and via conveyance agreements with Buena Vista Water Storage District. As pointed out in 2.2.8 Surface Water Bodies, the Kern National Wildlife Refuge relies on these deliveries of surface water, though these water supplies are becoming less reliable. These surface deliveries have benefited the SWSD management area by providing the use of surface water in-lieu of local groundwater resources, and creating a source for groundwater recharge from the delivered surface water.	Acknowledge that this supply was not accounted for, but neither was the demand or conveyance losses for delivery of Refuge water.

Commentor	Ref #	Comment	Response
Audobon	A13	P 58. Table 2-4. Land Uses Within SWSD. Duck clubs and overall managed habitat should be a separate land use in this table. It is not clear where the acres for Kern National Wildlife Refuge or the various private duck clubs are represented in this table. This land use, managed habitat, has an applied water demand similar to agriculture and should be included in current and projected water budgets.	Table was removed from text. Numbers inconsistent with other figures **Land Use / Acres / Percentage (%)** Agriculture 146,000 65.21 Industrial 685 0.31 Commercial 461 0.21 Riparian 20,109 8.98 Native Vegetation 53,624 23.95 Urban Landscape 48 0.02 Residential 129 0.06 Vacant 817 0.36 Surface Water 2,009 0.90 Total 223,885 100
Audobon	A14	P 77. 2.3.7 Interconnected Surface Water Systems. In this section it states that "In order to sustain the managed wetlands in the study area, imported surface water is needed," suggesting that these habitats rely solely on surface water. This is correct for some managed wetlands, such as those found at Kern National Wildlife Refuge. Most private wetlands, operated as duck hunting clubs, pump groundwater to support managed habitat and may access surface water at times. Furthermore, in the proceeding section, 2.3.8 Potential Groundwater Dependent Ecosystems, it describes areas with GDEs being associated with "managed wetlands and riparian areas" that are supported by a "combination of groundwater and imported surface water." These two sections contradict one another and consistency is needed.	Text as been changed as follows: Interconnected surface water systems are surface waters that are hydraulically connected by a continuous saturated zone to an underlying aquifer (DWR, 2016). There are no known natural interconnected surface water systems in the study area. ~~The majority of surface water bodies in the study area, such as Jerry Slough, Kern River Channel, receive managed surface water deliveries. In order to sustain the managed wetlands in the Semitropic area, imported surface water or pumped groundwater is used. For example, the Kern National Wildlife Refuge (KNWR) is now sustained by imported surface water wheeled from the California Aqueduct and conveyed by the Goose Lake Canal (USFS, 2005) or from groundwater pumping at the site. Any interconnected surface water systems in the Semitropic area are sustained by managed water deliveries of either Kern River water, imported surface water or local groundwater pumping.~~ The Poso Creek channel is the only channel that experiences natural recharge from the surrounding highlands. However, Poso Creek is ephemeral and only flows during limited wet periods.
Audobon	A15	P 82. Land Use Data. Though Kern National Wildlife Refuge relies solely on surface water, most managed wetlands in SWSD depend solely on groundwater. Some private wetlands do purchase surface water in select years. This distinction should be highlighted in this section.	The section reads as follows. Yellow highlight is suggested addition Land use data surrounding NCCAG vegetation and wetlands indicate actively managed wetlands as well as agricultural land. The agricultural lands may employ groundwater pumping in dry years; however, it is unknown if pumping occurs in the upper zone. In general, the actively managed wetlands are reliant on a combination of surface water imports and ~~are therefore not dependent solely on~~ pumped groundwater. For example, the KNWR (Figures 2-48 and 2-49), is sustained by surface water imports.
Audobon	A16	P 82-83. 2.3.8.6 Shallow Groundwater and Land Use Discussion (third paragraph). The identification of sources that contribute to shallow groundwater should be identified. This information will be important to understanding how to maintain critical habitat areas and should be prioritized for monitoring efforts.	We state that "It is unknown if or from which aquifer zone groundwater pumping occurs for adjacent agricultural land."

Commentor	Ref #	Comment	Response
Audobon	A17	P 93-94. 2.6 Management Areas within SWSD. Duck clubs and the Kern National Wildlife Refuge actively apply water to meet consumptive use needs so therefore should not be considered "undeveloped." These lands should be recognized as developed lands within their respective management areas.	Change to: "Management area 3 includes managed wetlands (private duck clubs), the Kern National Wildlife Refuge, undeveloped native lands." Not sure I see a reason to change the statement.
Audobon	A18	P 97. Increased Direct Recharge Capability. Managed wetlands, including Kern National Wildlife Refuge and duck clubs, can potentially provide a unique opportunity for in-lieu recharge while providing waterbird habitat. It is recommended that this be further evaluated for increasing recharge capacity within the service area.	Noted for future consideration
Audobon	A19	P 98. Implemented Third-Party Water Banking. The imported water for the Kern National Wildlife Refuge could be treated similarly to other lands in this section - as a source of continuous surface delivery in-lieu of groundwater use, and a source of recharge with delivery of the surface water through Goose Lake canal.	The refuge is not currently a third party banker. Not appropriate
Audobon	A20	P 154. Table 4-1. Potential Impacts of Overdraft with Corresponding Monitoring. There should be a unique row for managed habitats, as they will have the same impacts as "Irrigated Agriculture." Managed habitats pump groundwater (and when available rely on SWSD surface water) to meet irrigation and habitat needs.	Table 4-1 - In the User Group identification add: Irrigated Agriculture (including managed habitats)
Audobon	A21	P 156. 4.2.2.6 Consumptive Use. We understand that the District is not confident in the consumptive use estimates for managed habitat areas and would like to work together to improve this data set.	Noted - will include a management action for refinement of ET on managed wetlands
Audobon	A22	P 157. 4.3.3 Rationale for Design (paragraph after bullet points). To improve the understanding of how groundwater pumping can impact managed habitat, monitoring well locations may be available within duck clubs or state and federally managed habitats.	Will consider in future updates to monitoring network. No response in document suggested.
Audobon	A23	P 180. Table 5.1. Rows 4 & 7. As specific projects become further developed, managed habitat areas may offer ideal opportunities for recharge or temporary storage of water during high flow events. Projects that utilize habitat lands may lessen negative impacts to cultivated lands from flooding or intentional recharge. We recommend that the GSA investigate opportunities that can allow habitat areas to function both for habitat and to provide recharge or temporary storage. Additionally, knowing that water for recharge likely comes in large quantities over short timeframes, the existing configurations of managed habitat areas can make for useful retention areas, without risking the flooding on irrigated crops such as trees and vines. Expanding priorities that have added benefit, such as habitat and wildlife value, can also lead to non-target benefits (e.g. water filtration or recreation opportunities) and be accomplished through simple actions. This may open the door to additional funding sources that otherwise would not have been available if these benefits were not part of a project. Audubon is interested in helping the GSA investigate these potential opportunities to develop multi-benefit projects.	This concept is captured in the Tulare Lake project and the Poso Creek MAR project. Comment will be considered as projects are developed. No change to text or table as suggested.
Audobon	A24	P 185. 5.2.1 Existing Projects and Management Actions (second bullet point). How will managed habitat lands fit into this program and fee structure given the uncertainties of managed habitat consumptive use? (See above comment related to consumptive use). Clarification here is recommended.	To be determined. We are awaiting additional data from Audubon re consumptive use.

Commentor	Ref #	Comment	Response
Audobon	A25	P 186-187. 5.2.2 Future Projects and Management Actions (bullet #6 and 8). For the management action that "will be developed in a manner which allows for the creation of a 'market' for the transfer of water among District landowners," will this be limited to transfer of Native Yield, or will it also include Incremental Pumping Allowances? Also, please clarify which water supplies this market is intended for. Additionally, what does the management action "equal access to participate proportionate to investment" mean? Managed habitats are a significant benefit to the public resource, are managed to provide critical habitat to migratory birds and other wildlife, and create recreational and economic benefits (i.e. hunting and wildlife viewing) to the community. Please clarify what is the "access" level that may vary by investment?	Water markets will be considered as future management actions.
Audobon	A26	P 189. Incremental Pumping Allowance (IPA). This section states, "The IPA will be established by the District and set such that on average no individual landowner will be short of a water supply at the initiation of the SGMA implementation period." The current estimate of Incremental Pumping Allowance for "duck clubs" is likely insufficient and will make duck clubs "short" at the initiation of the SGMA implementation period. This needs to be addressed to ensure that the duck clubs can continue to provide critical habitat to migratory birds and other wildlife during the transition period of GSP implementation.	Changing IPA to Temprorary Consumptive Use Allowance (TCA)
Audobon	A27	P 192. Special GPSC (Duck Clubs). Details and clarification of how consumptive use amounts were determined for managed habitat is needed. Has the District obtained any data from duck club operators regarding water use per acre? The Incremental Pumping Allowance should be increased to meet the consumptive use needs, similar to the standard GPSC designated lands. Furthermore, for Kern National Wildlife Refuge, the 'banked supplies' should recognize the seepage losses in the Goose Lake Canal that occur from the imported surface water, that is not imported by the SWSD. This is an independent source of surface water imported by the U.S. Bureau of Reclamation and conveyed per agreements with Buena Vista Water Storage District to lands that include a significant portion of Kern National Wildlife Refuge lands within the District. Audubon is interested in working with SWSD to improve information on habitat consumptive use in the management area.	Currently under review.
Dept of Fish and Wildlife	DFW1	The Department recommends continued data collection to reduce uncertainty around shallow groundwater, and concurrently, around the presence of GDEs. Until such time as a GOE can be verified through field work or increased resolution of groundwater mapping reliant on hydrologically robust baselines, the Department recommends including all potential GDEs in the MAP as beneficial users of groundwater	Will include a management action for identification and assesement of GDE and managed habitat water uses and needs. We do identify this as a data gap.
Dept of Fish and Wildlife	DFW2	i. Revise the sustainable management criteria and accompanying narrative by accounting for undesirable results for environmental beneficial users of groundwater. Clarify how species and habitat groundwater needs were considered in the identification of sustainable management criteria. ii. Revise sustainable management criteria to reflect a 'Critically Overdrafted' subbasin designation by seeking to improve current groundwater conditions rather than allowing for continued aquifer depletions over the next two decades.	i) no distinction on landowner use of water ii) NO - Sustainable management critieria developed using concensus position as to what constitutes a significant and undesireable result or worse case scenario (not best case)
Dept of Fish and Wildlife	DFW3	The Department recommends that the GSP clarify locations of existing shallow groundwater monitoring wells used to create the shallow groundwater elevation contour map provided within the MAP (Figure 2-27). Additionally, the figure should show overlap potential GDEs with shallow monitoring well locations to vet vegetation groundwater reliance. This figure and associated information would clarify monitoring data gaps and serve as an assessment tool when verifying GDEs.	The District has added a management action to evaluate the presense of GDEs, in order to determine the appropriate level of monitoring required.

Commentor	Ref #	Comment	Response
Dept of Fish and Wildlife	DFW4	Many of the Duck Clubs in the MAP area are currently supported by the Department'sCalifornia Waterfowl Habitat Program to ensure the adequate maintenance of habitat critical to wetland-dependent species. Implementation of pumping allowances identified in Figure 5-3 would eliminate all wildlife value associated with these wetlands. To continue to share in the support of this valuable public benefit, the Department recommends that the Semitropic Water Storage District Groundwater Sustainability Agency create additional pumping allowances and/or supplemental water supply opportunities for lands that support wetland habitat. The Department also requests confirmation that all Department-owned lands within Semitropic Water Storage District jurisdiction (see Comment #1) will be granted an equitable native groundwater yield allocation under new Landowner Water Budget management actions (starting page 187).	Semitropic will support the Department in securing additional diversions from the Delta for environmental benefits in Semitropic, with no impacts to Semtropic's SWP allocations. All allocations of native groundwater yield will be undertaken in accordance with SGMA, including but not limited to the requirement that water rights not be altered.
Bob Bostick Duck Club	BB1	I support Rancho Visalia's proposal to allow private wetland owners in the Special GPSC to extract 3.5 ac/ft/yr for the acres of land paying the Special GPSC. This would amount to approximately 10,000 ac/ft for the all of the private wetlands in the district and only 0.08 percent of the targeted reduction in groundwater pumping required by SGMA.	The Special GPSC lands have been give a TCA of 4.2 ac-ft per acre.
Bob Bostick Duck Club	BB2	In cooperation with NGOs like CWA and DU, WCB, CA DFW, US Fish and Wildlife, and TBWA develop a written plan and agree to execute the plan to connect all private wetlands to the Pintail Slough water delivery system.	Noted - will be considerd in development of future projects and management actions
Bob Bostick Duck Club	BB3	Agree to support efforts by the private wetland owners to obtain Environmental water to be used only by the wetlands.	Noted - will be considerd in development of future projects and management actions
Clean Water Action	CWA1	Disadvantaged communities are present in the District but are not identified. An ongoing study "Tulare Kern Funding Area Disadvantaged Community Involvement Program" is mentioned but not referenced, nor is there a description of what information is being developed and how it would be used in this plan, particularly since the information won't be available until after the plan is prepared. Instead the plan should use the DWR DAC mapping tool at https://gis.water.ca.gov/app/dacs/ , and identify the program listed above as a refinement of that information that can be used to improve implementation	Noted
Clean Water Action	CWA2	The CA MCLs are cited, however the OEHHA PHG for hexavalent chromium should be used since a standard is unavailable. No other criteria from the RWQCB Plan or Transportation Plan appear to be used.	Noted
Clean Water Action	CWA3	The beneficial uses, including environmental, are listed but no specific groups are mentioned. Kern National Wildlife Refuge (NWR) and Duck Clubs (i.e. private managed wetlands) are identified later in the document, but should be specifically listed as beneficial users of groundwater as Kern NWR uses groundwater for domestic purposes and Duck Clubs use groundwater to provision habitat. There is no mention of involvement in the GSP development by Kern NWR or the Duck Clubs, which is especially important given that this GSP contains one of the largest extents of these environmental beneficial users of all the critical basin GSPs. The Community Portal on the District Website was listed in the GSP as a means of engaging in the development of the GSP, but a more thorough description should be given of actions to engage environmental beneficial users.	Representative from the Kern NWR and private Duck Clubs were notified of all outreach and stakeholder opportunities. Representatives were present at public workshops held by the District and a GSA Board meetings. Comments were received and responded.

Commentor	Ref #	Comment	Response
Clean Water Action	CWA4	The types and locations of environmental uses, species and habitats supported, and the designated beneficial environmental uses and users of surface waters that may be affected by groundwater extraction in the Subbasin should be specified. The GSP should explicitly identify any environmental uses and users of groundwater in the plan area, and take particular note of the species with protected status. The following are resources that can be used: ● Natural Communities Commonly Associated with Groundwater dataset (NC Dataset): https://gis.water.ca.gov/app/NCDatasetViewer/ ● The list of freshwater species located in the Kern County Subbasin can be found here: https://groundwaterresourcehub.org/sgma-tools/environmental-surface-water-beneficiaries/ ● The California Department of Fish and Wildlife's California Natural Diversity Database (CNDDB): https://www.wildlife.ca.gov/Data/CNDDB ● Land Use Datasets on the Department of Water Resources' SGMA Data Viewer: https://sgma.water.ca.gov/webgis/?appid=SGMADataViewer	Noted - will consider in proposed management action to evaluate the presense of GDEs
Clean Water Action	CWA5	The GSP does not include a copy of the SCEP. An SCEP should be included in the GSP as an appendix or attachment.	The District has engaged in stakeholder engagement through out the development of the GSP, as documented in the GSP.
Clean Water Action	CWA6	The GSP should clearly identify how DAC beneficial users were engaged in the GSP planning process, by providing detailed information on the number of meetings held, general levels of attendance, what feedback was provided by community members, etc.	GSP identifies all public meetings. District will include attendance sheets from all meeting in Plan updates.
Clean Water Action	CWA7	The draft GSP states that stakeholders' input was considered during decision making processes, however, it does not describe how the input was incorporated. The GSP should provide detailed description about stakeholder input and responses and how are those were addressed by the decisions.	Noted - comments from all stakeholders where considered during the development process.
Clean Water Action	CWA8	Detailed information regarding the location and depths of domestic wells is currently lacking in the GSP. Domestic well location and construction information are essential for evaluating impacts of proposed MOs/MTs on domestic wells. The GSP should provide the locations and depths of all domestic and public supply wells in the GSA area using the best available information, and present this information on maps along with the proposed SGMA-compliance monitoring network so that the public can evaluate how well the monitoring network addresses these key beneficial users. If no better source is available, DWR has made well construction records available through its Well Completion Report Map application website: https://www.arcgis.com/apps/webappviewer/index.html?id=181078580a214c0986e2da28f8623b37	Noted - will consider adding additonal detail on well impact analysis.
Clean Water Action	CWA9	The GSP should provide a more thorough assessment of GDEs, per the discussion provided in Question 2a above. The GSP should provide depth to groundwater contour maps and note the following best practices for doing so: ● Are the wells used for interpolating depth to groundwater sufficiently close (<5km) to NC Dataset polygons to reflect local conditions relevant to ecosystems? ● Are the wells used for interpolating depth to groundwater screened within the surficial unconfined aquifer and capable of measuring the true water table? ● Is depth to groundwater contoured using groundwater elevations at monitoring wells to get groundwater elevation contours across the landscape? This layer can then be subtracted from land surface elevations from a Digital Elevation Model (DEM) to estimate depth-to-groundwater contours across the landscape. This will provide much more accurate contours of depth to groundwater along streams and other land surface depressions where GDEs are commonly found. Depth to groundwater contours developed from depth to groundwater measurements at wells assumes that the land surface is constant, which is a poor assumption to make. It is better to assume that water surface elevations are constant in between wells, and then calculate depth to groundwater using a DEM of the land surface to contour depth to groundwater.	Noted - District is proposing a management action to evaluate the presense of GDEs and appropropriate monitoring requirements, if needed.
Clean Water Action	CWA10	The GSP should also provide maps of the representative monitoring network overlaid with location of DACs, GDEs, and any other sensitive beneficial users. Such maps will allow the reader to evaluate the adequacy of the network to monitor conditions near these beneficial users, and whether or not the GSP is compliant with 23 CCR § 354.34.(b)(2)	Noted

Commentor	Ref #	Comment	Response
Clean Water Action	CWA11	The GSP should include a discussion regarding the nature and characteristics of the identified GDEs and potential GDEs, and should provide information on the current and historical groundwater conditions near the GDEs and corresponding GDE ecological conditions. The GSP should include an ecological inventory for all potential GDEs that includes vegetation or habitat types and rank the GDEs as having a high, moderate or low value.	Information is provided in the GSP
Clean Water Action	CWA12	The GSP should identify whether any endangered or threatened freshwater species of animals and plants, or areas with critical habitat have been identified in or near any of theGDEs. Note that some organisms rely on uplands and wetlands during different stages of their lifecycle. Resources for this include the list of freshwater species located in the Subbasin that can be found at https://groundwaterresourcehub.org/sgma-tools/environmental-surface-water-beneficiaries/ , the Critical Species Lookbook, and CDFW's CNDDB database.	Noted - District is proposing a management action to evaluate the presense of GDEs and appropropriate monitoring requirements, if needed.
Clean Water Action	CWA13	The GSP should provide data or analysis to document the statement of the absence of interconnected surface water systems within the GSA area. The GSP should also identify data gaps (e.g., lack of shallow or nested/clustered monitoring wells or stream gauges) and either reconcile them or provide a plan to address them as needed to improve identification of ISWs prior to disregarding them in the GSP.	Groundwater elevation data is presented in the GSP
Clean Water Action	CWA14	The GSP uses a superficial manner of addressing water budgets. Water supplies for the current water budget are presented and the water demand is compared as a total. The available water supply from the State Water Project (SWP) is based on DWR's 2017 Delivery Capacity Report. The quantities related to the SWP are adjusted for 2030.	Noted
Clean Water Action	CWA15	The water demand based on land uses and cropping was not adjusted for 2030. The GSP deferred to the analysis in the KGA Umbrella GSP for 2070 and no summary is provided.	
Clean Water Action	CWA16	The GSP should provide a breakdown of ET for all land-cover types, including managed wetlands, and native and riparian vegetation (such as wetlands, riparian vegetation, phreatophytes and other communities). The GSP should identify any data gaps and outline the actions needed to address them and the schedule for their implementation.	Noted - District is proposing a management action to evaluate the presense of GDEs and appropropriate monitoring requirements, if needed.
Clean Water Action	CWA17	The GSP should design management areas and the associated monitoring network to adequately assess and protect against impacts to all beneficial users, including DACs. It is recommended that the GSP discuss what, if any, differential impacts would be anticipated as a result of the separate management of these areas.	Noted
Clean Water Action	CWA18	The GSP should describe the well network to provide methodologies, data and other information to support the investigation and monitoring of the shallow zone, GDEs and ISWs. This modification should include 1) locating new wells that are appropriately screened to detect connectivity of GDEs and ISWs with the shallow zone, particularly in the northwest management area, and 2) identifying or installing stream gages, if possible, in areas where there is potential for ISWs and GDEs. Please expand on the discussion of how the new well and stream data will be used to improve ISW mapping and inform an adequate analysis, and how the data will be used to verify possible GDEs. The GSP should address data gaps (shallow monitoring wells, stream gages, and nested/clustered wells) to improve ISW mapping in future GSPs.	Noted - District is proposing a management action to evaluate the presense of GDEs and appropropriate monitoring requirements, if needed.
Clean Water Action	CWA19	Based on the presented information, domestic well uses are considered under URs and for the development of water level MOs and MTs, but DAC members are not explicitly considered. More detail and specifics regarding DAC members, including those that rely on smaller community drinking water systems, not only domestic wells, is necessary to demonstrate that these beneficial users were adequately considered.	The District has engaged in stakeholder engagement through out the development of the GSP, as documented in the GSP.
Clean Water Action	CWA20	The information about impacts on domestic wells presented in Appendix D is presented as an average depth. The draft GSP should include more detailed information about the potential impacts on sensitive drinking water users, such as 1) where the likely impacted wells are located, 2) what communities are most affected (including DACs), 3) an estimate of the size of the population that relies on these domestic wells, or 4) if the creation of a new or expanded community water system could address some or all of the population affected by the loss of domestic wells.	Noted
Clean Water Action	CWA21	Undesirable results are not clearly identified in the plan. Instead an "undesirable results watch area" is created when 51% of identified representative monitoring sites exceed minimum threshold criteria and when multiple such watch areas are identified. However, there is no discussion of how many watch areas would trigger undesirable results, or whether those watch areas would be for the same sustainable management criteria or a mix. This seems to be contrary to the DWR definition of a minimum threshold in CCR § 351(t), which identifies a minimum threshold as "a numeric value for each sustainability indicator used to define undesirable results."	See section 3.2.2 of District GSP and KGA GSP

Commentor	Ref #	Comment	Response
Clean Water Action	CWA22	The GSP states (page 158): "A minimum threshold for degraded water quality has not been set because historical data used to evaluate groundwater conditions does not indicate lowered water levels, at least at levels observed to date, resulting in degraded water quality. Regardless, groundwater sampling will continue: monitoring sites and parameters were strategically selected to inform on future degradation." The GSP should present a clear and detailed plan for evaluating and monitoring water quality parameters. Specifically, any plan to recharge groundwater must include groundwater quality monitoring, as recharge even with high quality water can mobilize contaminants.	Noted
Clean Water Action	CWA23	The GSP should include GDEs when developing MOs and MTs and whether the MOs and interim milestones will help achieve the sustainability goal as it pertains to environmental beneficial users. The water quality MOs does not consider the water quality needs of GDEs. The GSP should include impacts from degraded water quality on the plant and wildlife communities within GDEs. The GSP should include all potential MOs and MTs impacts on ISWs and GDEs in the analysis.	Noted - District is proposing a management action to evaluate the presense of GDEs and appropropriate monitoring requirements, if needed.
Clean Water Action	CWA24	The GSP should also discuss any potential undesirable results from degradation of water quality that may impact GDEs and freshwater species in the area.	Noted - District is proposing a management action to evaluate the presense of GDEs and appropropriate monitoring requirements, if needed.
Clean Water Action	CWA25	For each potential GDE unit with supporting hydrological datasets, the GSP should include: ● Plot and provide hydrological datasets for each GDE. ● Define the baseline period in the hydrologic data. ● Classify GDE units as having high, moderate, or low susceptibility to changes in groundwater. ● Explore cause-and-effect relationships between groundwater changes and GDEs.	Noted - District is proposing a management action to evaluate the presense of GDEs and appropropriate monitoring requirements, if needed.
Clean Water Action	CWA26	The GSP should include 1) an assessment of the nature of potential undesirable results to ISWs and GDEs; 2) recognition of the existence of potential ISWs and GDEs, unless adequate data can be provided to dismiss them, 3) a statement that the aquifers will be managed such that there will be no depletion of ISWs that results in a significant and unreasonable impact to GDEs; and 4) recognition of any data gaps and specific steps to verify the presence or absence of ISWs and GDEs with monitoring wells screened at the appropriate depths.	Noted - District is proposing a management action to evaluate the presense of GDEs and appropropriate monitoring requirements, if needed.
Clean Water Action	CWA27	We recommend that the sustainability goal explicitly include drinking water and nature because they are important beneficial uses of groundwater.	Noted
Clean Water Action	CWA28	The likely benefits and impacts to DAC members by the proposed projects and management actions are not clearly identified in the GSP. A discussion should be added for each project or management action to clearly identify the benefits to DAC drinking water users and potential impacts to the water supply. For all potential impacts, the project/management action should include a clear plan to monitor for, prevent, and/or mitigate against such impacts.	Noted
Clean Water Action	CWA29	For the projects already identified, describe and assess how ISWs and GDEs will benefit or be protected, or what other environmental benefits will accrue. If ISWs will not be adequately protected by those listed, include and describe additional management actions and projects targeted for protecting ISWs.	Noted - District is proposing a management action to evaluate the presense of GDEs and appropropriate monitoring requirements, if needed.
Clean Water Action	CWA30	For projects that construct recharge ponds, the GSP should consider identifying if there is habitat value incorporated into the design and how the recharge ponds can be managed as multiple-benefit projects to benefit environmental users. The GSP should include environmental benefits and multiple benefits as criteria for assessing project priorities. For examples of case studies on how to incorporate environmental benefits into groundwater projects, visit TNC's website: https://groundwaterresourcehub.org/case-studies/recharge-case-studies/	Noted
Pat MarchBanks	PM1	In conclusion, I encourage the District to Amend the draft SGMA policy. I request that you be more sensitive and considerate of the future water needs and embrace the value of these important wetlands that are within the District and take proper action to insure their survival.	Noted. Adjusts have been make to the water budget for duck clubs and is reflected in the revised GSP.

Commentor	Ref #	Comment	Response
Valley Water	VW1	Long-term and sustainable management of California's groundwater basins is important, and Valley Water will encourage the Semitropic GSA's to make efforts towards curbing historic overdraft and other undesirable groundwater impacts in its portion of Kern County. In this regard, Valley Water also recognizes that groundwater bank 'leave behind' (i.e., 10-percent of all stored water provided to Semitropic for their use in local groundwater management), provided by Valley Water and the other banking partners, has proven a positive contribution to local groundwater levels. It is important to Valley Water that existing Semitropic Bank terms and conditions are protected as groundwater managers move forward with the requirements of SGMA. Valley Water will continue to monitor GSP development throughout the DWR review process, and will continue to work with Semitropic regarding annual banking operations. Additionally, as the Semitropic GSA moves forward with SGMA requirements and finalizing the GSP document, Valley Water would appreciate insight or notice from Semitropic on how contemplated actions could directly or indirectly impact the Semitropic Bank	Noted

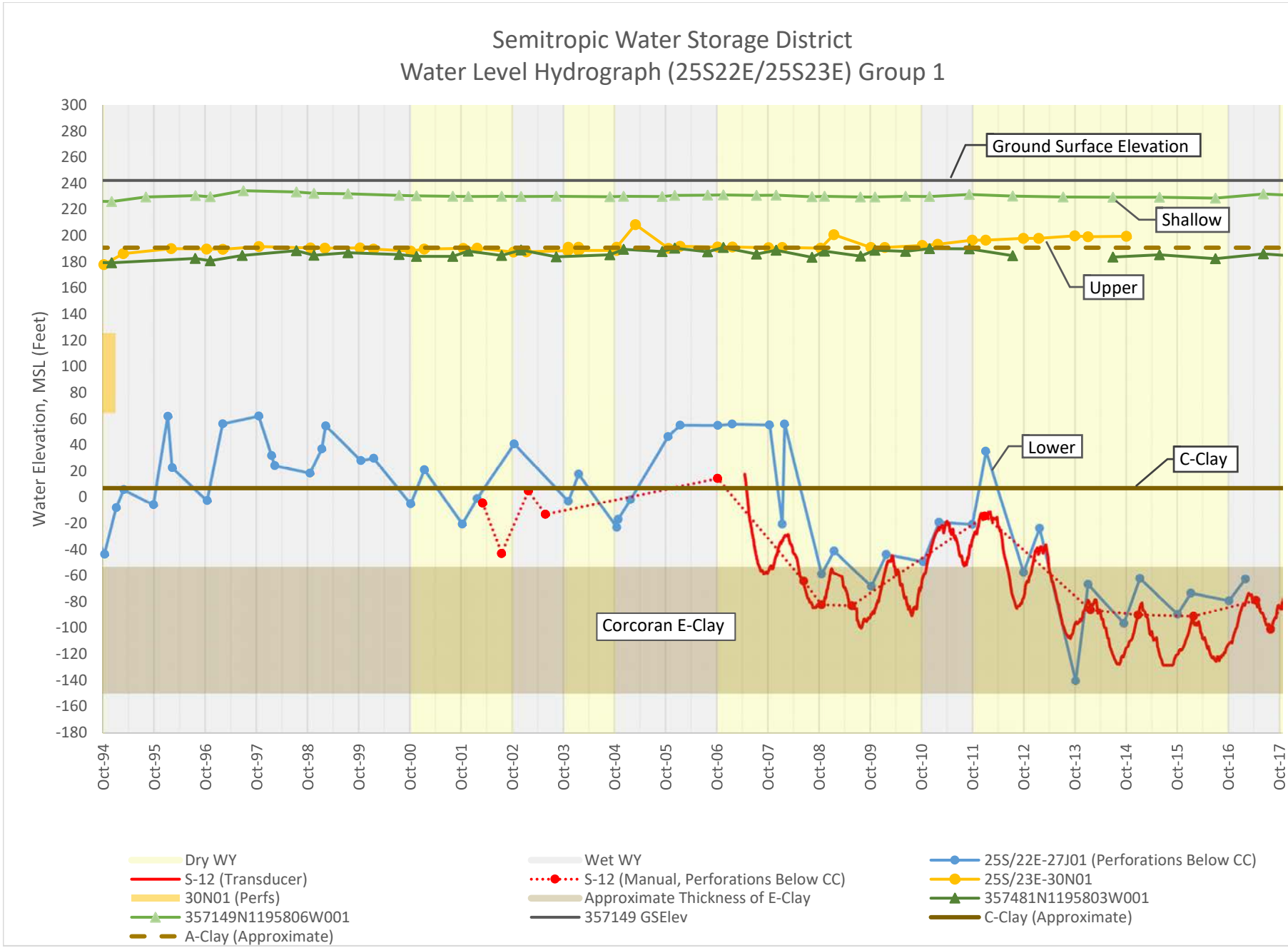
Semitropic Groundwater Sustainability Agency
Final 2020 Groundwater Sustainability Plan

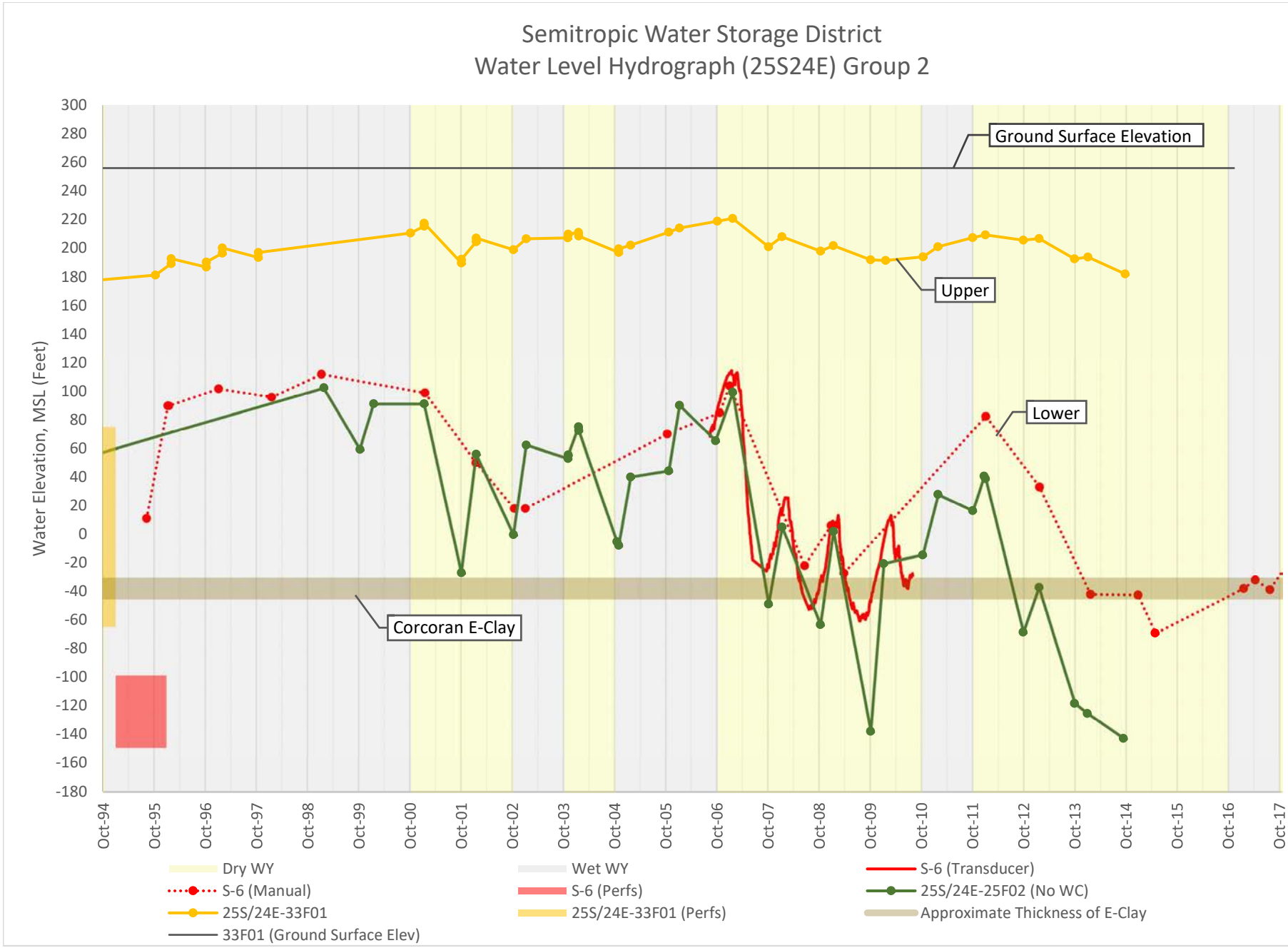
APPENDIX B – HYDROGRAPHS

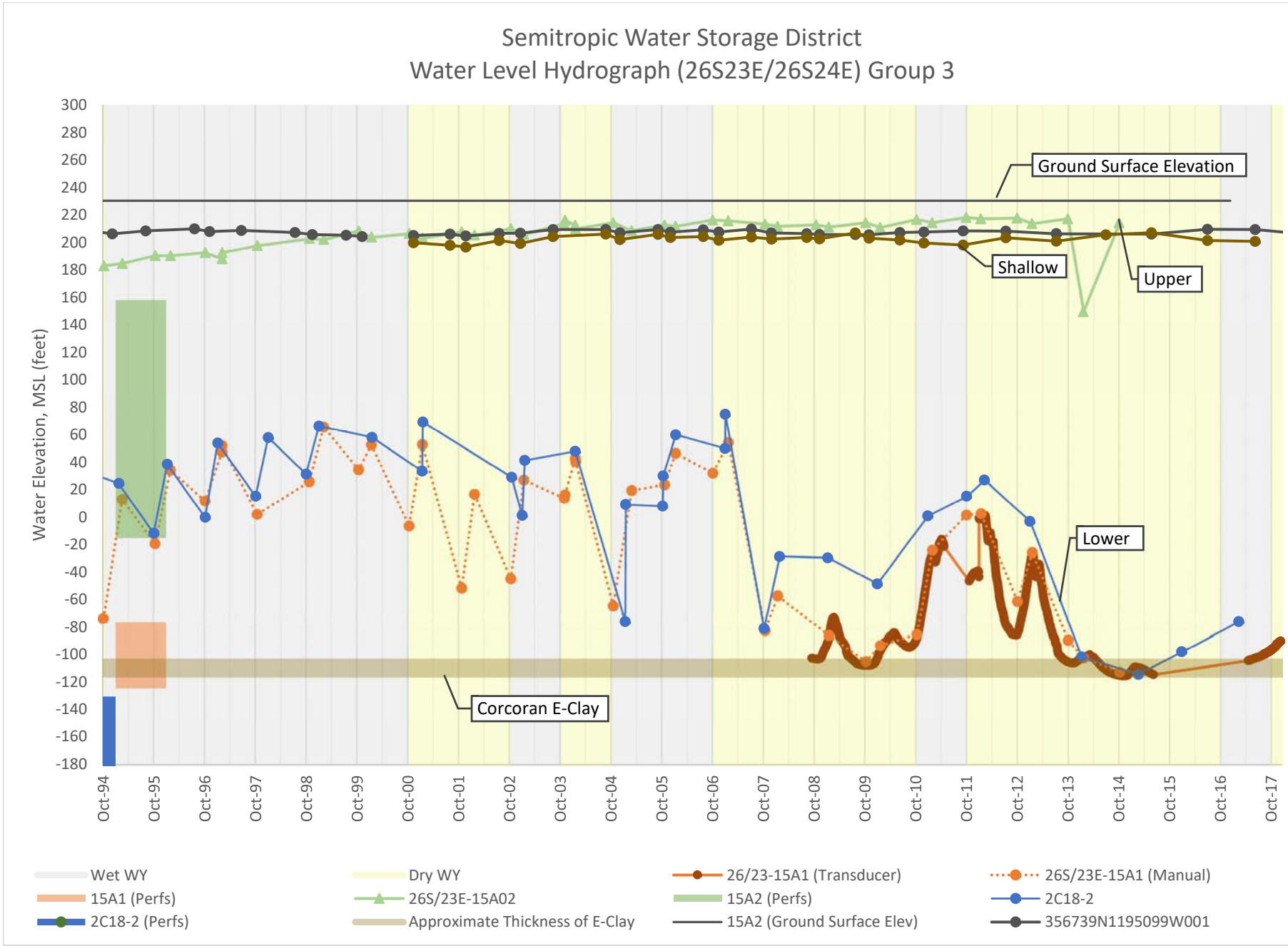
Hydrograph Summary Table

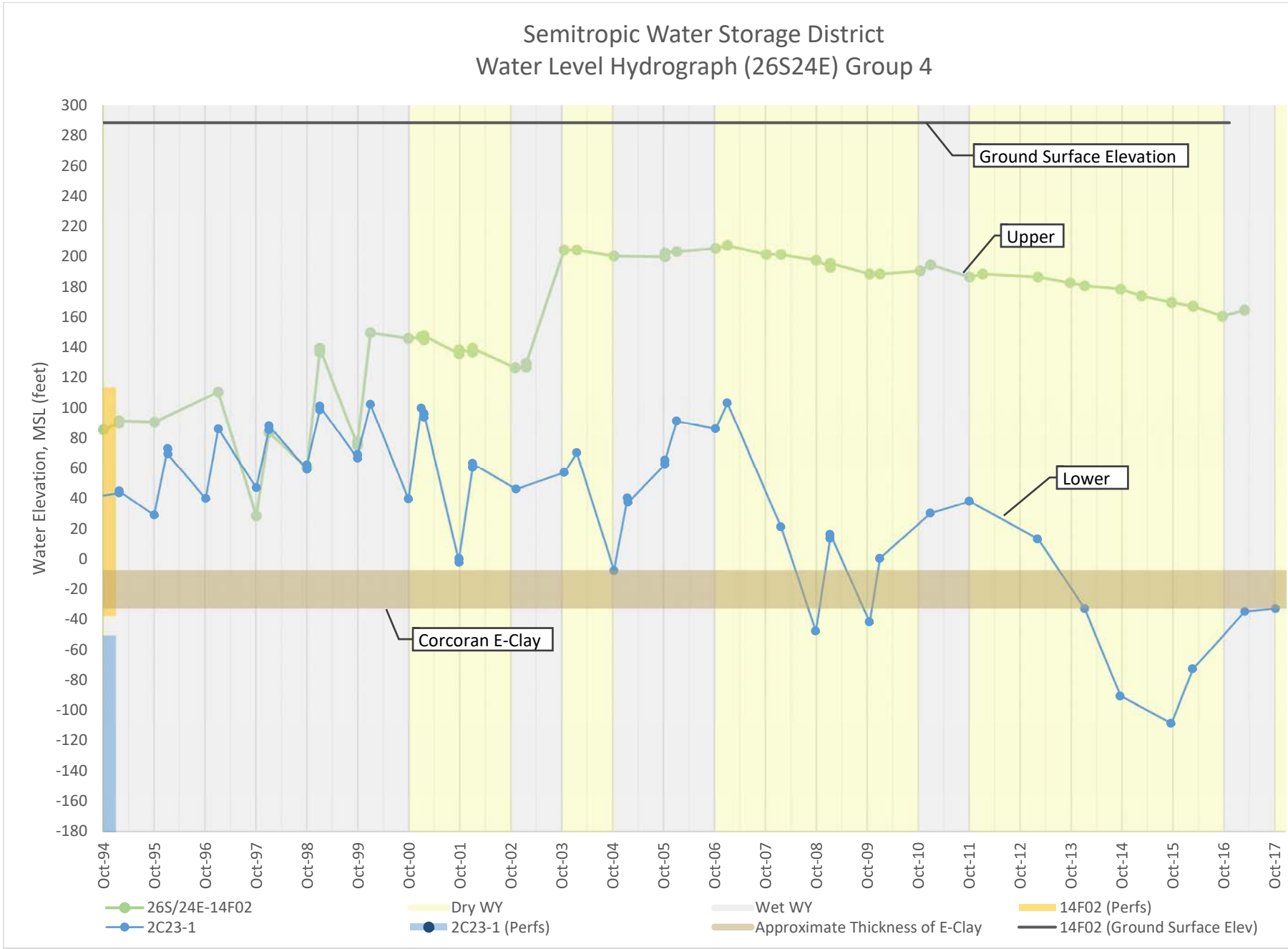
Group	CASGEM ID	SWN	DMS ID	Well Name As Shown on Figures	Well Type	Township	Range	Section	Quarter	GSE (Approximate)	Perforation Top (bgs)	Perforation Bottom (bgs)	Aquifer Zone
1	357149N1195806W001	25S22E34A061M	8119	25S/22E-34A61	Monitoring	25S	22E	34	A61	243	--	--	Shallow
1	357183N1195417W001	25S23E30N001M	7889	25S/23E-30N01	Private	25S	23E	30	N01	220	99	150	Upper
1	357228N1195538W001	25S22E25L001M	8028	S-12	Production	25S	22E	25	L	217	510	740	Lower
1	357236N1195804W001	25S22E27J001M	3140	25S/22E-27J01	Irrigation	25S	22E	27	J01	226	497	800	Lower
1	357481N1195803W001	25S22E14N061M	9348	25S/22E-14N61	Monitoring	25S	22E	14	N61	194	--	--	Shallow
2	357036N1193392W001	25S24E36Q001M	8018	S-6	Monitoring	25S	24E	36	Q	282	381	431	Lower
2	357106N1193928W001	25S24E33F001M	10876	25S/24E-33F01	Irrigation	25S	24E	33	F01	256	182	320	Upper
2	357253N1193406W001	25S24E25F002M	10036	25S/24E-25F02	Irrigation	25S	24E	25	F02	275	--	--	Lower
3	356445N1195100W001	26S23E20R061M	8073	26S/23E-20R61	Monitoring	26S	23E	20	R061	216	--	--	Shallow
3	356600N1194198W001	26S24E18R001M	8574	2C18-2	Production	26S	24E	18	R01	259	410	820	Lower
3	356728N1194735W001	26S23E15A002M	2368	26S/23E-15A02	--	26S	23E	15	A02	230	80	237	Upper
3	356736N1194735W001	26S23E15A001M	2567	26S/23E-15A01	--	26S	23E	15	A01	229	310	350	Lower
3	356739N1195099W001	26S23E08R061M	8070	26S/23E-08R61	Monitoring	26S	23E	08	R061	219	--	--	Shallow
4	356569N1193505W001	26S24E23H001M	7580	2C23-1	Production	26S	24E	23	H01	298	362	638	Lower
4	356675N1193584W001	26S24E14F002M	8565	26S/24E-14F02	Production	26S	24E	14	F02	289	174	327	Upper
5	355687N1195623W001	27S22E24D001M	8014	S-2	Monitoring	27S	22E	24	D	235	370	410	Lower
5	355864N1195670W001	27S22E14B061M	9795	27S/22E-14B61	Monitoring	27S	22E	14	B061	231	--	--	Shallow
5	355944N1195814W001	27S22E10J001M	8135	S-1	Monitoring	27S	22E	10	J	240	285	315	Upper
6	355725N1195079W001	27S23E16N001M	5735	27S/23E-16N01	--	27S	23E	16	N01	282	300	600	Unknown*
6	355870N1194571W001	27S23E11R061M	9506	27S/23E-11R61	Monitoring	27S	23E	11	R061	255	--	--	Shallow
7	355140N1196164W001	28S22E04N061M	9509	28S/22E-04N61	Monitoring	28S	22E	04	N061	243	--	--	Shallow
7	355205N1195821W001	28S22E03H001M	8016	S-4	Monitoring	28S	22E	03	H	248	390	420	Lower
7	355423N1195825W001	27S22E34A001M	8015	S-3	Monitoring	27S	22E	34	A	262	240	270	Lower*
8	355156N1194841W001	28S23E03P001M	2126	28S/23E-03P01	--	28S	23E	03	P01	258	196	426	Upper/Lower
8	355162N1194935W001	28S23E03N061M	9524	28S/23E-03N61	Monitoring	28S	23E	03	T061	242	--	--	Shallow
8	355219N1194829W001	28S23E03G001M	3175	28S/23E-03G01	Production	28S	23E	03	G01	252	362	632	Lower
8	355220N1194759W001	28S23E03H061M	9523	28S/23E-03H61	Monitoring	28S	23E	03	H061	240	--	--	Shallow
9	354714N1193894W001	28S24E28A001M	3754	28S/24E-28A01	Production	28S	24E	28	A01	300	--	--	Lower
9	355219N1193943W001	28S24E04L001M	8022	S-9A	Monitoring	28S	24E	04	L	297	660	690	Lower
10	354135N1194484W001	29S23E12R061M	9539	29S/23E-12R61	Monitoring	29S	23E	12	Q061	289	--	--	Shallow
10	354189N1194216W002	29S24E08L003M	8056	29S/24E-08L03	Monitoring	29S	24E	08	L03	295	--	--	Unknown*
10	354276N1194210W001	29S24E05Q061M	9544	29S/24E-05Q61	Monitoring	29S	24E	05	Q061	289	--	--	Shallow
10	354350N1194070W001	29S24E04E001M	10454	29S/24E-04E01	--	29S	24E	04	E01	278	150	250	Upper

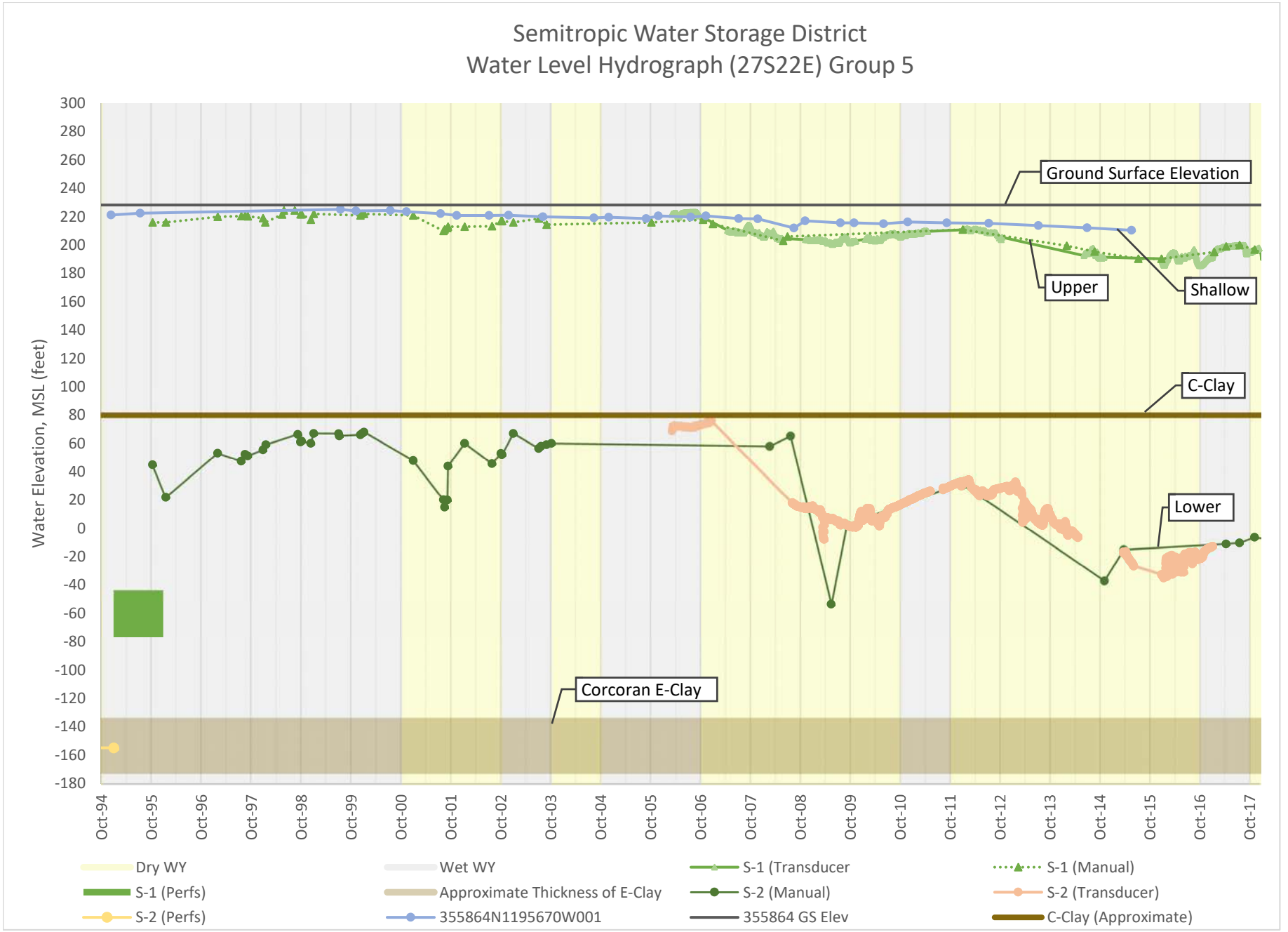
* Indicates wells categorized by hydrograph trends instead of perforation relationship to Corcoran Clay. If "Unknown" then the presence of the clay is unknown at this location. Trends similar to Lower Zone.

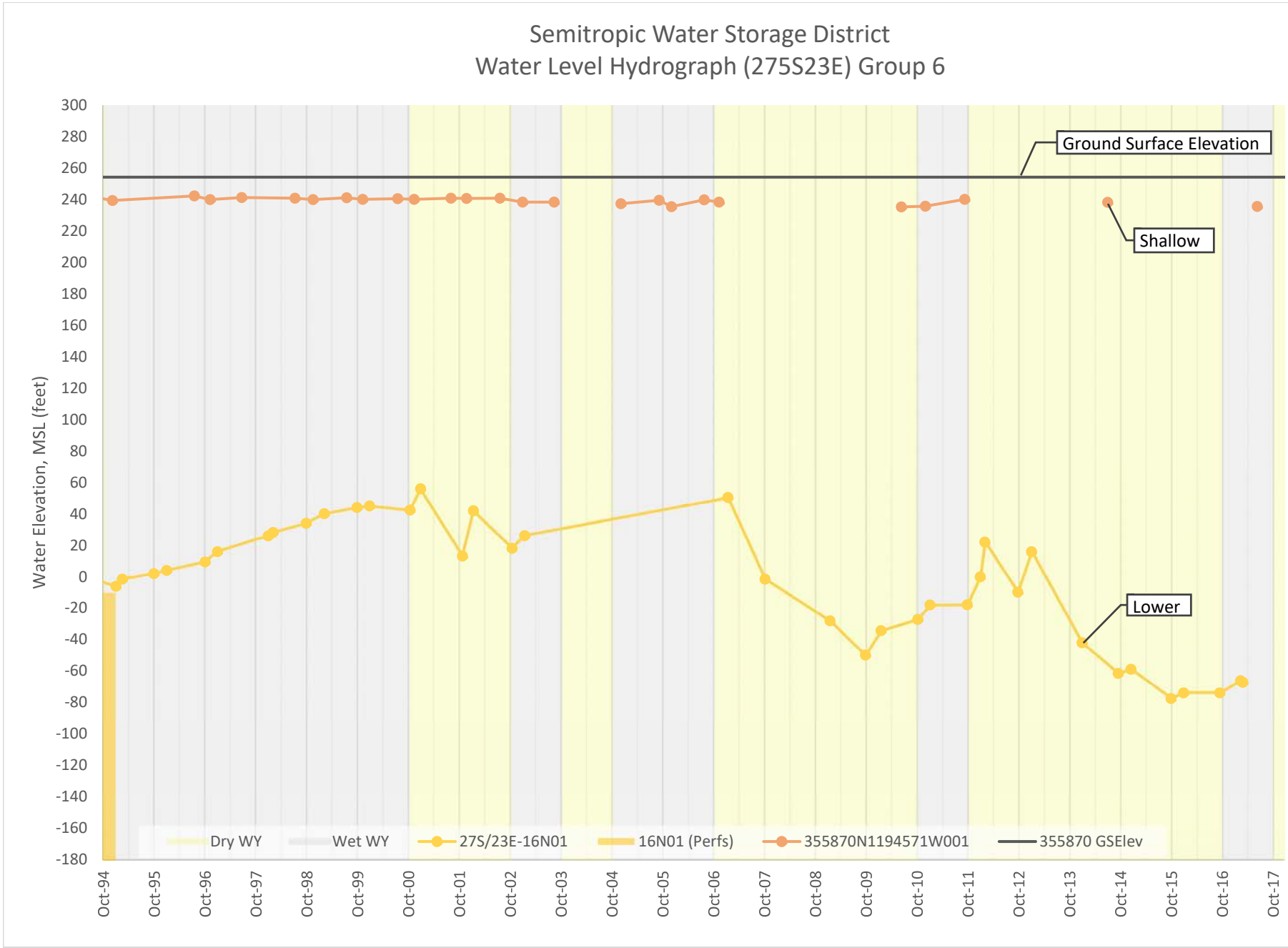

Semitropic Water Storage District
Water Level Hydrograph (25S22E/25S23E) Group 1
Water Elevation, MSL (Feet)
300
280
260
240
220
200
180
160
140
120
100
80
60
40
20
0
-20
-40
-60
-80
-100
-120
-140
-160
-180
Oct-94
Oct-95
Oct-96
Oct-97
Oct-98
Oct-99
Oct-00
Oct-01
Oct-02
Oct-03
Oct-04
Oct-05
Oct-06
Oct-07
Oct-08
Oct-09
Oct-10
Oct-11
Oct-12
Oct-13
Oct-14
Oct-15
Oct-16
Oct-17
Ground Surface Elevation
Shallow
Upper
Lower
C-Clay
Corcoran E-Clay
Dry WY
Wet WY
25S/22E-27J01 (Perforations Below CC)
S-12 (Transducer)
S-12 (Manual, Perforations Below CC)
25S/23E-30N01
30N01 (Perfs)
Approximate Thickness of E-Clay
357481N1195803W001
357149N1195806W001
357149 GSElev
C-Clay (Approximate)
A-Clay (Approximate)

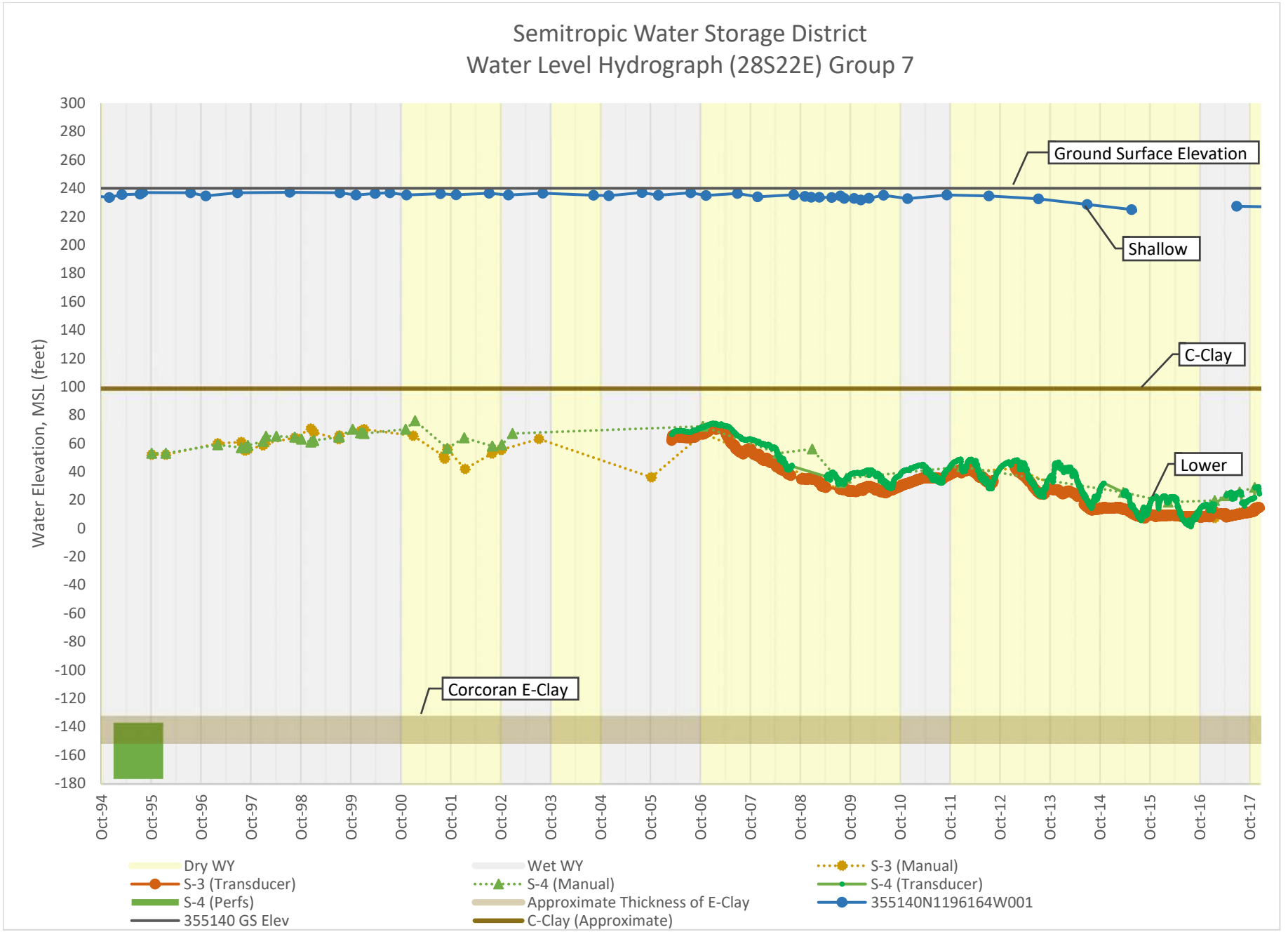

Semitropic Water Storage District
Water Level Hydrograph (25S24E) Group 2
Water Elevation, MSL (Feet)
300
280
260
240
220
200
180
160
140
120
100
80
60
40
20
0
-20
-40
-60
-80
-100
-120
-140
-160
-180
Oct-94
Oct-95
Oct-96
Oct-97
Oct-98
Oct-99
Oct-00
Oct-01
Oct-02
Oct-03
Oct-04
Oct-05
Oct-06
Oct-07
Oct-08
Oct-09
Oct-10
Oct-11
Oct-12
Oct-13
Oct-14
Oct-15
Oct-16
Oct-17
Ground Surface Elevation
Upper
Lower
Corcoran E-Clay
Dry WY
Wet WY
S-6 (Transducer)
S-6 (Manual)
S-6 (Perfs)
25S/24E-25F02 (No WC)
25S/24E-33F01
25S/24E-33F01 (Perfs)
Approximate Thickness of E-Clay
33F01 (Ground Surface Elev)

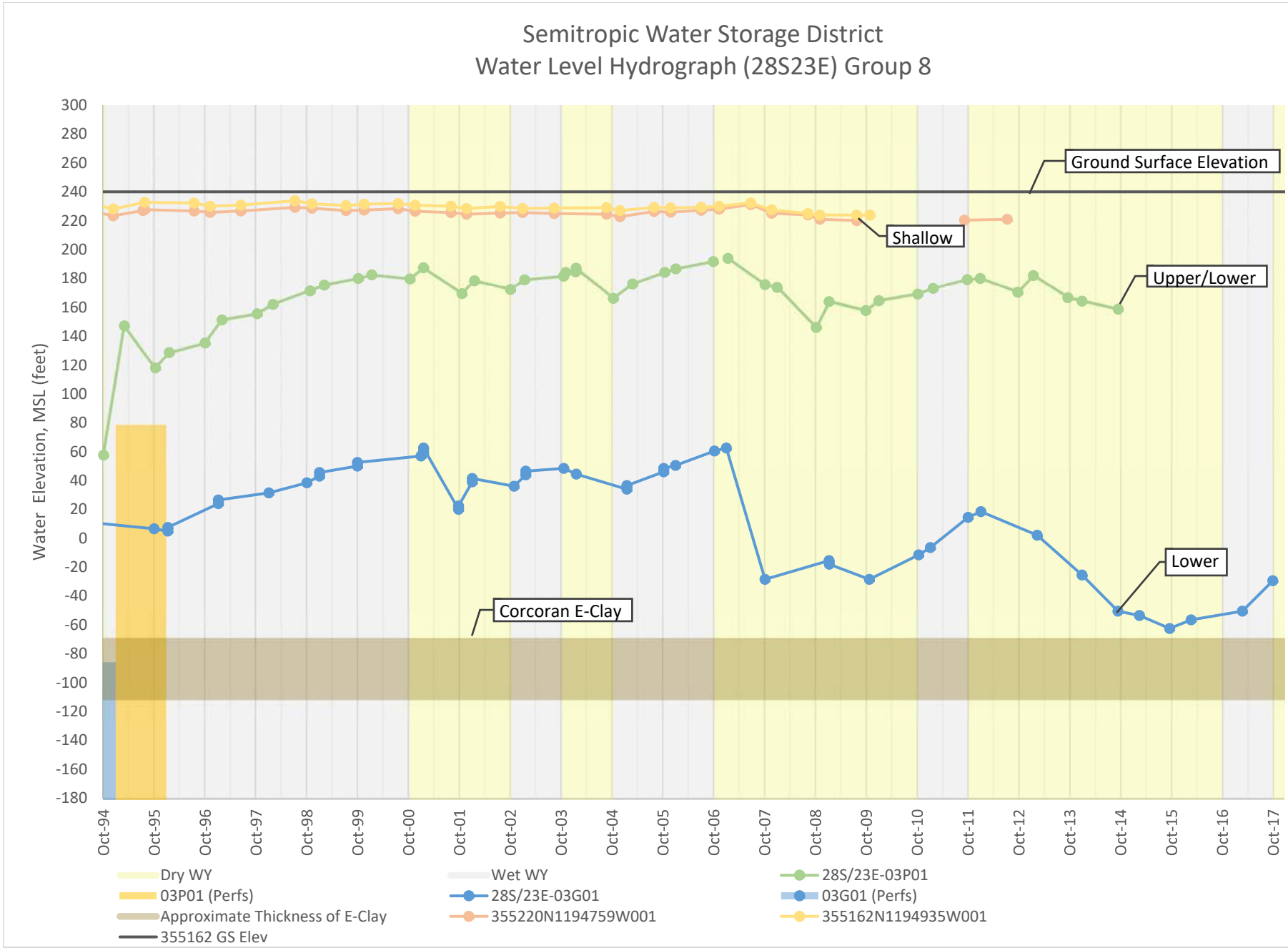

Semitropic Water Storage District
Water Level Hydrograph (26S23E/26S24E) Group 3
Water Elevation, MSL (feet)
300
280
260
240
220
200
180
160
140
120
100
80
60
40
20
0
-20
-40
-60
-80
-100
-120
-140
-160
-180
Oct-94
Oct-95
Oct-96
Oct-97
Oct-98
Oct-99
Oct-00
Oct-01
Oct-02
Oct-03
Oct-04
Oct-05
Oct-06
Oct-07
Oct-08
Oct-09
Oct-10
Oct-11
Oct-12
Oct-13
Oct-14
Oct-15
Oct-16
Oct-17
Ground Surface Elevation
Shallow
Upper
Lower
Corcoran E-Clay
Wet WY
Dry WY
26/23-15A1 (Transducer)
26S/23E-15A1 (Manual)
15A1 (Perfs)
26S/23E-15A02
15A2 (Perfs)
2C18-2
2C18-2 (Perfs)
Approximate Thickness of E-Clay
15A2 (Ground Surface Elev)
356739N1195099W001

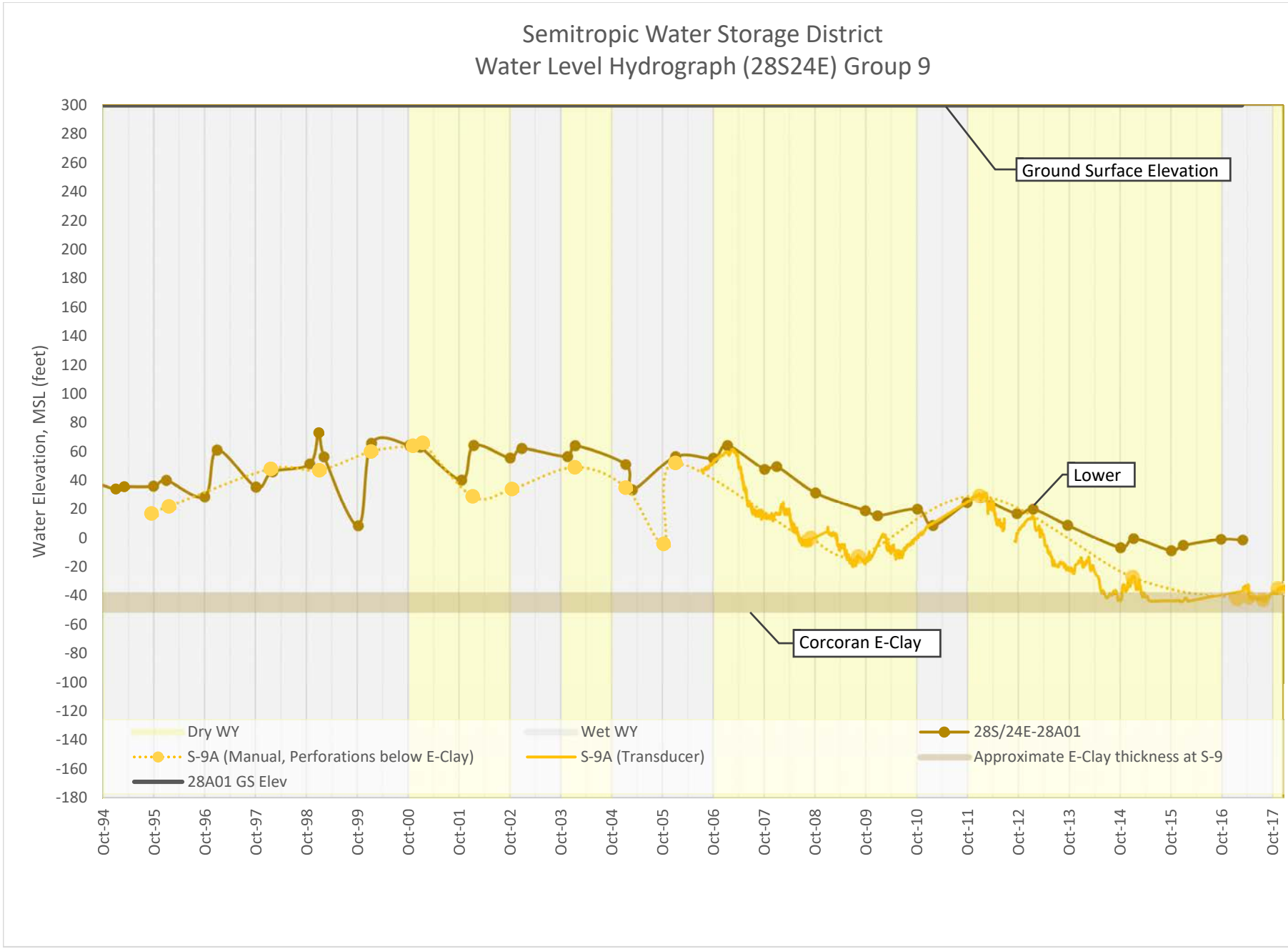

Semitropic Water Storage District
Water Level Hydrograph (26S24E) Group 4
Water Elevation, MSL (feet)
300
280
260
240
220
200
180
160
140
120
100
80
60
40
20
0
-20
-40
-60
-80
-100
-120
-140
-160
-180
Oct-94
Oct-95
Oct-96
Oct-97
Oct-98
Oct-99
Oct-00
Oct-01
Oct-02
Oct-03
Oct-04
Oct-05
Oct-06
Oct-07
Oct-08
Oct-09
Oct-10
Oct-11
Oct-12
Oct-13
Oct-14
Oct-15
Oct-16
Oct-17
Ground Surface Elevation
Upper
Lower
Corcoran E-Clay
26S/24E-14F02
2C23-1
Dry WY
2C23-1 (Perfs)
Wet WY
Approximate Thickness of E-Clay
14F02 (Perfs)
14F02 (Ground Surface Elev)

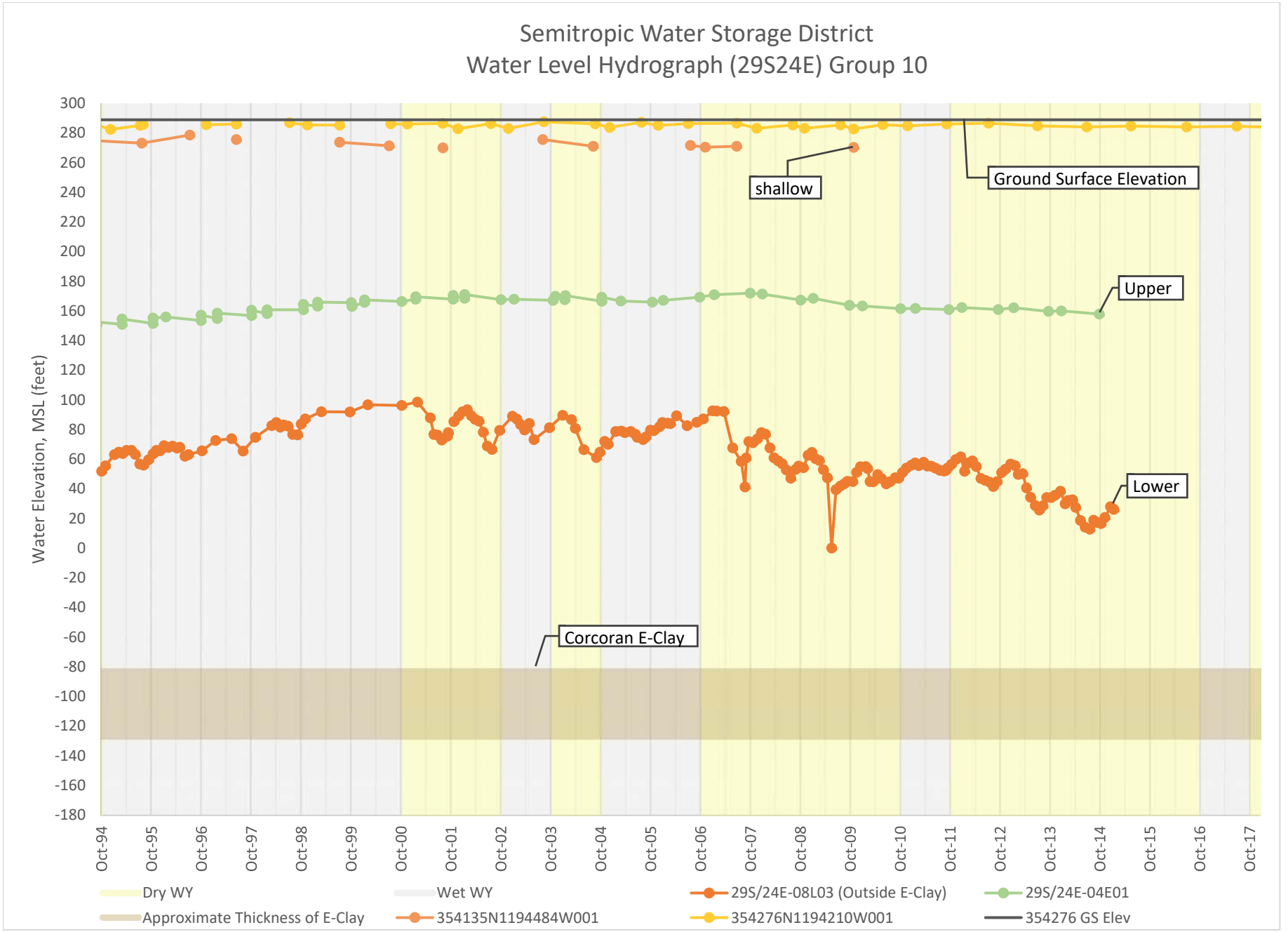

Semitropic Water Storage District
Water Level Hydrograph (27S22E) Group 5
Water Elevation, MSL (feet)
300
280
260
240
220
200
180
160
140
120
100
80
60
40
20
0
-20
-40
-60
-80
-100
-120
-140
-160
-180
Oct-94
Oct-95
Oct-96
Oct-97
Oct-98
Oct-99
Oct-00
Oct-01
Oct-02
Oct-03
Oct-04
Oct-05
Oct-06
Oct-07
Oct-08
Oct-09
Oct-10
Oct-11
Oct-12
Oct-13
Oct-14
Oct-15
Oct-16
Oct-17
Ground Surface Elevation
Upper
Shallow
C-Clay
Lower
Corcoran E-Clay
Dry WY
Wet WY
S-1 (Transducer
S-1 (Manual)
S-1 (Perfs)
Approximate Thickness of E-Clay
S-2 (Manual)
S-2 (Transducer)
S-2 (Perfs)
355864N1195670W001
355864 GS Elev
C-Clay (Approximate)

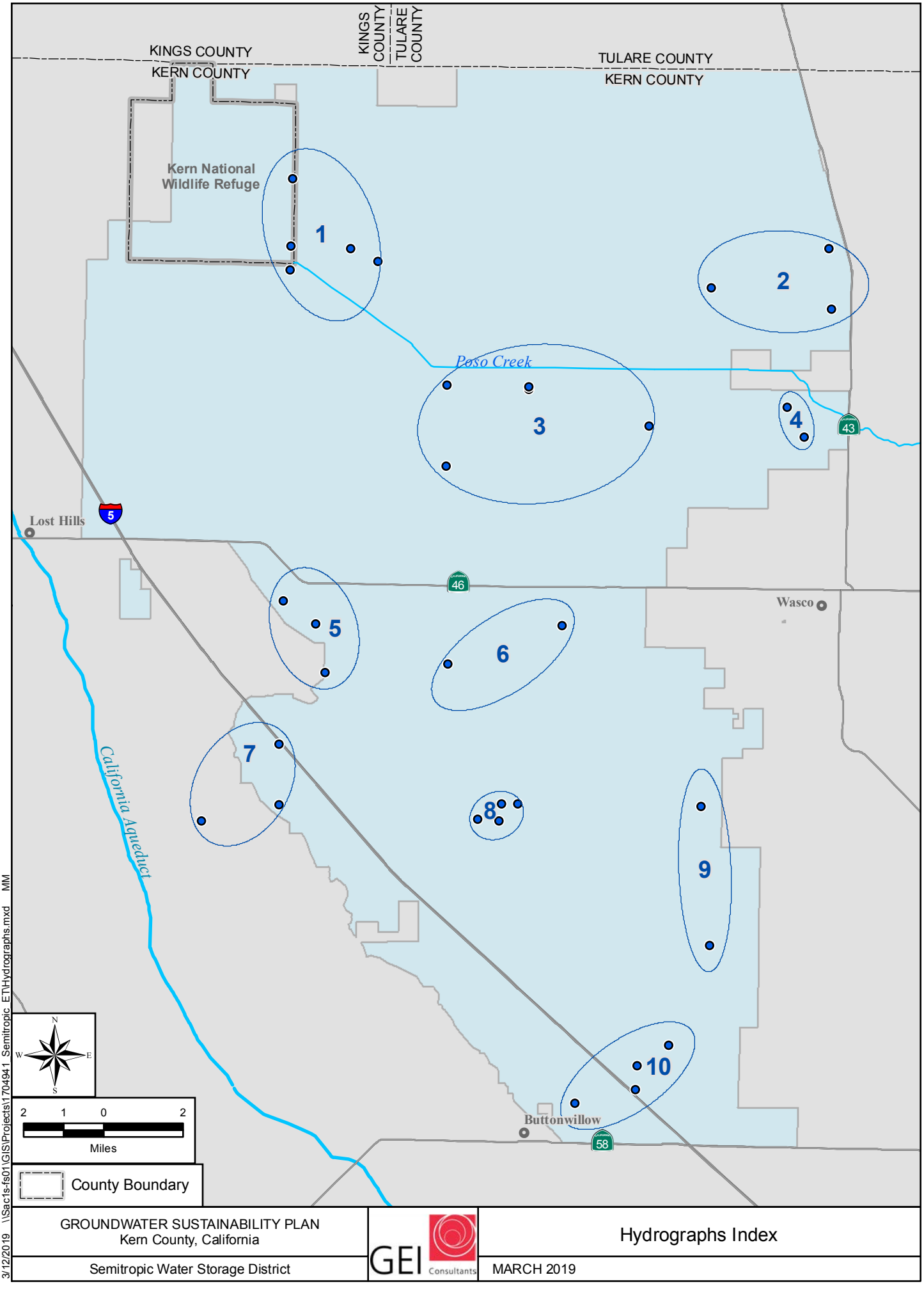

Semitropic Water Storage District
Water Level Hydrograph (275S23E) Group 6
Water Elevation, MSL (feet)
300
280
260
240
220
200
180
160
140
120
100
80
60
40
20
0
-20
-40
-60
-80
-100
-120
-140
-160
-180
Oct-94
Oct-95
Oct-96
Oct-97
Oct-98
Oct-99
Oct-00
Oct-01
Oct-02
Oct-03
Oct-04
Oct-05
Oct-06
Oct-07
Oct-08
Oct-09
Oct-10
Oct-11
Oct-12
Oct-13
Oct-14
Oct-15
Oct-16
Oct-17
Ground Surface Elevation
Shallow
Lower
Dry WY
Wet WY
27S/23E-16N01
16N01 (Perfs)
355870N1194571W001
355870 GSElev


Semitropic Water Storage District
Water Level Hydrograph (28S22E) Group 7
Water Elevation, MSL (feet)
300
280
260
240
220
200
180
160
140
120
100
80
60
40
20
0
-20
-40
-60
-80
-100
-120
-140
-160
-180
Oct-94
Oct-95
Oct-96
Oct-97
Oct-98
Oct-99
Oct-00
Oct-01
Oct-02
Oct-03
Oct-04
Oct-05
Oct-06
Oct-07
Oct-08
Oct-09
Oct-10
Oct-11
Oct-12
Oct-13
Oct-14
Oct-15
Oct-16
Oct-17
Ground Surface Elevation
Shallow
C-Clay
Lower
Corcoran E-Clay
Dry WY
Wet WY
S-3 (Manual)
S-3 (Transducer)
S-4 (Manual)
S-4 (Transducer)
S-4 (Perfs)
Approximate Thickness of E-Clay
355140N1196164W001
355140 GS Elev
C-Clay (Approximate)


Semitropic Water Storage District
Water Level Hydrograph (28S23E) Group 8
Water Elevation, MSL (feet)
300
280
260
240
220
200
180
160
140
120
100
80
60
40
20
0
-20
-40
-60
-80
-100
-120
-140
-160
-180
Oct-94
Oct-95
Oct-96
Oct-97
Oct-98
Oct-99
Oct-00
Oct-01
Oct-02
Oct-03
Oct-04
Oct-05
Oct-06
Oct-07
Oct-08
Oct-09
Oct-10
Oct-11
Oct-12
Oct-13
Oct-14
Oct-15
Oct-16
Oct-17
Ground Surface Elevation
Shallow
Upper/Lower
Lower
Corcoran E-Clay
Dry WY
Wet WY
28S/23E-03P01
03P01 (Perfs)
28S/23E-03G01
03G01 (Perfs)
Approximate Thickness of E-Clay
355220N1194759W001
355162N1194935W001
355162 GS Elev


Semitropic Water Storage District
Water Level Hydrograph (28S24E) Group 9
Water Elevation, MSL (feet)
300
280
260
240
220
200
180
160
140
120
100
80
60
40
20
0
-20
-40
-60
-80
-100
-120
-140
-160
-180
Oct-94
Oct-95
Oct-96
Oct-97
Oct-98
Oct-99
Oct-00
Oct-01
Oct-02
Oct-03
Oct-04
Oct-05
Oct-06
Oct-07
Oct-08
Oct-09
Oct-10
Oct-11
Oct-12
Oct-13
Oct-14
Oct-15
Oct-16
Oct-17
Ground Surface Elevation
Lower
Corcoran E-Clay
Dry WY
Wet WY
28S/24E-28A01
S-9A (Manual, Perforations below E-Clay)
S-9A (Transducer)
Approximate E-Clay thickness at S-9
28A01 GS Elev


Semitropic Water Storage District
Water Level Hydrograph (29S24E) Group 10
Water Elevation, MSL (feet)
300
280
260
240
220
200
180
160
140
120
100
80
60
40
20
0
-20
-40
-60
-80
-100
-120
-140
-160
-180
Oct-94
Oct-95
Oct-96
Oct-97
Oct-98
Oct-99
Oct-00
Oct-01
Oct-02
Oct-03
Oct-04
Oct-05
Oct-06
Oct-07
Oct-08
Oct-09
Oct-10
Oct-11
Oct-12
Oct-13
Oct-14
Oct-15
Oct-16
Oct-17
shallow
Ground Surface Elevation
Upper
Lower
Corcoran E-Clay
Dry WY
Wet WY
29S/24E-08L03 (Outside E-Clay)
29S/24E-04E01
Approximate Thickness of E-Clay
354135N1194484W001
354276N1194210W001
354276 GS Elev



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GROUNDWATER SUSTAINABILITY PLAN
Kern County, California

Semitropic Water Storage District

GEI Consultants

Hydrographs Index

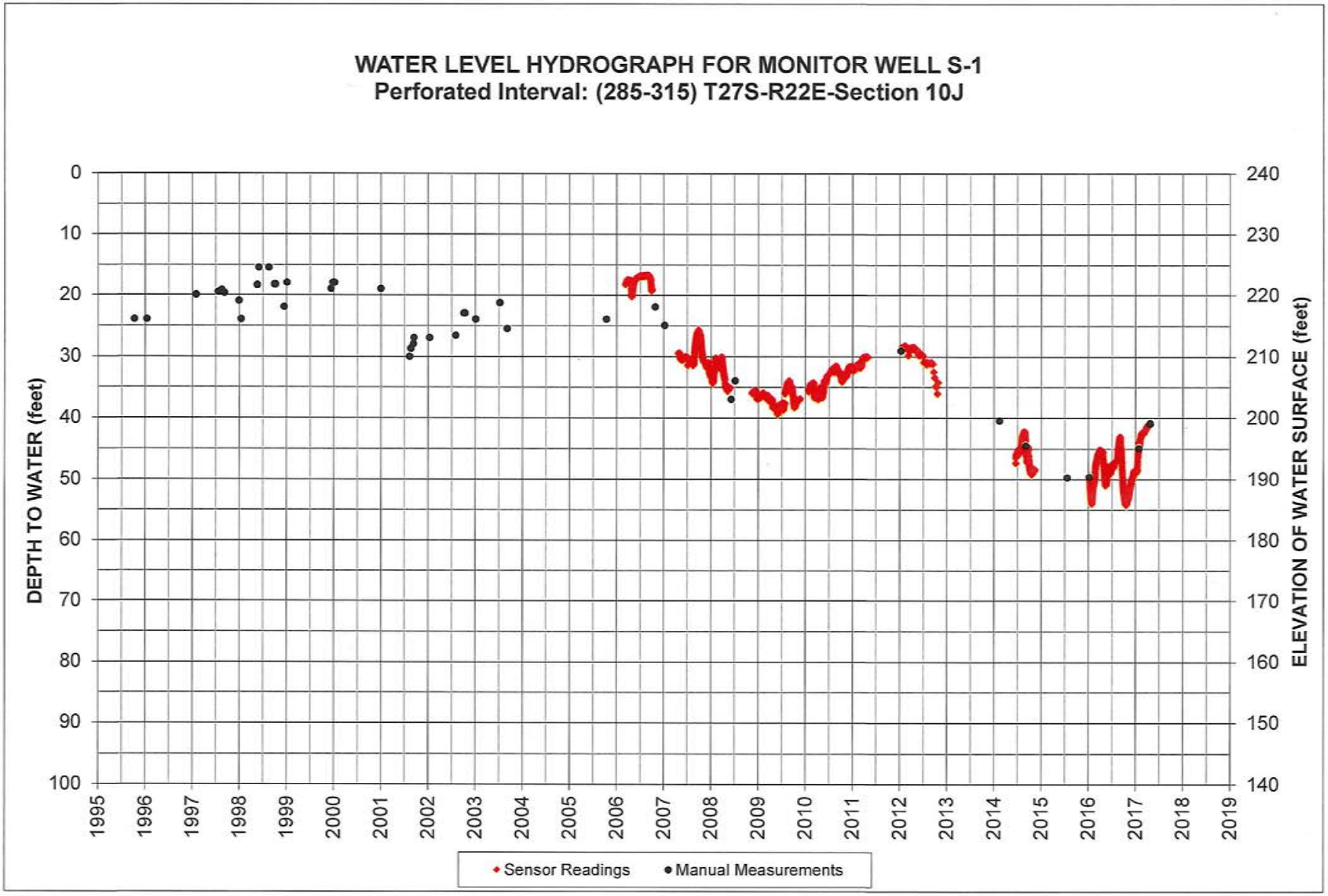
MARCH 2019

APPENDIX B-2

Monitor Wells

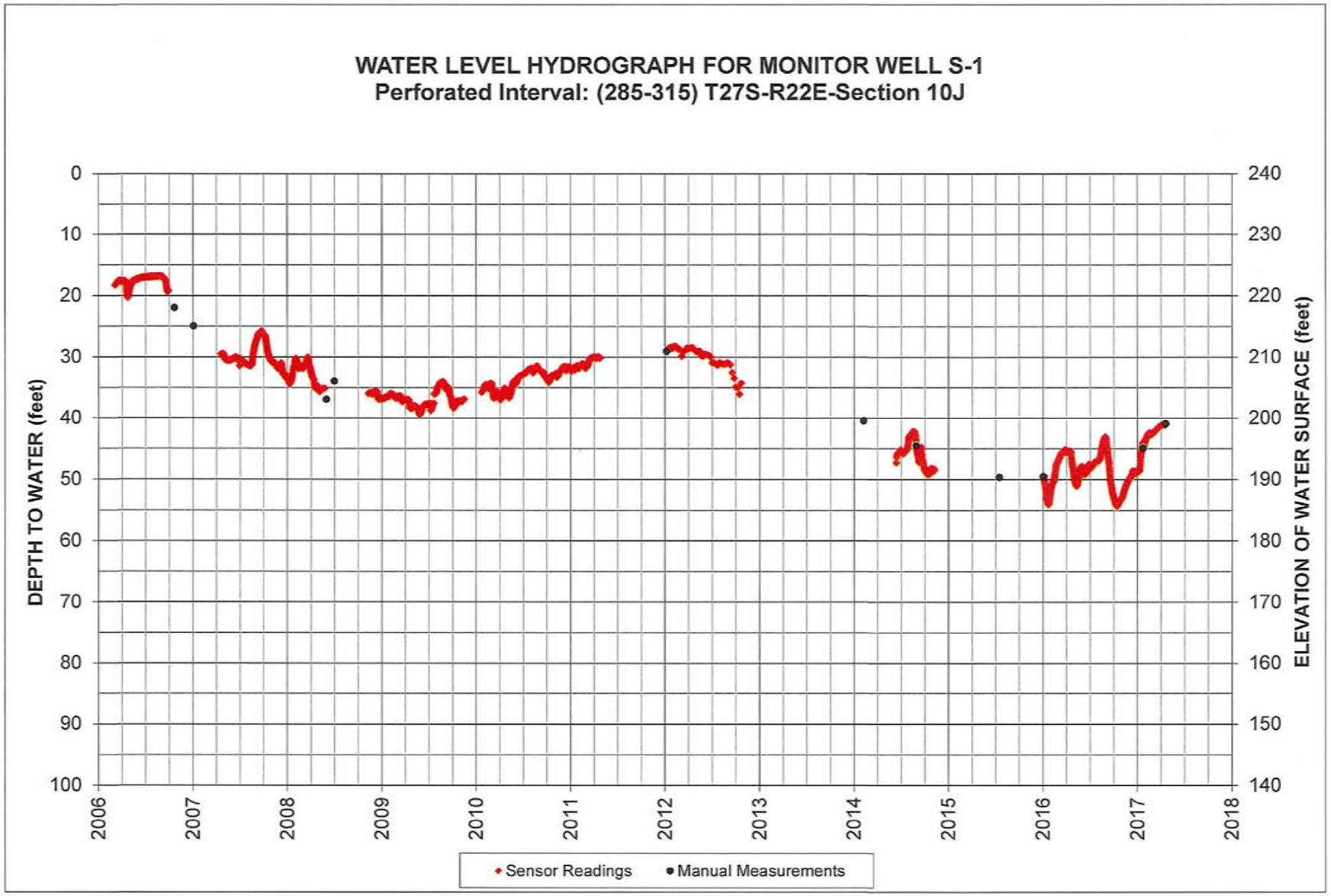
Well Characteristics

Well No.	Location T-R-S	Type of Well Monitoring -or- Production	Installed Transducer Serial Number	Year Well Constructed	RP Elevation (ft MSL)	Boring Depth (ft)	Completed Depth (ft)	Perforated Interval (ft)	Annular Seal Interval (ft)	Casing		Water Level Sounder Measurement Frequency	Sampling Pump	Sampling Frequency
										Diameter (in)	Material			
948L02	29S-24E-8L02	Monitor Well	105000	1992	295		625	525 - 625		6		6-12		2
948L03	29S-24E-8L03	Monitor Well	104970	1992	295		440	360 - 440		6		6-12		2
S-1	27S-22E-10J	Monitor Well	104935	1994	240	422	340	285-315		5.761	Sch.80 PVC	2		1
S-2	27S-22E-24D	Monitor Well	104939	1994	235	500	448	370-410		5.761	Sch.80 PVC	2		1
S-3	27S-22E-34A	Monitor Well	104942	1994	262	500	300	240-270		5.761	Sch.80 PVC	2		1
S-4	28S-22E-3H	Monitor Well	104996	1994	248	501	445	390-420		5.761	Sch.80 PVC	2		1
S-5	27S-23E-29M	Monitor Well	104999	1994	242	500	430	380-410		5.761	Sch.80 PVC	2		1
S-6	25S-24E-36Q	Monitor Well	104958	1995	282	450	431	381 - 431	0 - 356	6	3/16-in. Steel	2	X	
S-7A	26S-24E-13N	Monitor Well	104957	1995	297	700	600	550 - 600	0 - 520	6	1/4-in. Steel	2	X	1
S-7B	26S-24E-13N	Monitor Well	104959	1995	297	380	380	330 - 380	0 - 310	6	3/16-in. Steel	2		
S-8A	26S-24E-33D	Monitor Well	104956	1995	276	700	687	637 - 687	0 - 600	6	1/4-in. Steel	2	X	1
S-8B	26S-24E-33D	Monitor Well	104941	1995	276	432	432	392 - 432	0 - 362	6	3/16-in. Steel	2		
S-9A	28S-24E-4L	Monitor Well	104978	1995	297	700	690	660 - 690	0 - 640	6	1/4-in. Steel	2	X	1
S-9B	28S-24E-4L	Monitor Well	104998	1995	297	407	407	357 - 407	0 - 322	6	3/16-in. Steel	2		
S-10A	25S-22E-35B	Monitor Well	104968	1999	222		900	420 - 460 490 - 700 740 - 890		4		2		
S-10B	25S-22E-35B	Monitor Well	no transducer	1999	222		1270	1,250 - 1,260		4		2		
S-10C	25S-22E-35B	Monitor Well	no transducer	1999	222		1100	1,080 - 1,090		4		2	X	1
S-11	26S-22E-2J	Monitor Well	104937	2001	222	900	700	550 - 700		6 & 8	1/4-in. Steel	2		
S-12	25S-22E-25L	Monitor Well	104962	2001	217	940	740	510 - 740		6 & 8	1/4-in. Steel	2		
S-13A	25S-24E-18D	Monitor Well	no transducer	2003	222	695	690	660 - 690	0 - 630	6	1/4-in. Steel	2	X	1
S-13B	25S-24E-18D	Monitor Well	no transducer	2003	222	430	435	390 - 430	0 - 370	6	3/16-in. Steel	2	X	
S-14A	26S-24E-16J	Monitor Well	no transducer	2003	274	715	710	670 - 710	0 - 640	6	1/4-in. Steel	2	X	1
S-14B	26S-24E-16J	Monitor Well	no transducer	2003	274	485	480	430 - 480	0 - 410	6	3/16-in. Steel	2	X	
S-15A	27S-24E-16P	Monitor Well	no transducer	2003	295	605	600	550 - 600	0 - 520	6	1/4-in. Steel	2	X	1
S-15B	27S-24E-16P	Monitor Well	no transducer	2003	295	455	450	400 - 450	0 - 380	6	3/16-in. Steel	2	X	
S-16A	26S-24E-27Q	Monitor Well	100993	2003	295	675	670	620 - 670	0 - 590	6	1/4-in. Steel	2	X	1
S-16B	26S-24E-27R	Monitor Well	114335	2003	295	415	410	370 - 410	0 - 350	6	3/16-in. Steel	2	X	
26S-23E-15A1	26S-23E-15A1	Monitor Well	101667	1974	229.3		350	310-350	0-80	6.625 (O.D.)				
26S-23E-15A2	26S-23E-15A2	Monitor Well	104977	1974	229.8		237	80-237	0-25	6.625 (O.D.)				



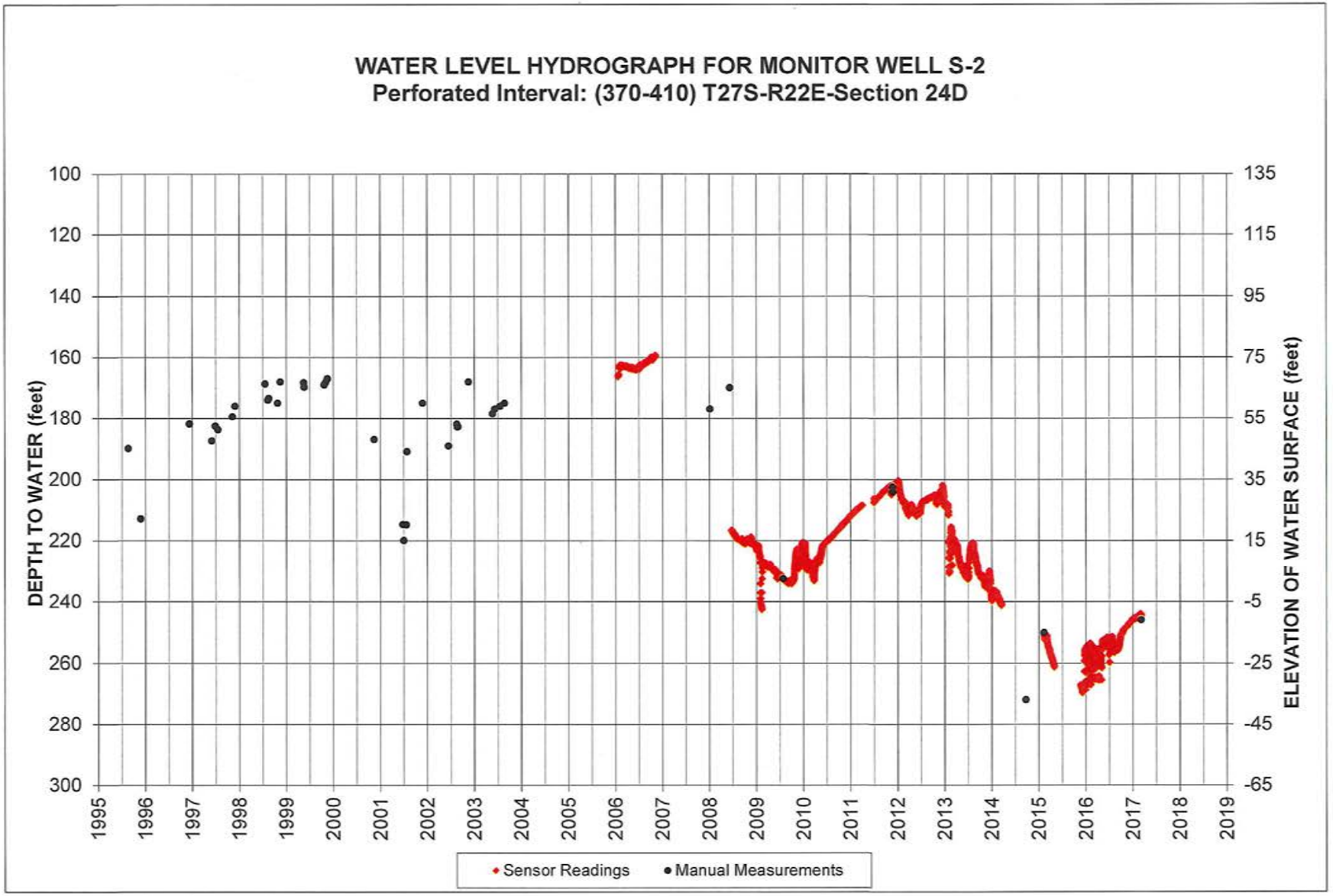
Semitropic Water Storage District
(Manual data from the KCWA)

5/8/2017



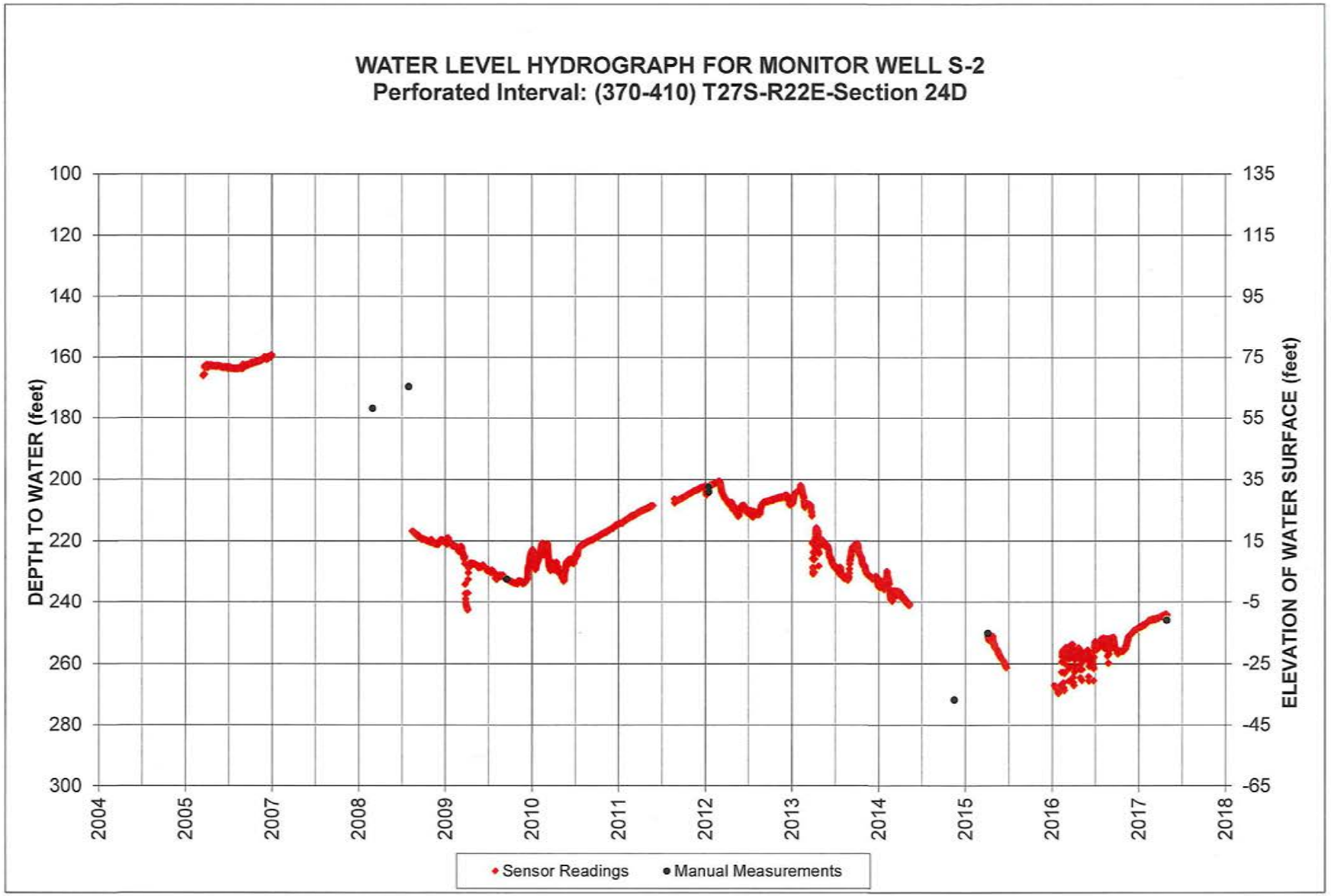
Semitropic Water Storage District
(Manual data from the KCWA)

5/8/2017



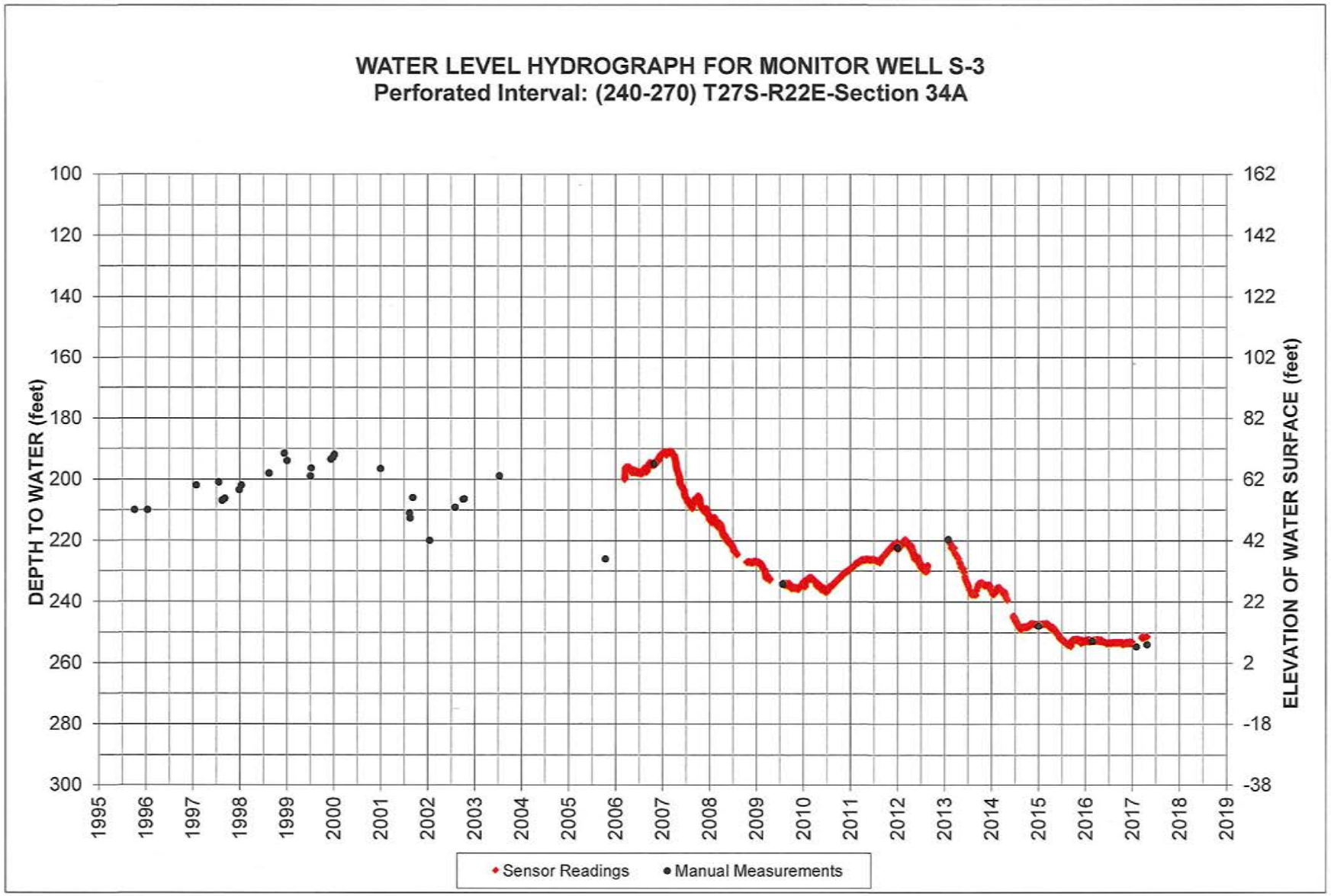
Semitropic Water Storage District
(Manual data from the KCWA)

5/8/2017



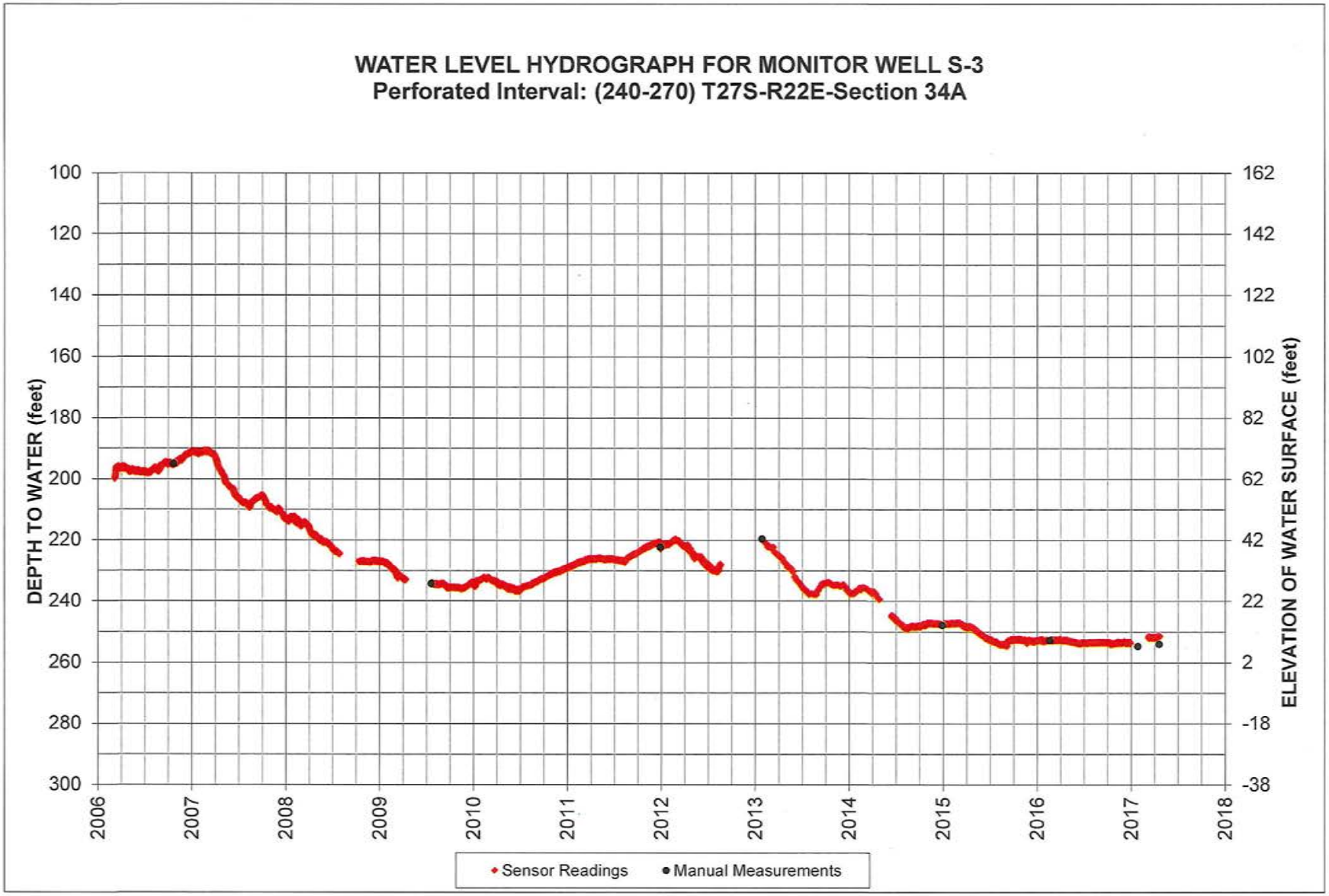
Semitropic Water Storage District
(Manual data from the KCWA)

5/8/2017



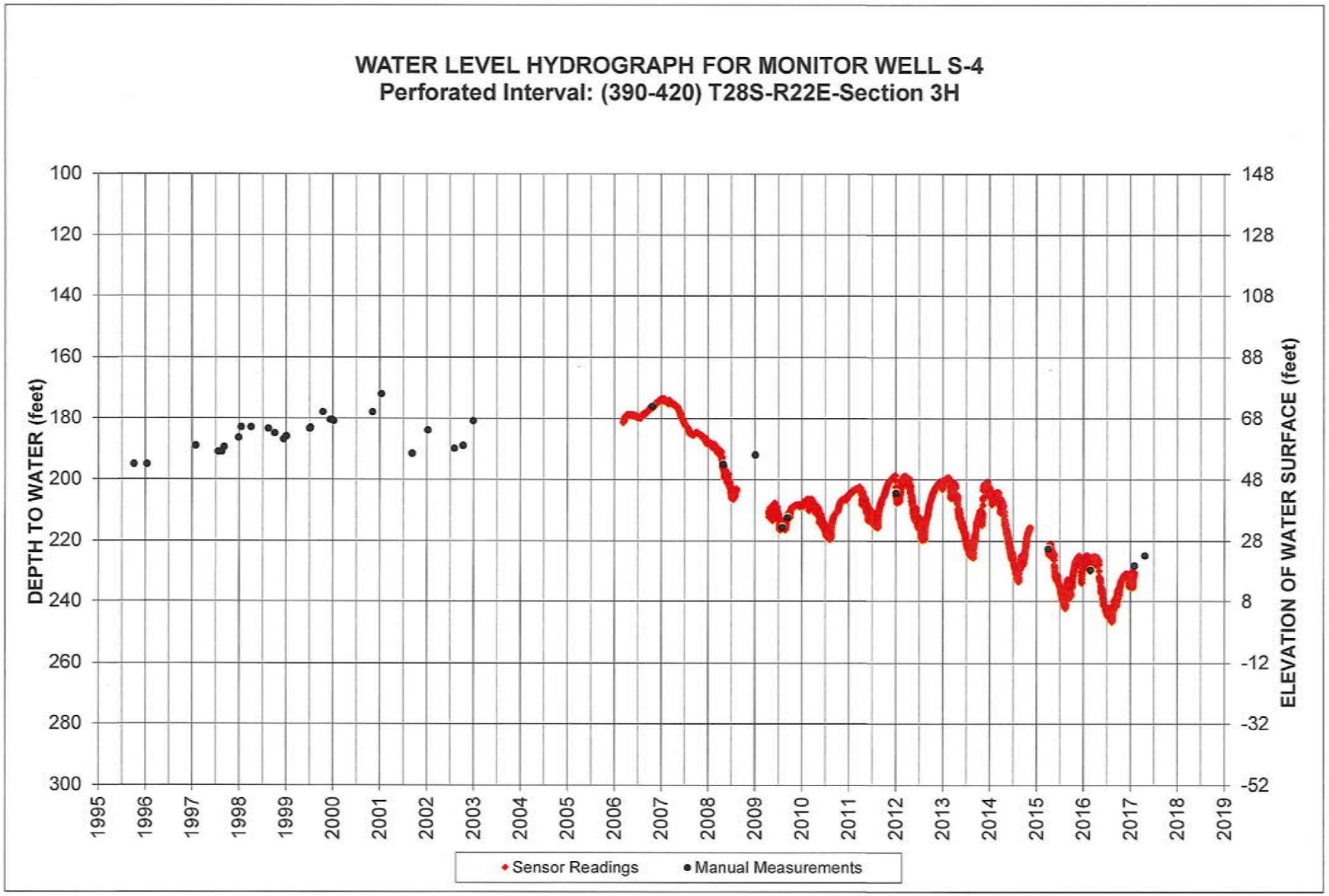
Semitropic Water Storage District
(Manual data from the KCWA)

5/8/2017



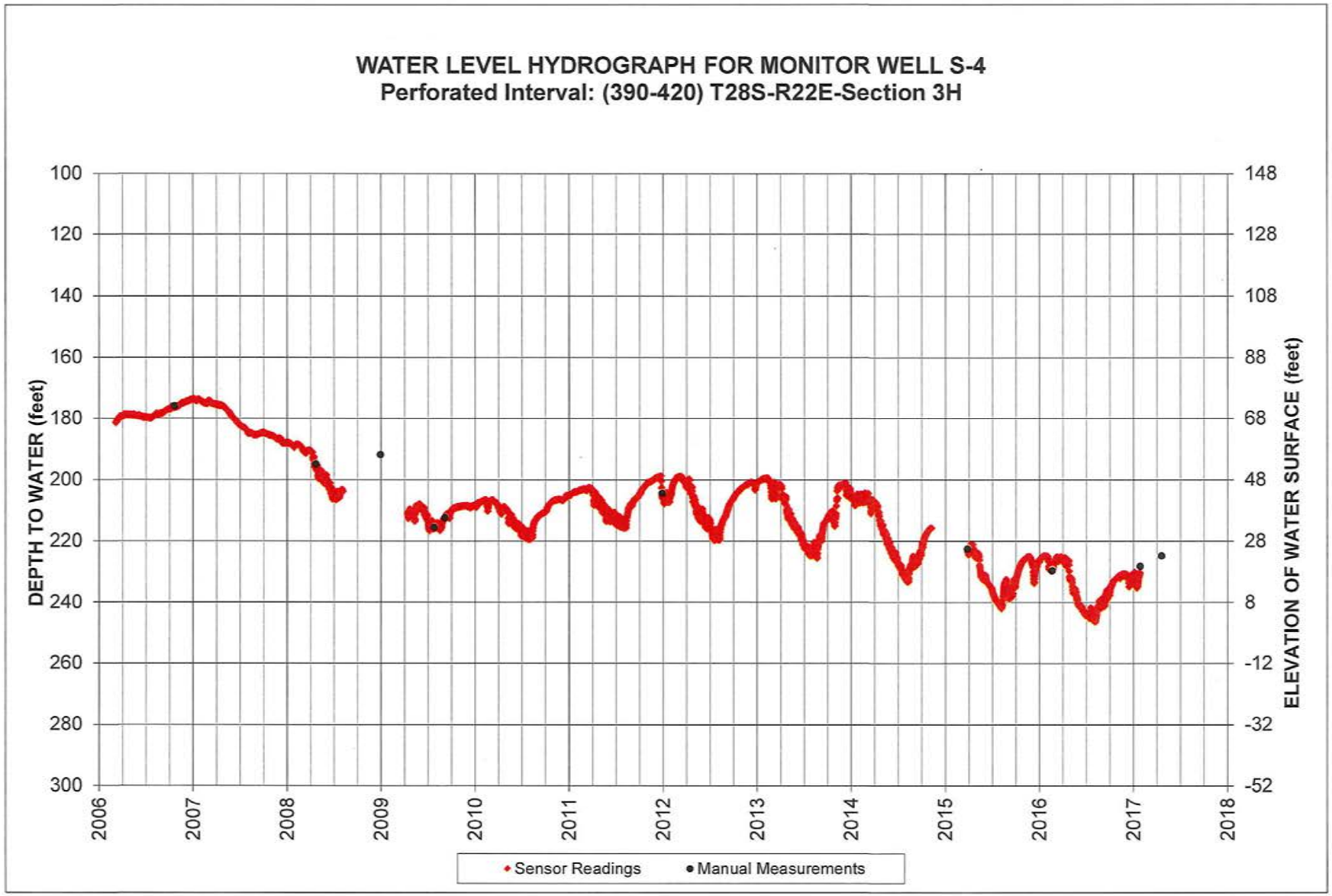
Semitropic Water Storage District
(Manual data from the KCWA)

5/8/2017



Semitropic Water Storage District
(Manual data from the KCWA)

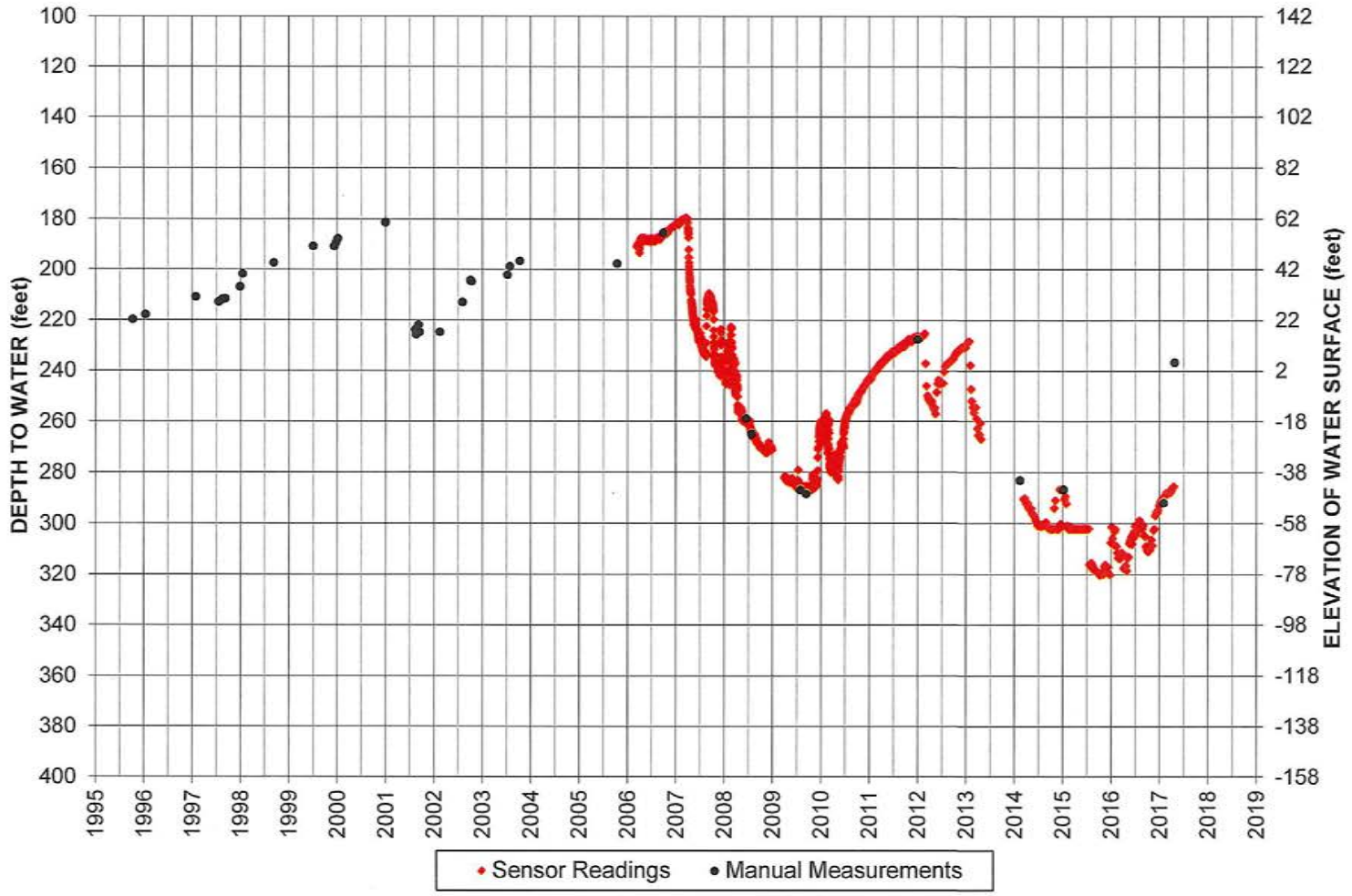
5/8/2017



Semitropic Water Storage District
(Manual data from the KCWA)

5/8/2017

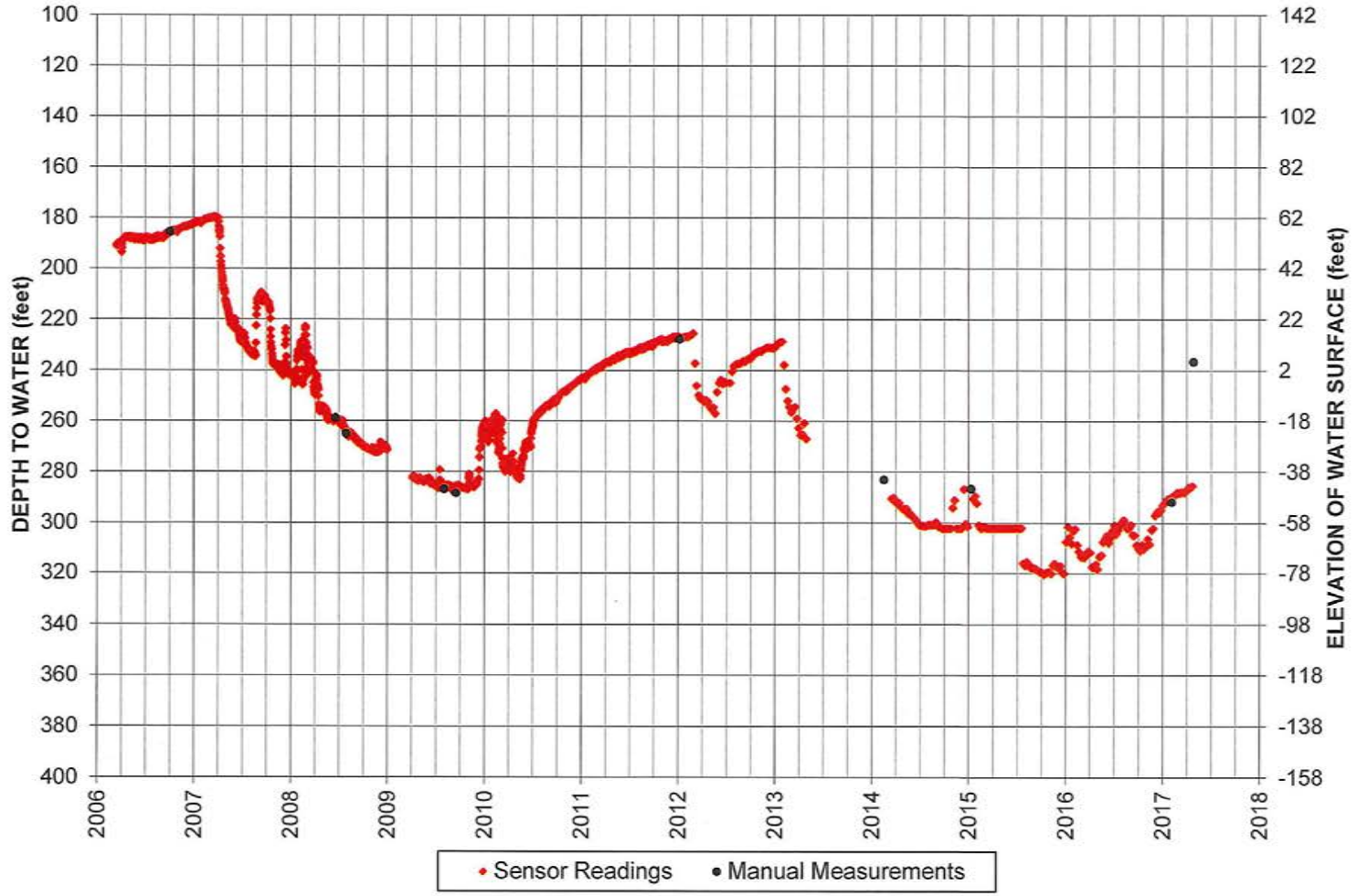
WATER LEVEL HYDROGRAPH FOR MONITOR WELL S-5
Perforated Interval: (380-410) T27S-R23E-Section 29M



Semitropic Water Storage District
(Manual data from the KCWA)

5/8/2017

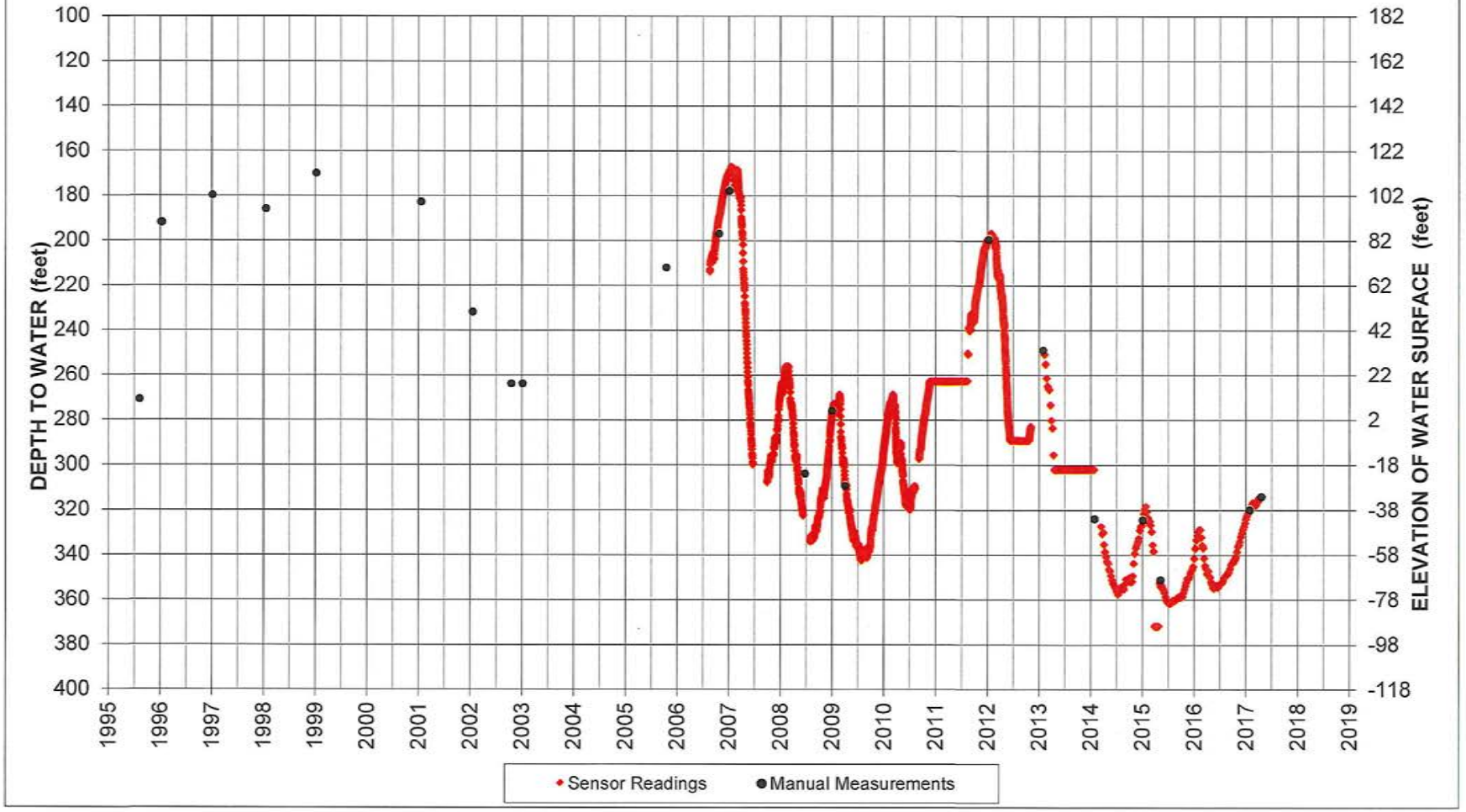
WATER LEVEL HYDROGRAPH FOR MONITOR WELL S-5
Perforated Interval: (380-410) T27S-R23E-Section 29M



Semitropic Water Storage District
(Manual data from the KCWA)

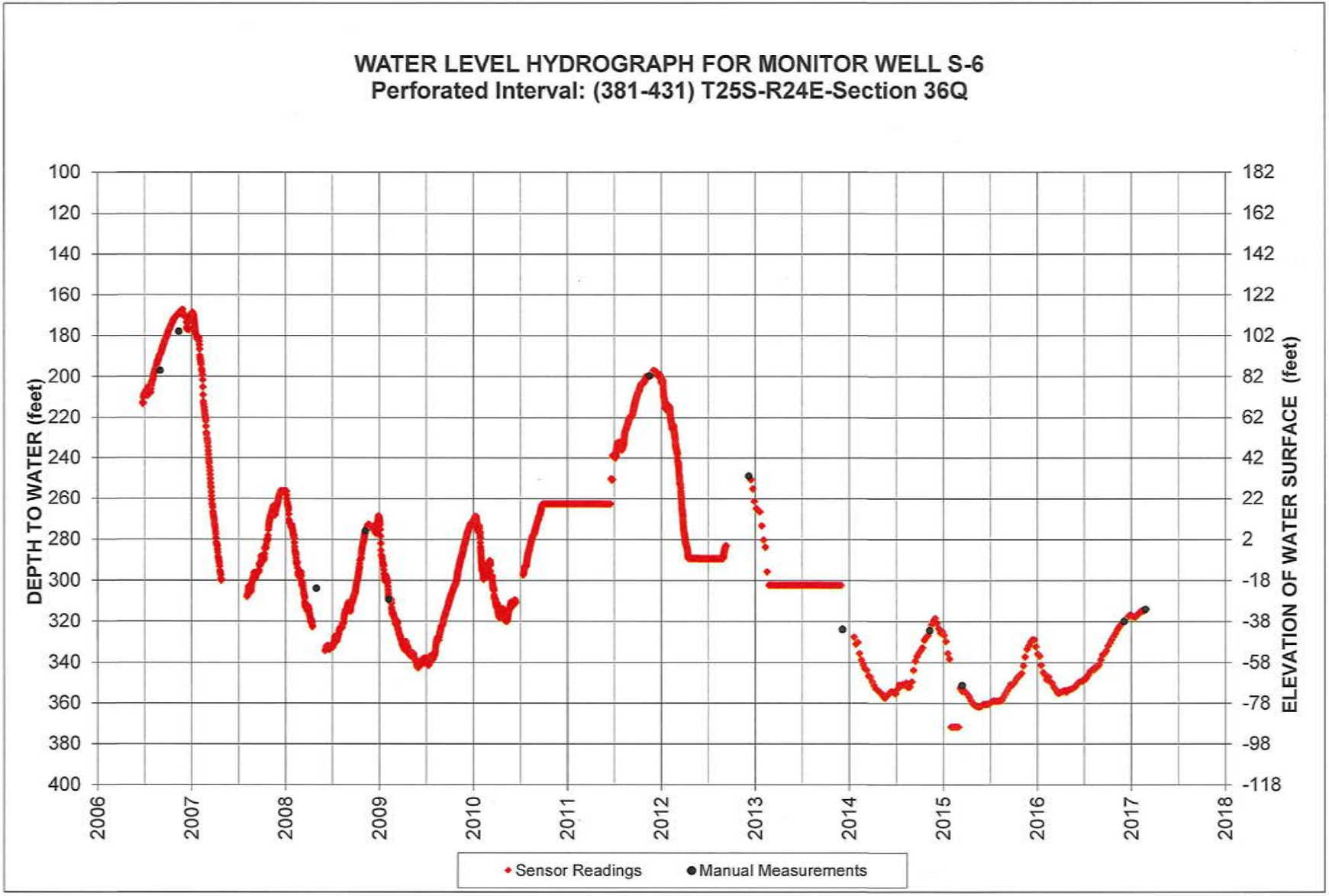
5/8/2017

WATER LEVEL HYDROGRAPH FOR MONITOR WELL S-6
Perforated Interval: (381-431) T25S-R24E-Section 36Q



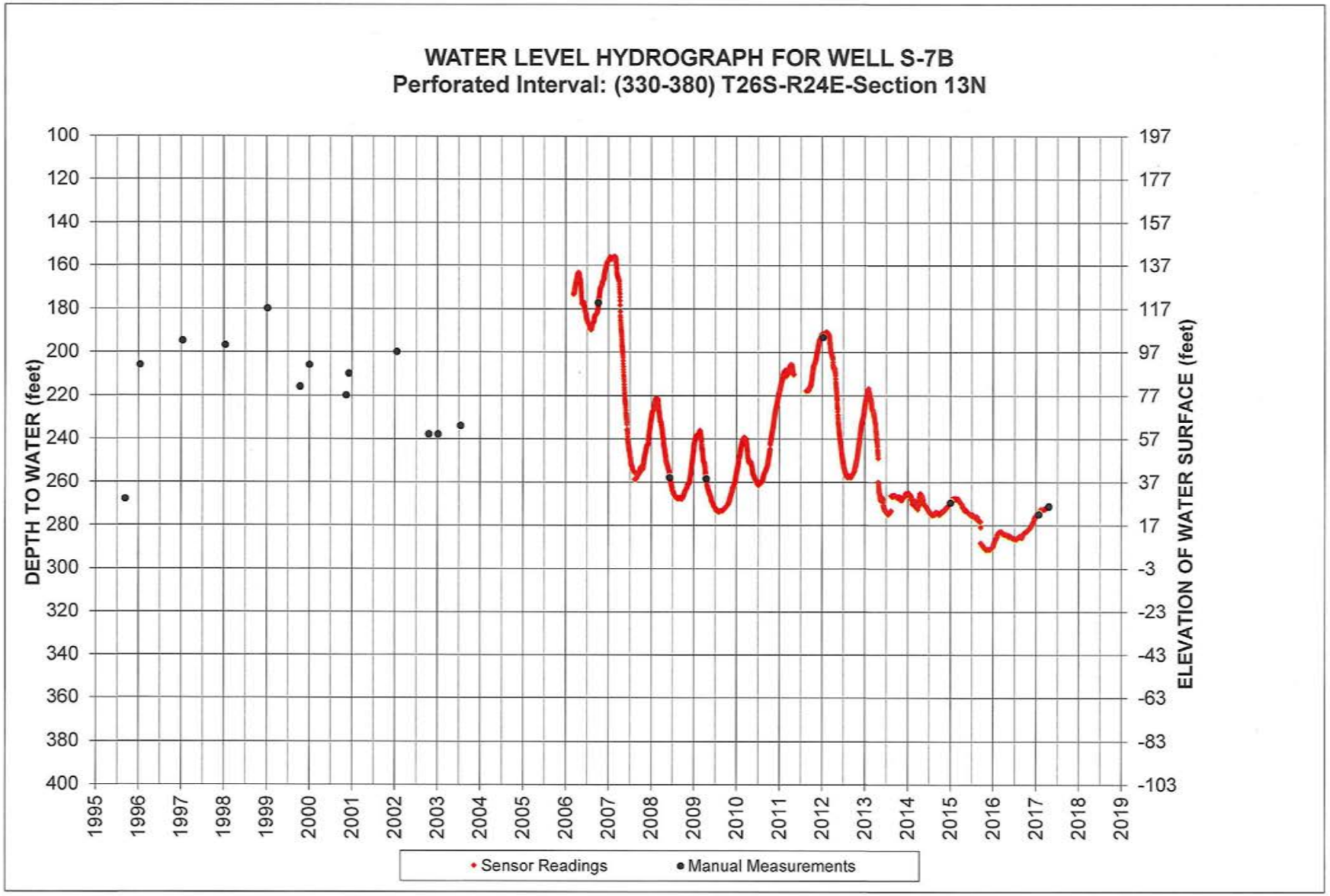
Semitropic Water Storage District
(Manual data from the KCWA)

5/8/2017



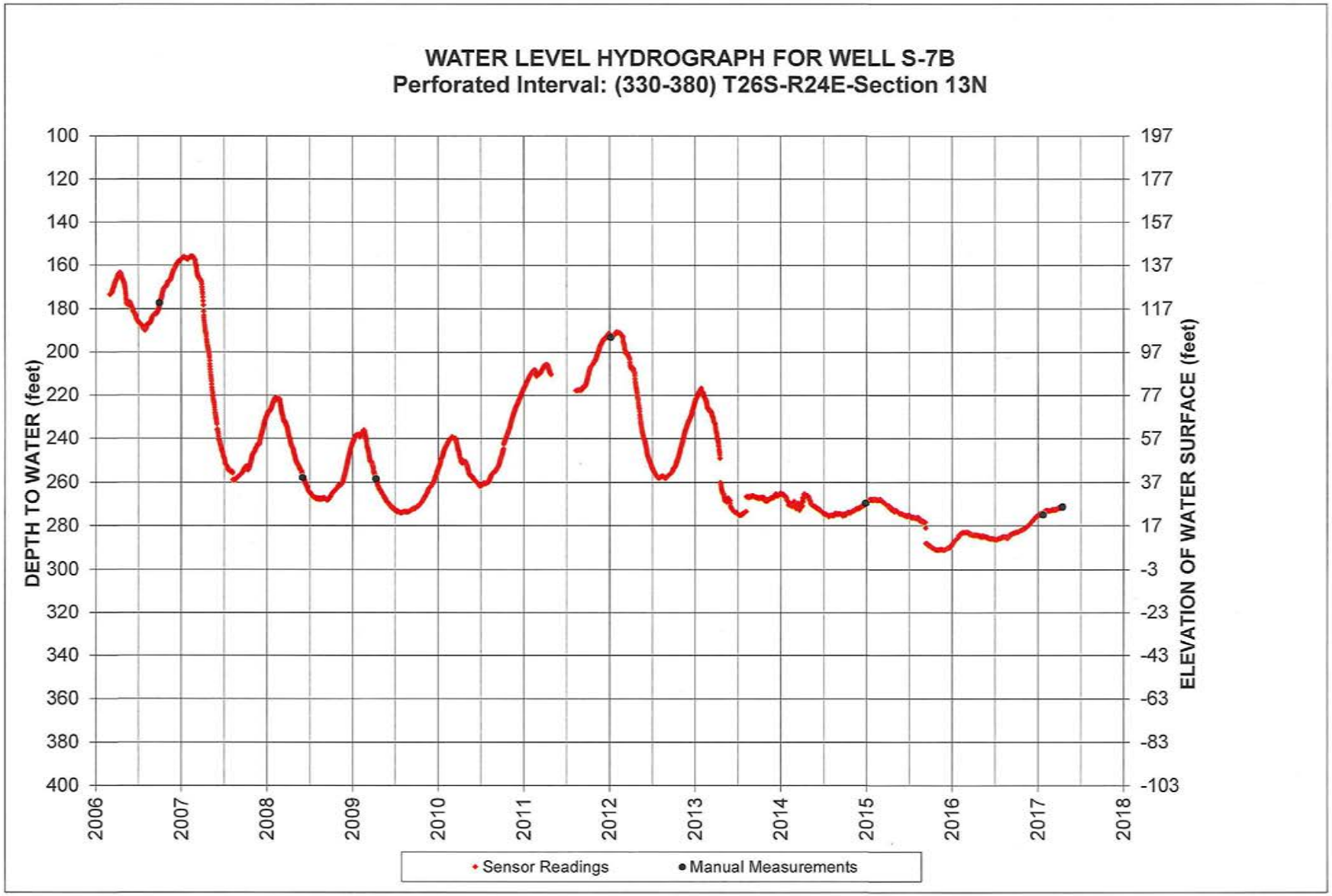
Semitropic Water Storage District
(Manual data from the KCWA)

5/8/2017



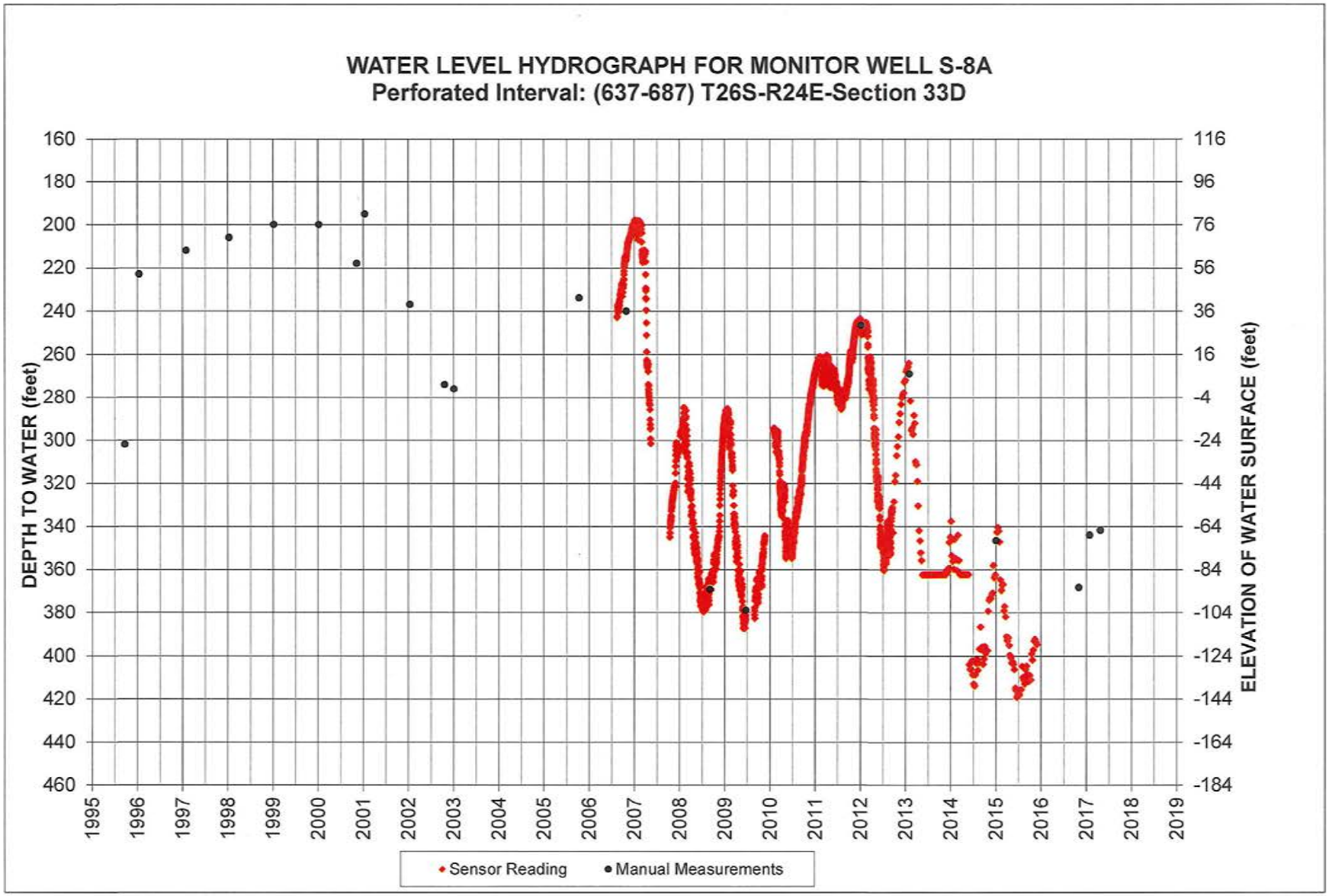
Semitropic Water Storage District
(Manual data from the KCWA)

5/8/2017



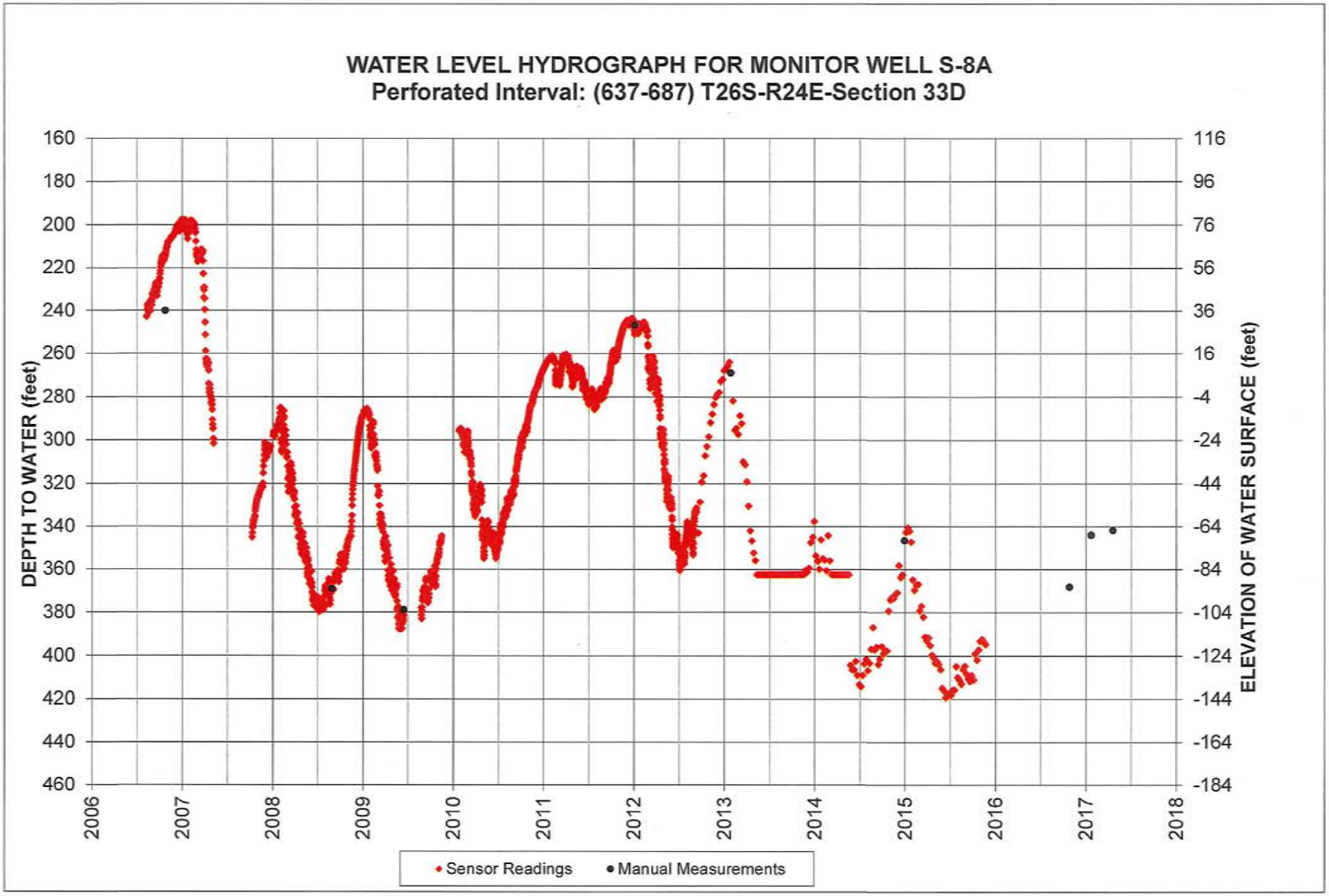
Semitropic Water Storage District
(Manual data from the KCWA)

5/8/2017



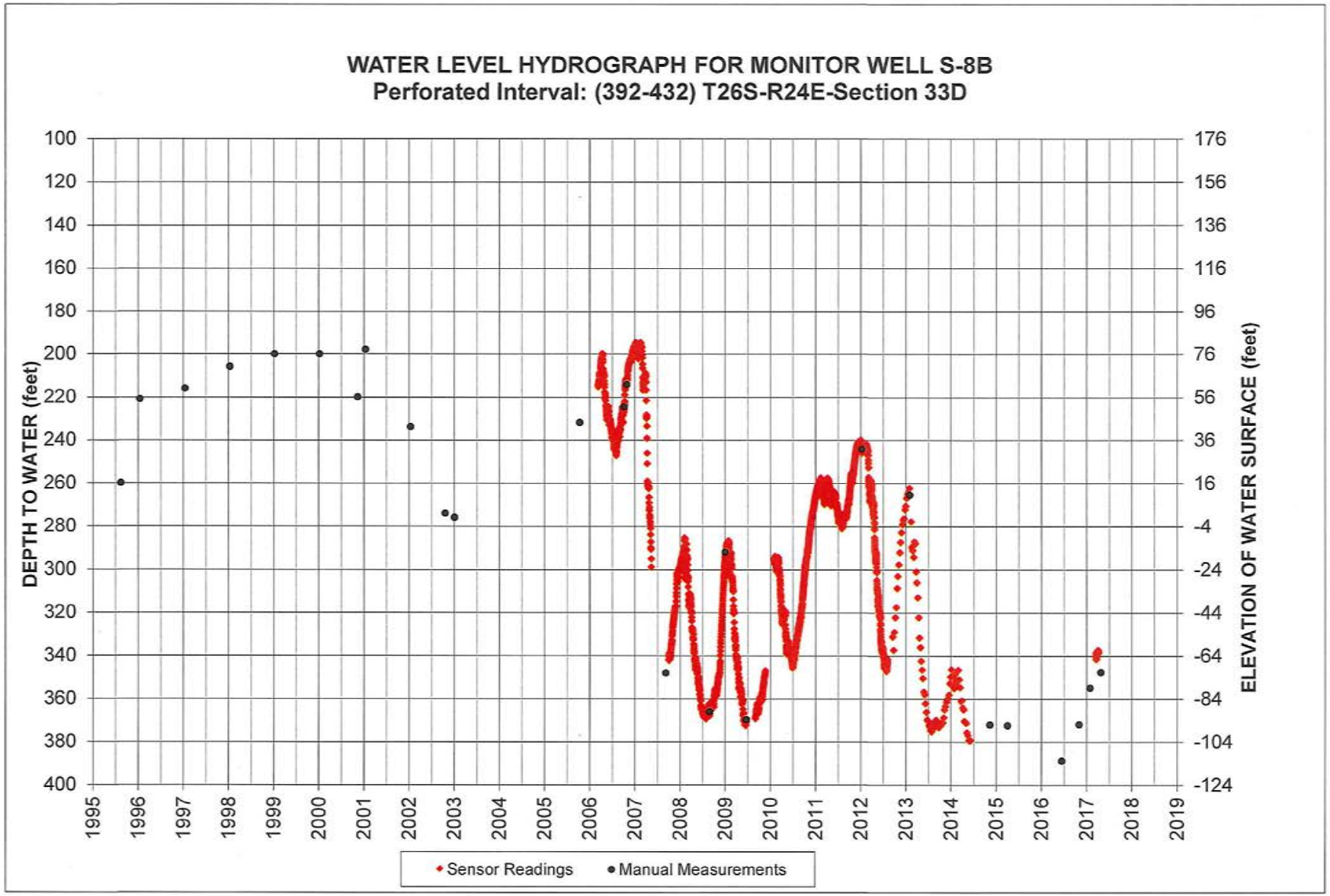
Semitropic Water Storage District
(Manual data from the KCWA)

5/8/2017



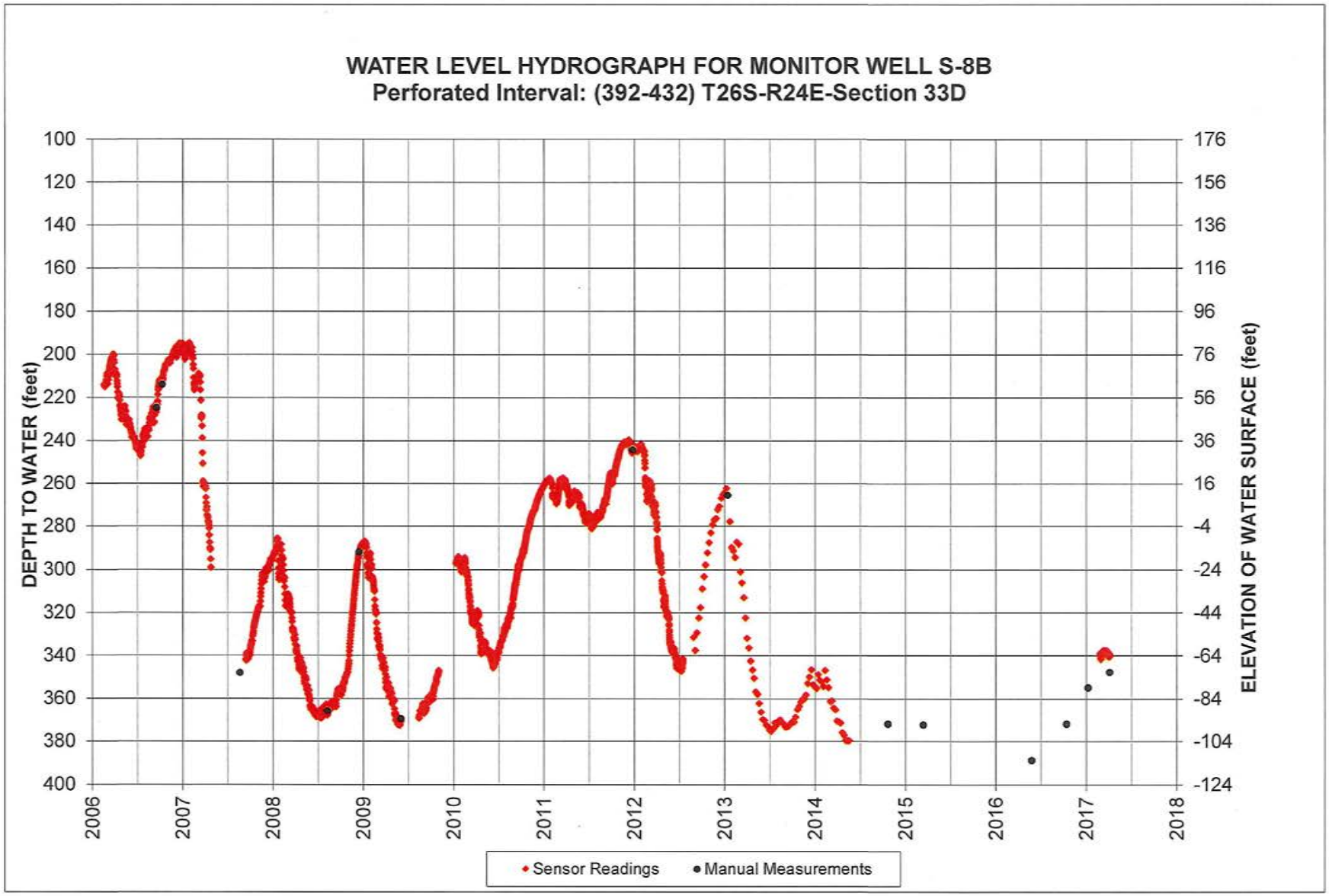
Semitropic Water Storage District
(Manual data from the KCWA)

5/8/2017



Semitropic Water Storage District
(Manual data from the KCWA)

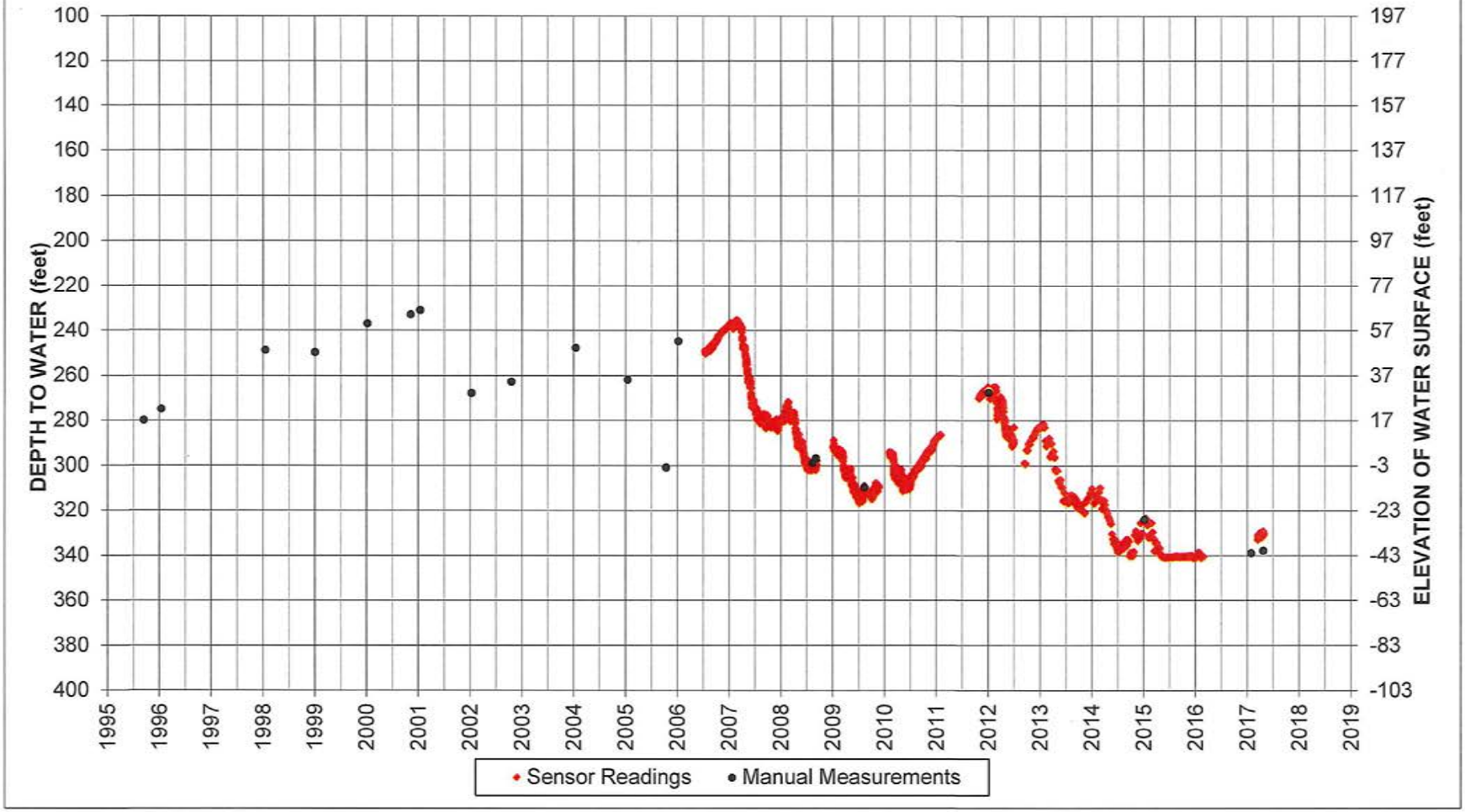
5/8/2017



Semitropic Water Storage District
(Manual data from the KCWA)

5/8/2017

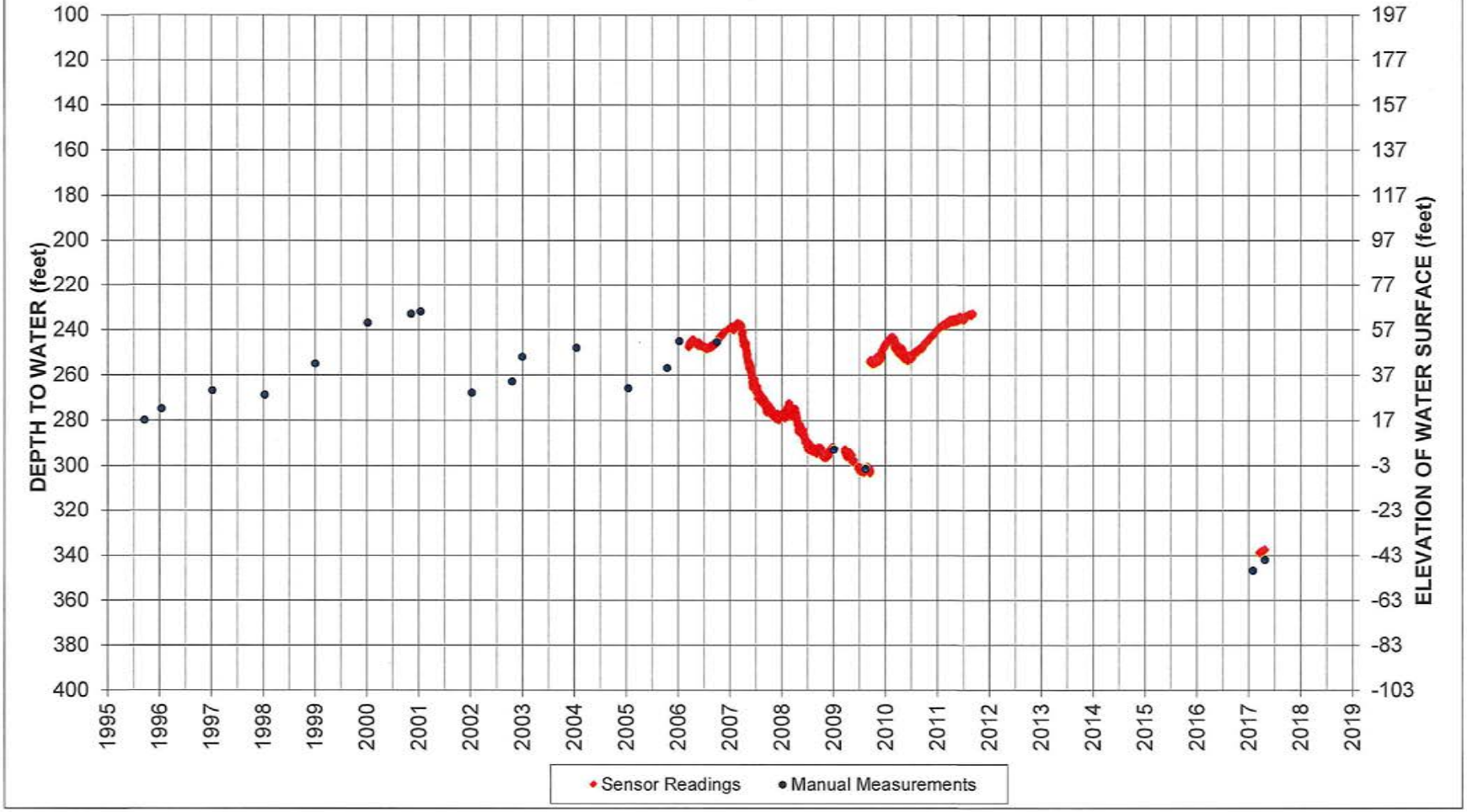
WATER LEVEL HYDROGRAPH FOR MONITOR WELL S-9A
Perforated Interval: (660-690) T28S-R24E-Section 4L



Semitropic Water Storage District
(Manual data from the KCWA)

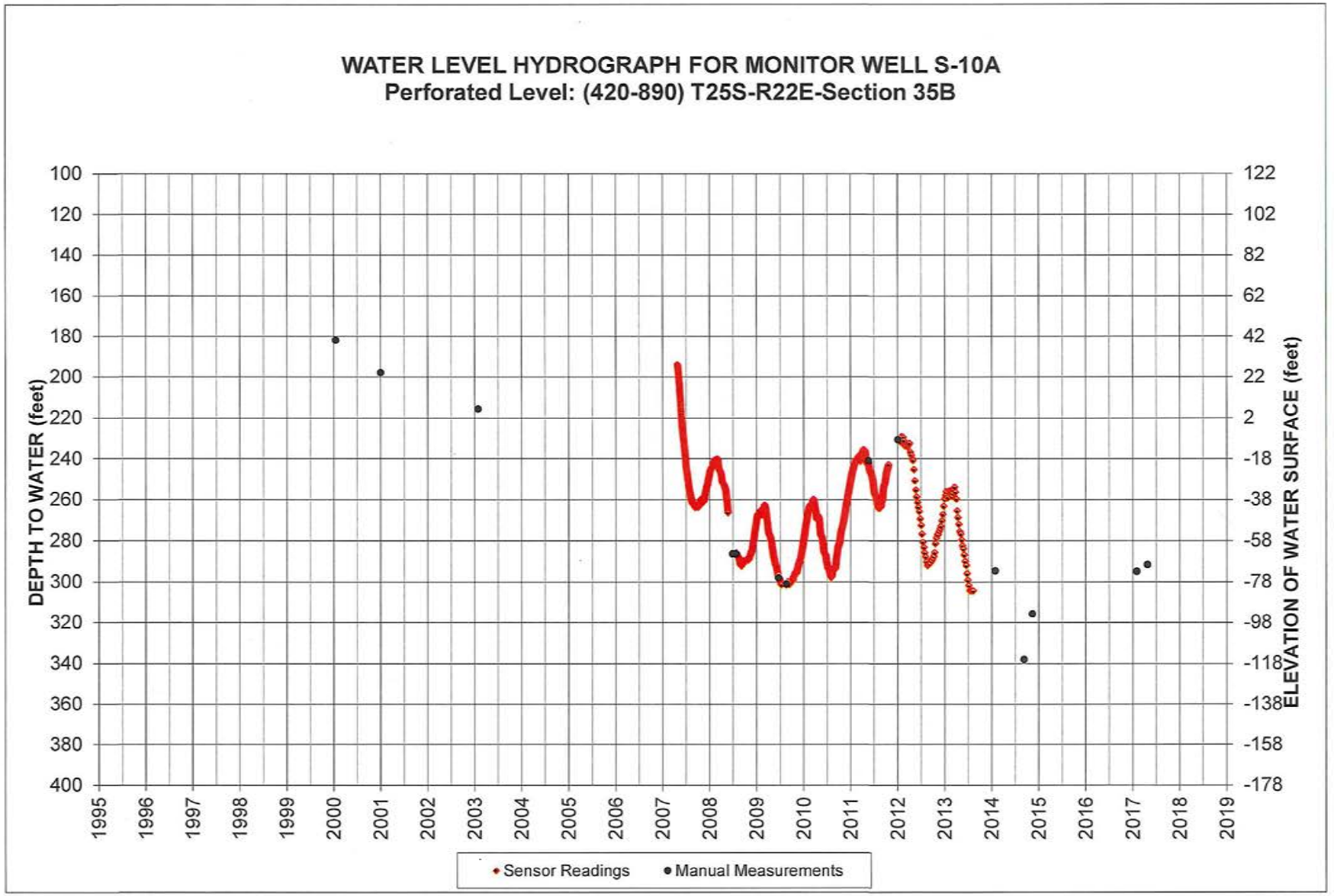
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WATER LEVEL HYDROGRAPH FOR MONITOR WELL S-9B
Perforated Interval: (357-407) T28S-R24E-Section 4L



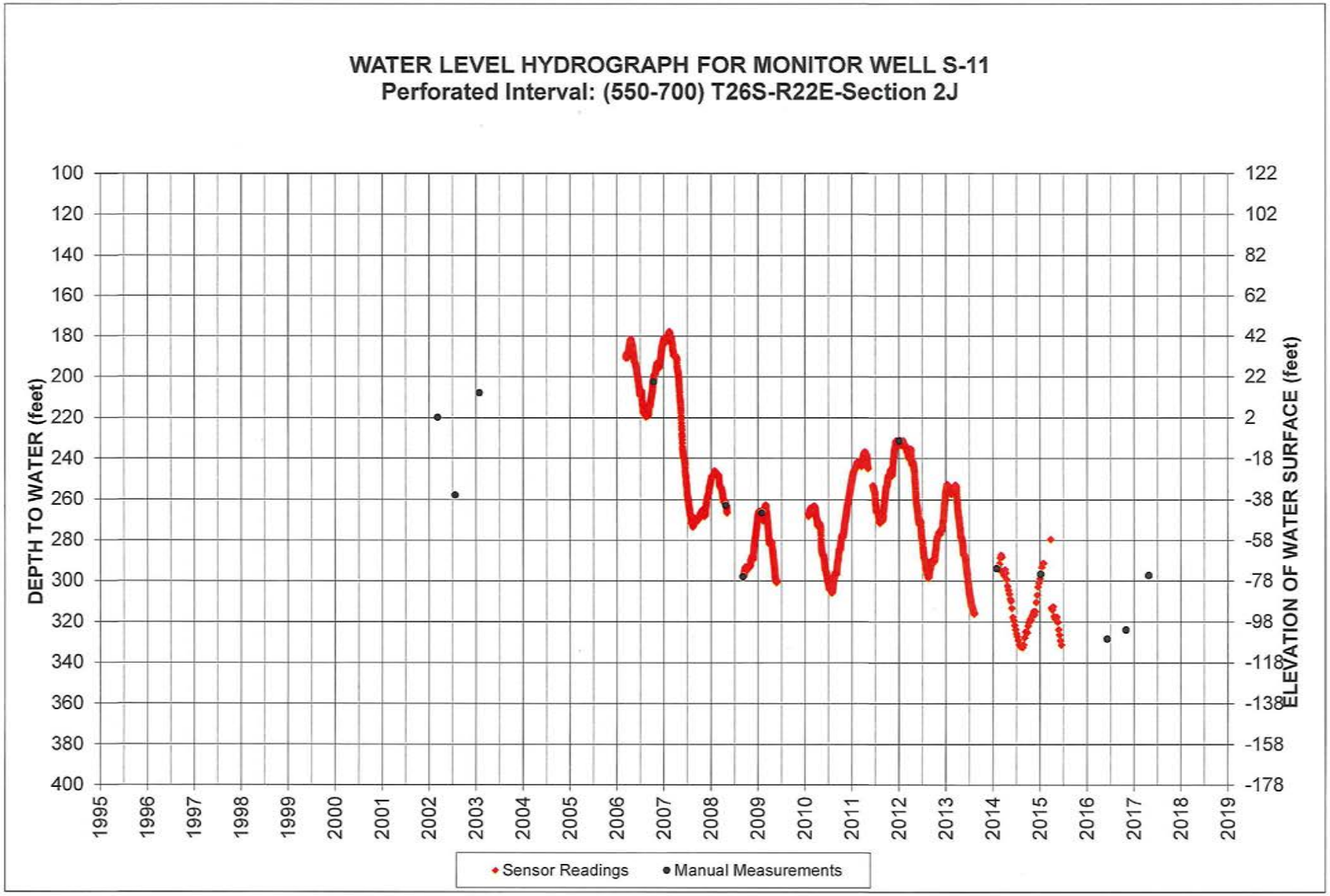
Semitropic Water Storage District
(Manual data from the KCWA)

5/8/2017



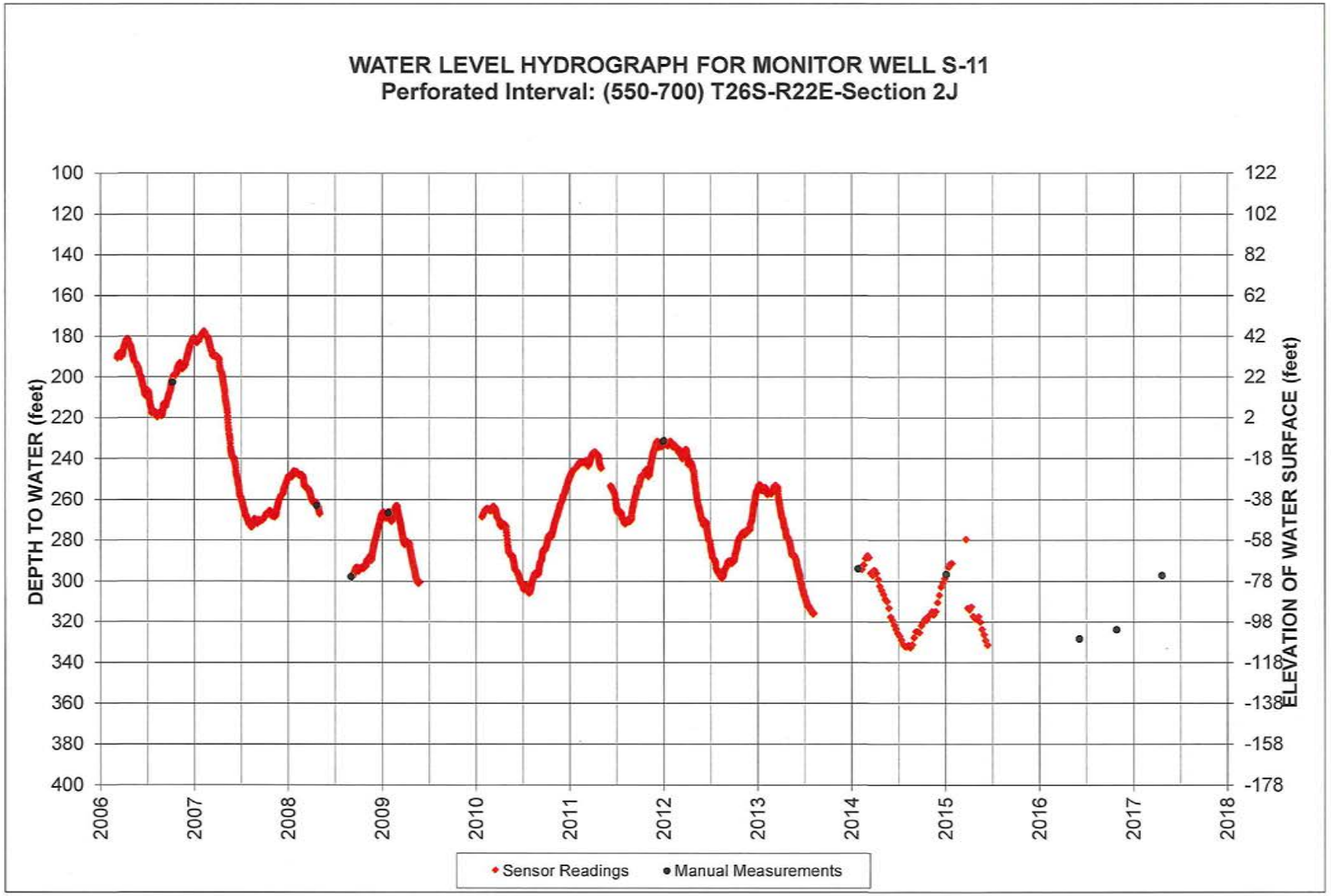
Semitropic Water Storage District
(Manual data from the KCWA)

5/8/2017



Semitropic Water Storage District
(Manual data from the KCWA)

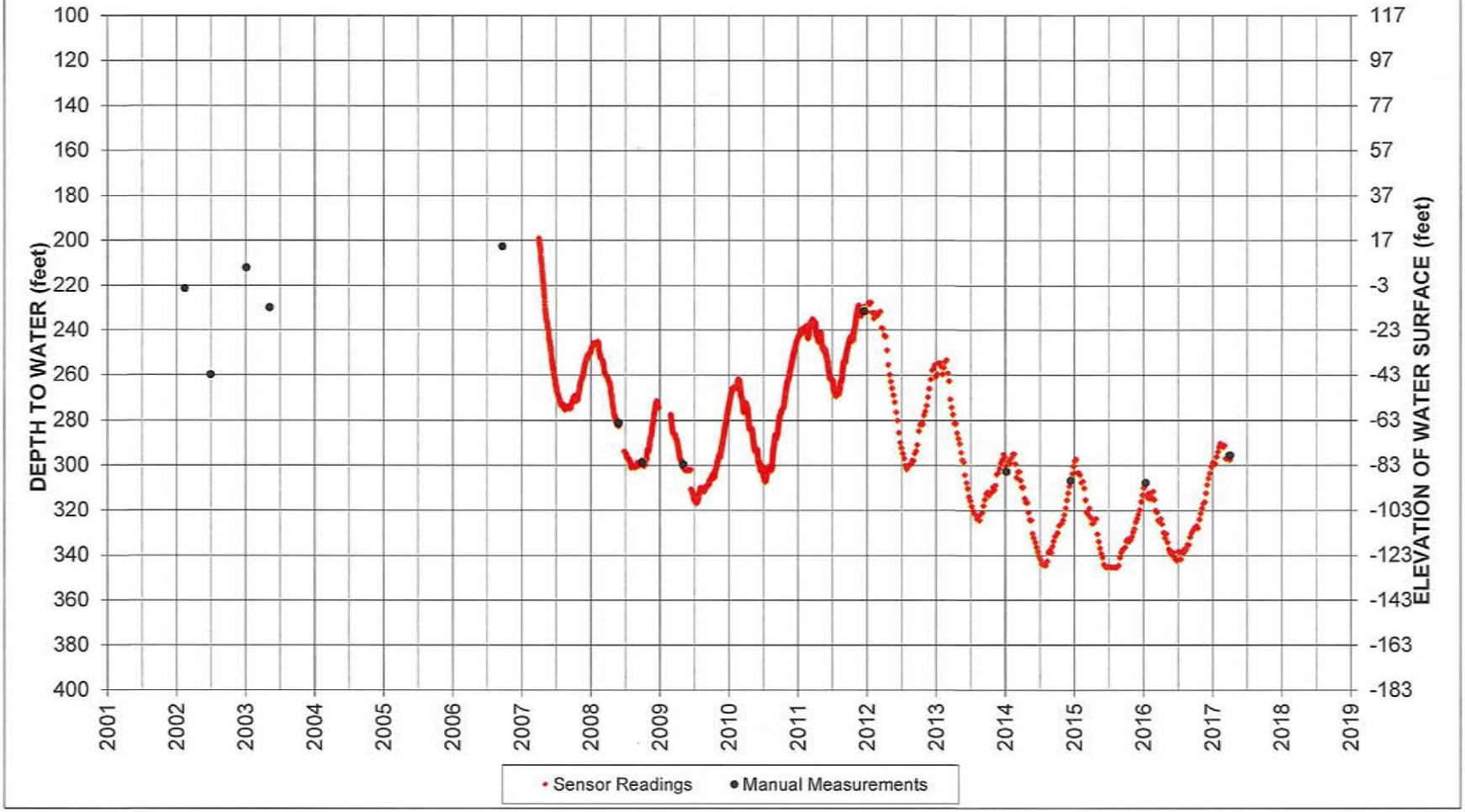
5/8/2017



Semitropic Water Storage District
(Manual data from the KCWA)

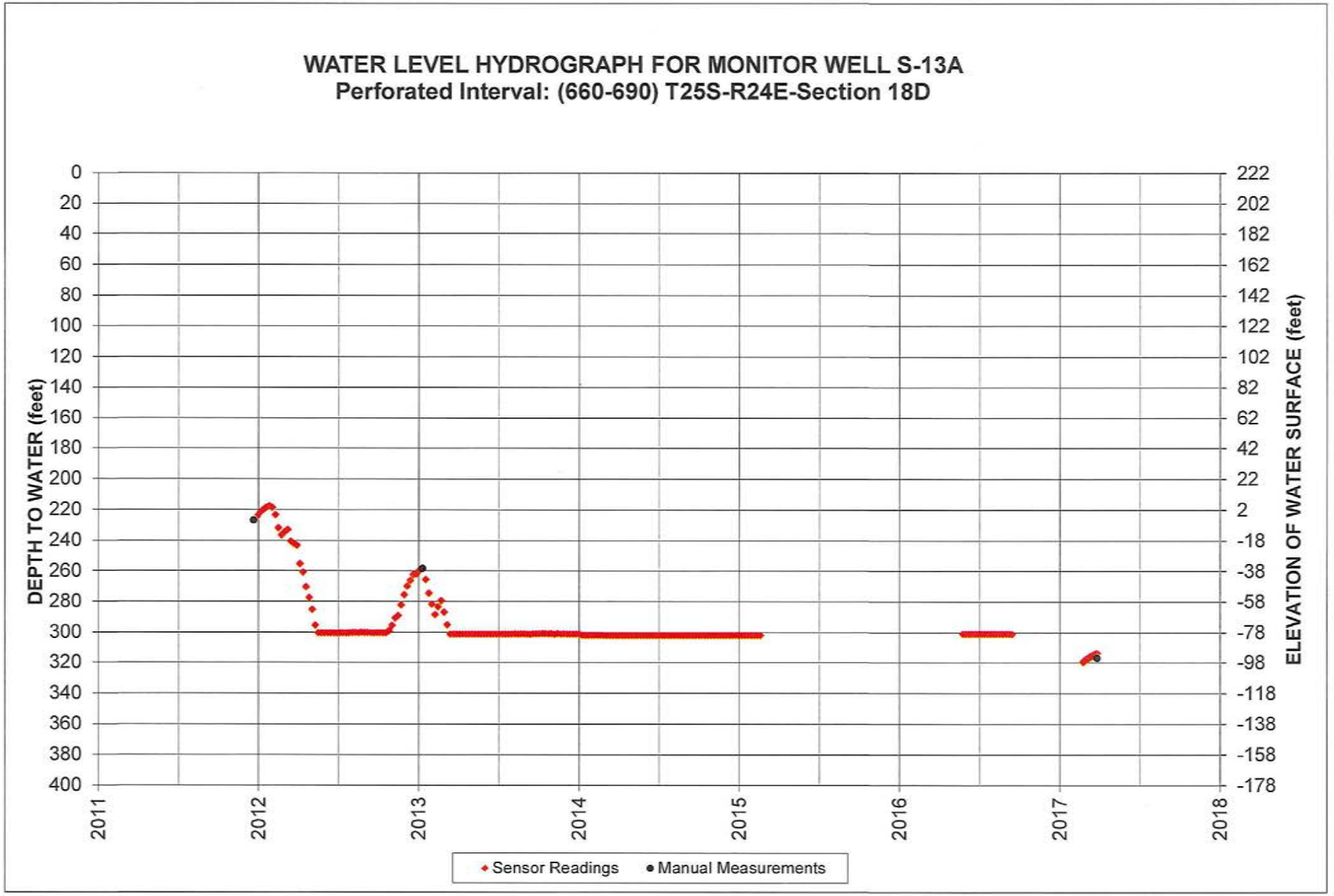
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WATER LEVEL HYDROGRAPH FOR MONITOR WELL S-12
Perforated Interval: (510-740) T25S-R22E-Section 25L



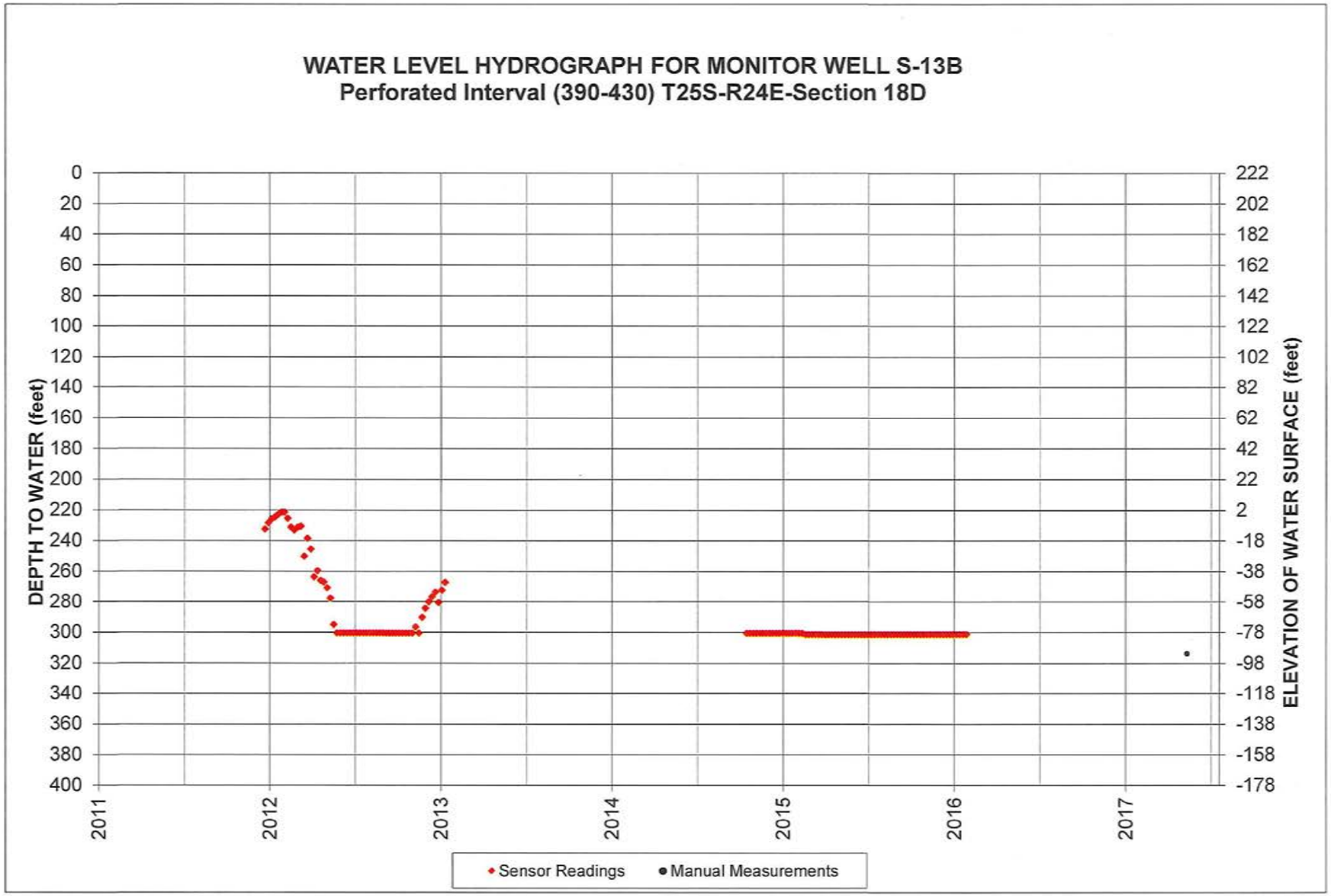
Semitropic Water Storage District
(Manual data from the KCWA)

5/8/2017



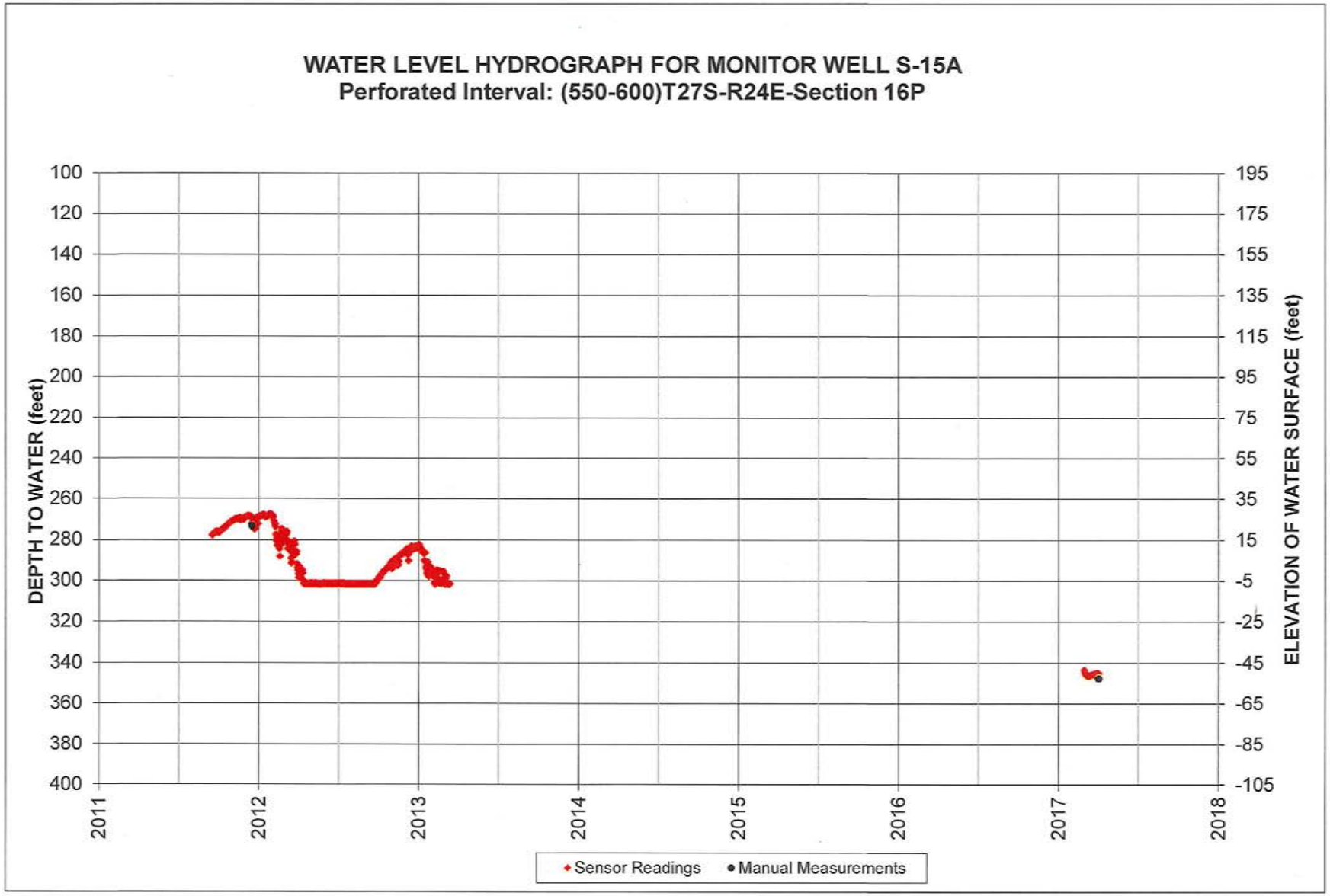
Semitropic Water Storage District
(Manual data from the KCWA)

5/8/2017



Semitropic Water Storage District
(Manual data from the KCWA)

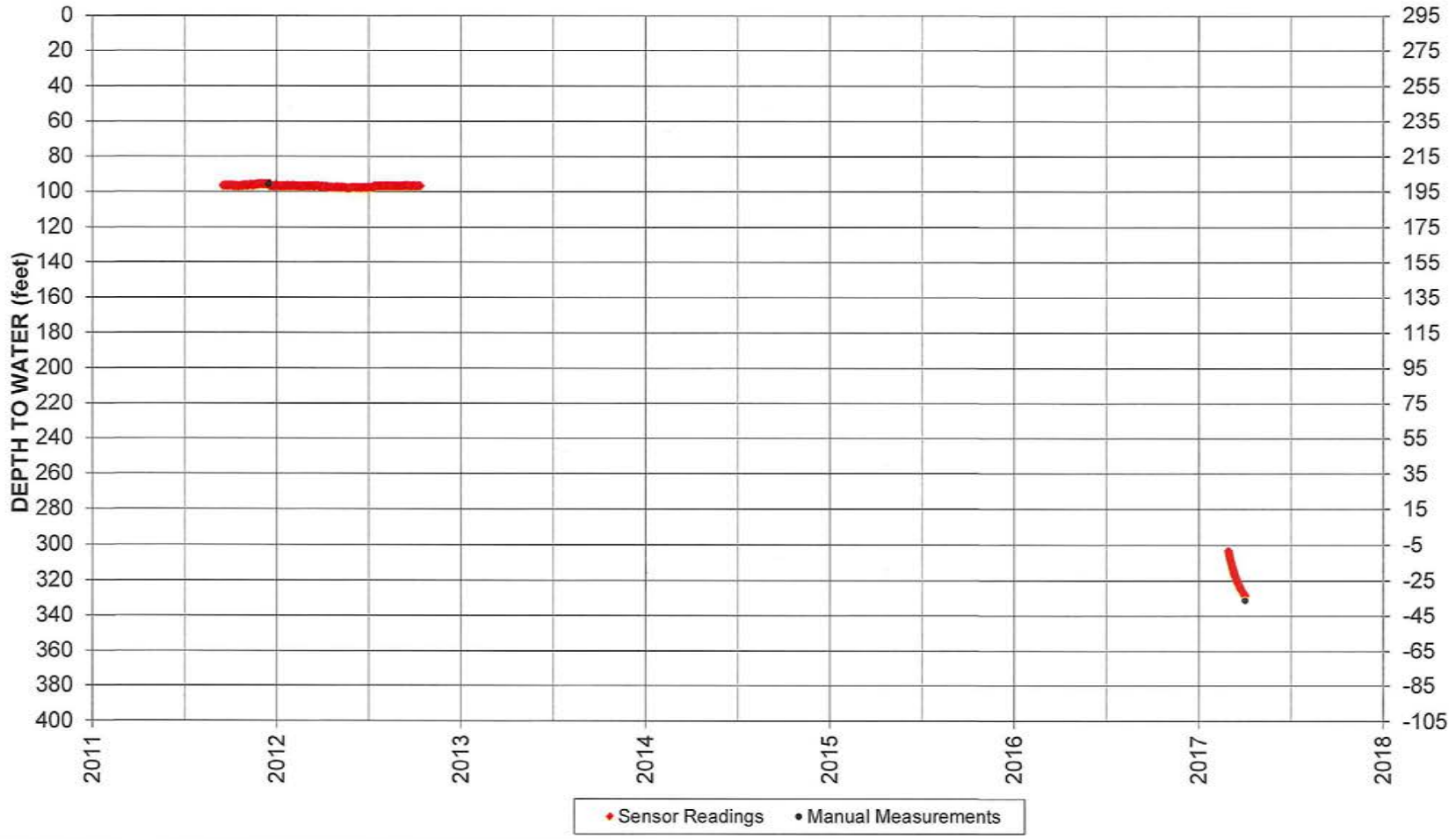
5/8/2017



Semitropic Water Storage District
(Manual data from the KCWA)

5/8/2017

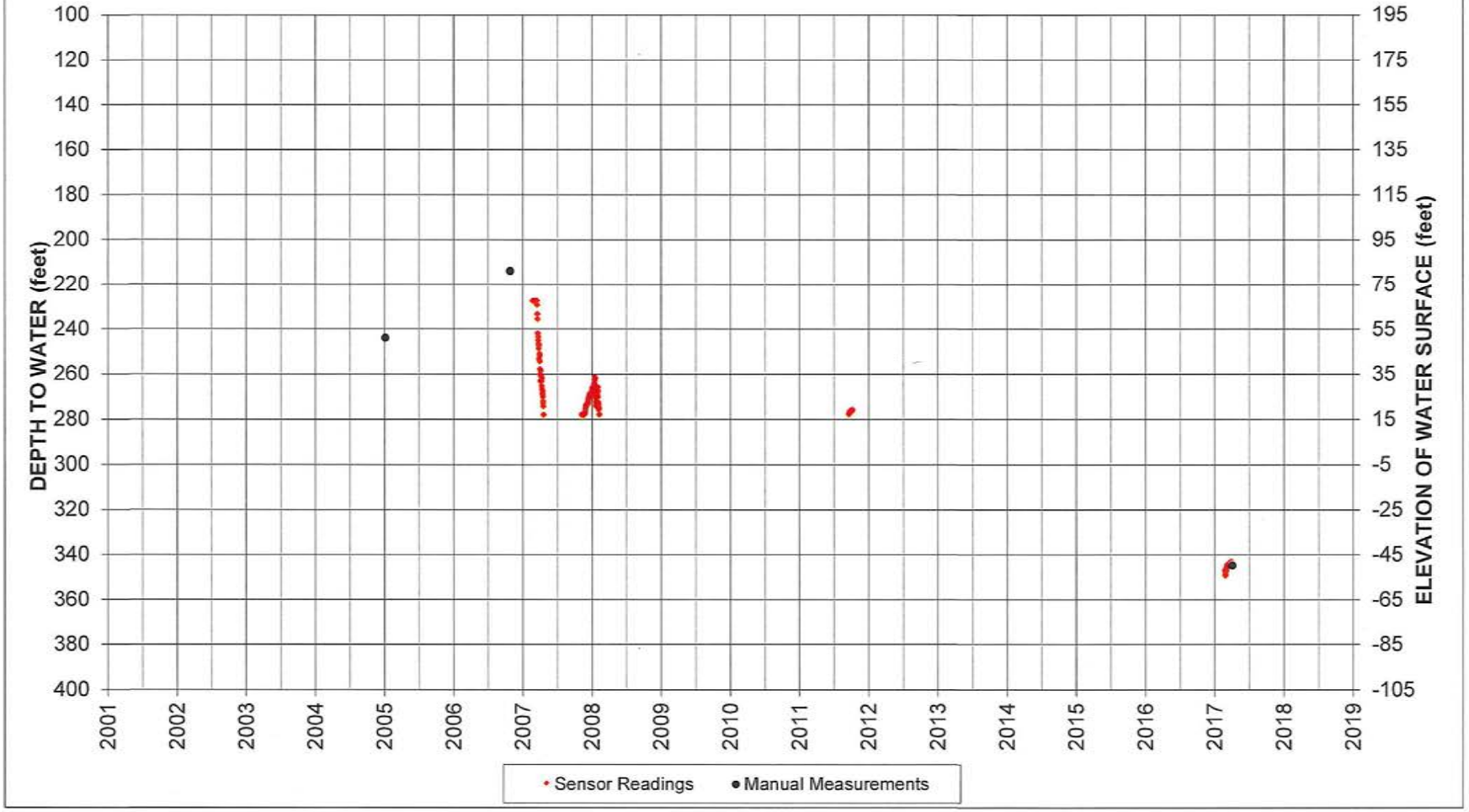
WATER LEVEL HYDROGRAPH FOR MONITOR WELL S-15B
Perforated Interval: (400-450)T27S-R24E-Section 16P



Semitropic Water Storage District
(Manual data from the KCWA)

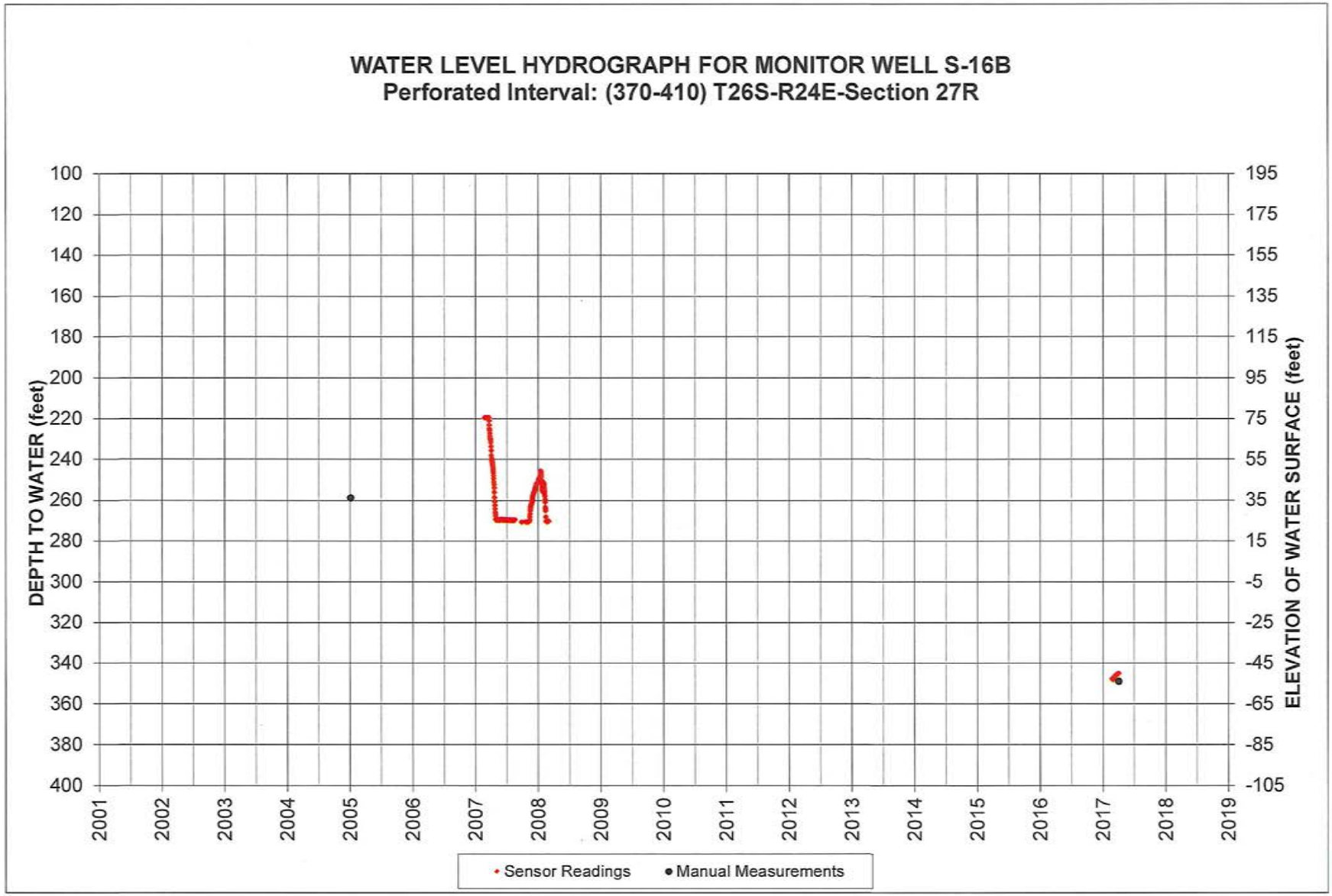
5/8/2017

WATER LEVEL HYDROGRAPH FOR MONITOR WELL S-16A
Perforated Interval: (620-670) T26S-R24E-Section 27Q



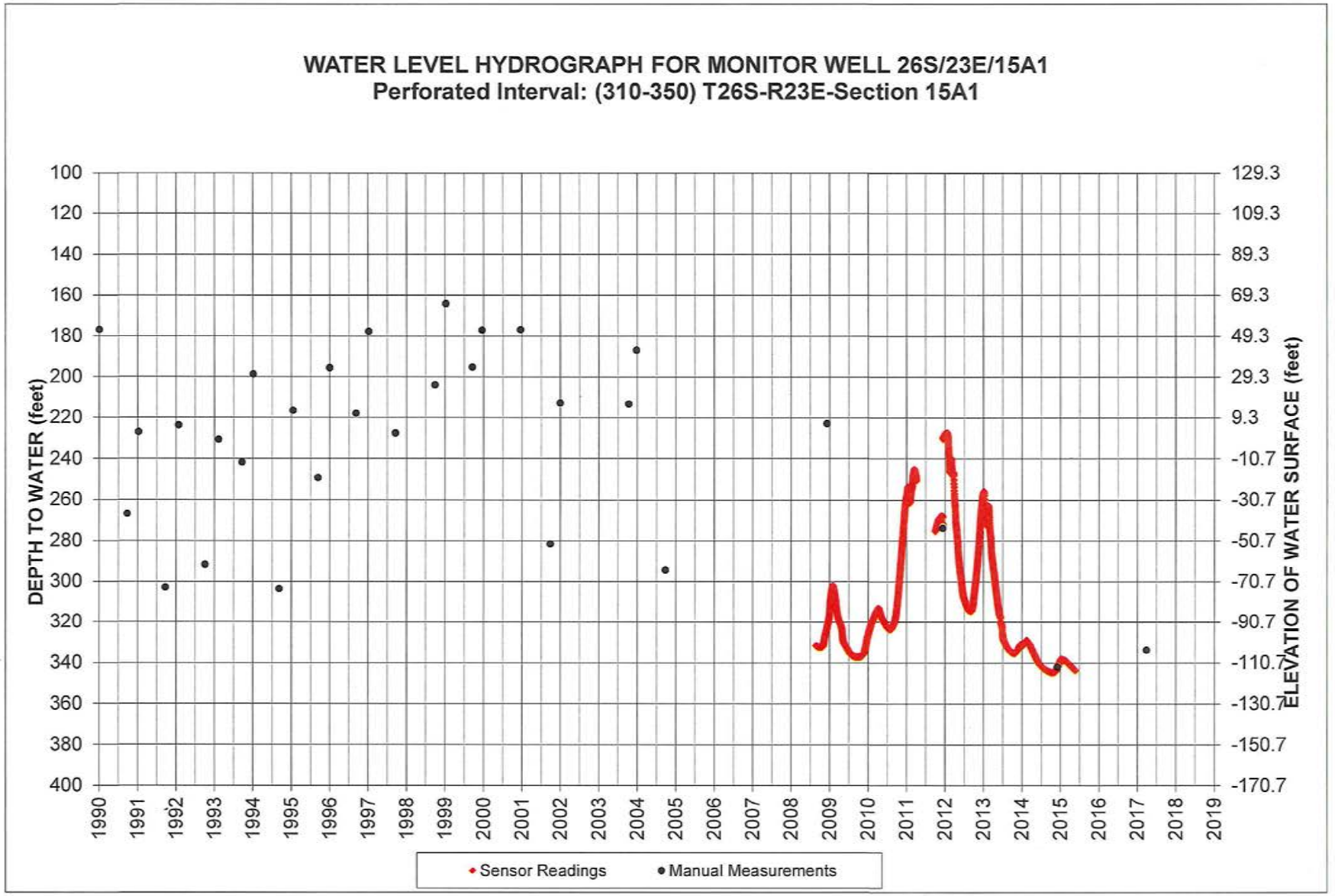
Semitropic Water Storage District
(Manual data from the KCWA)

5/8/2017



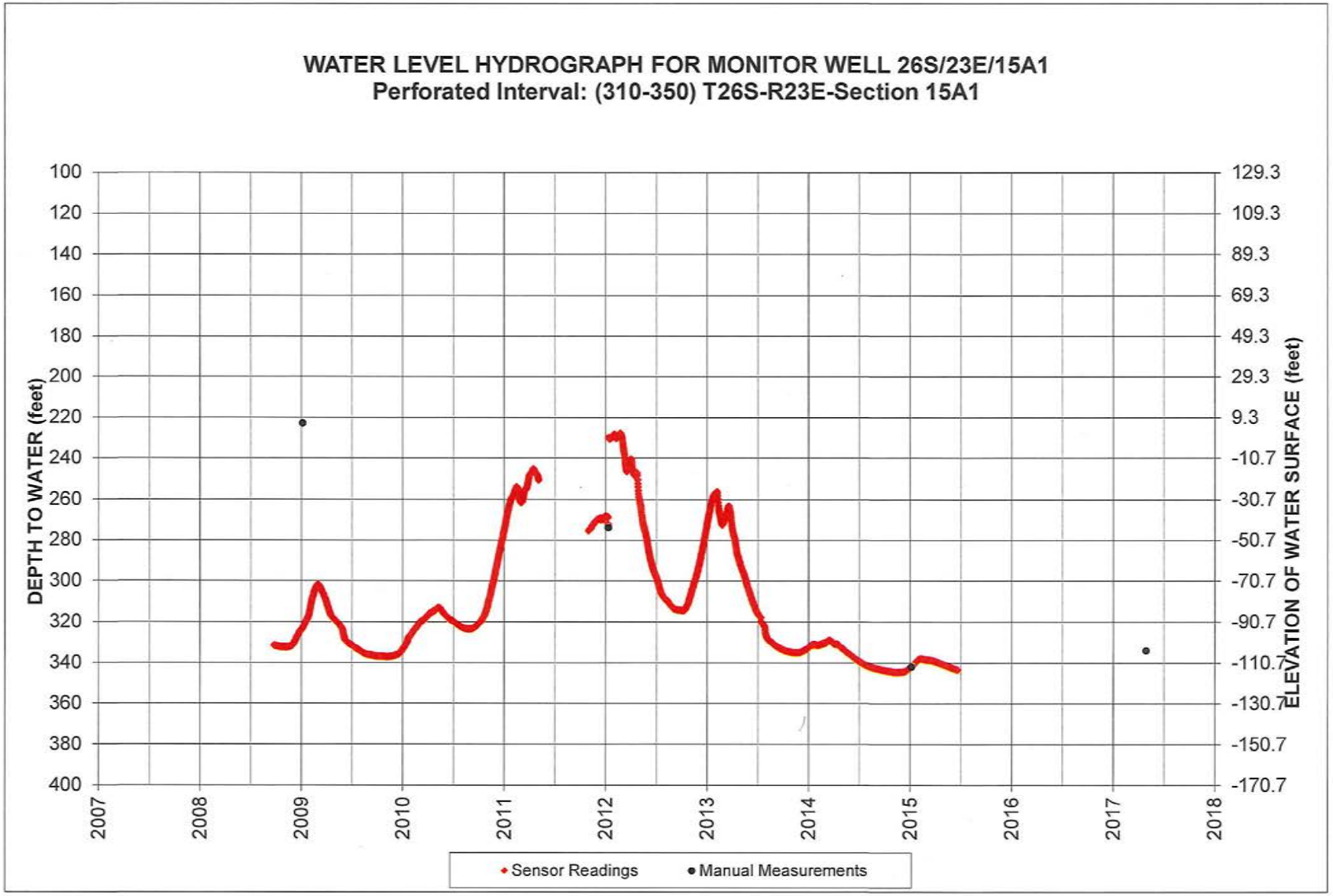
Semitropic Water Storage District
(Manual data from the KCWA)

5/8/2017



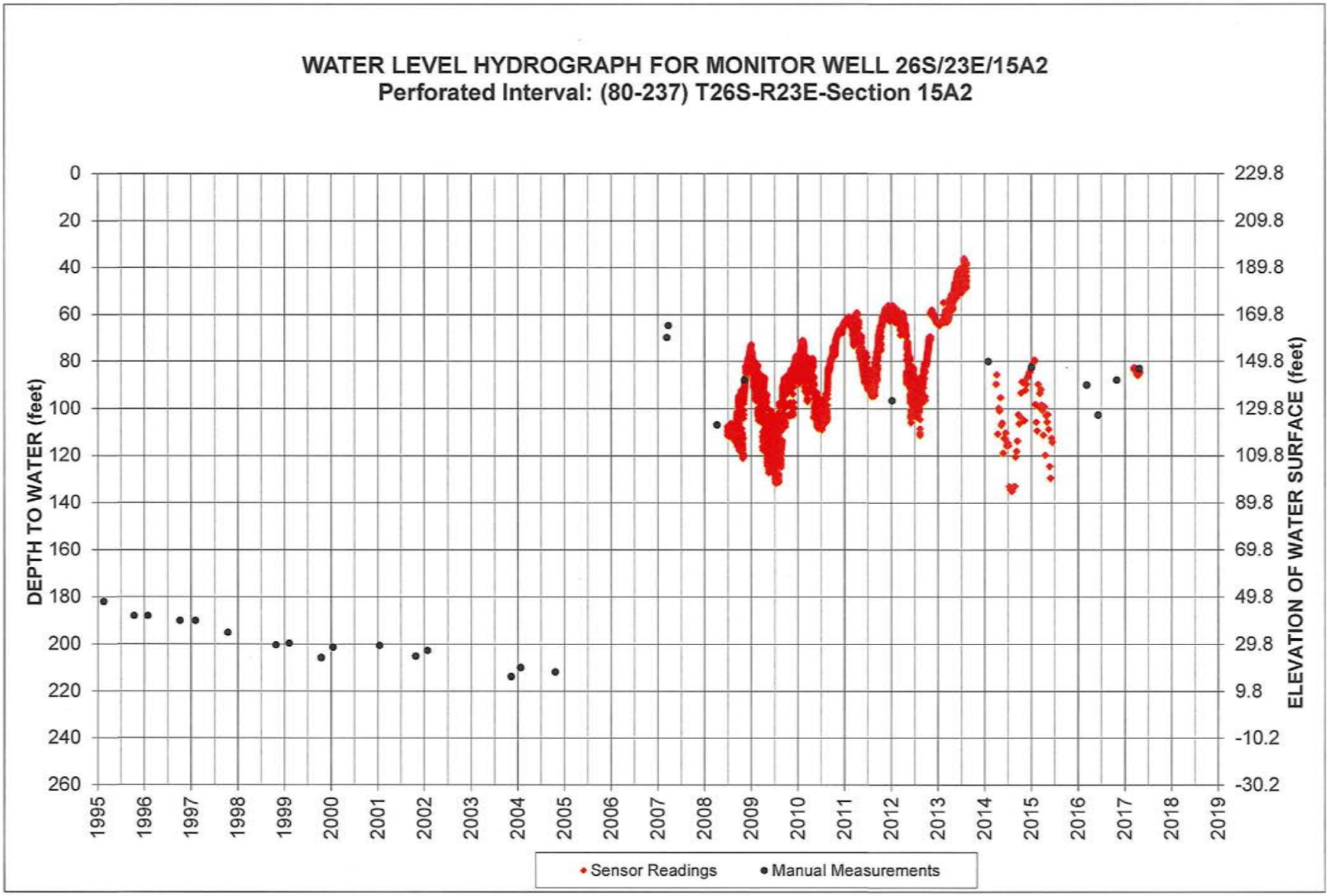
Semitropic Water Storage District
(Manual data from the KCWA)

5/8/2017



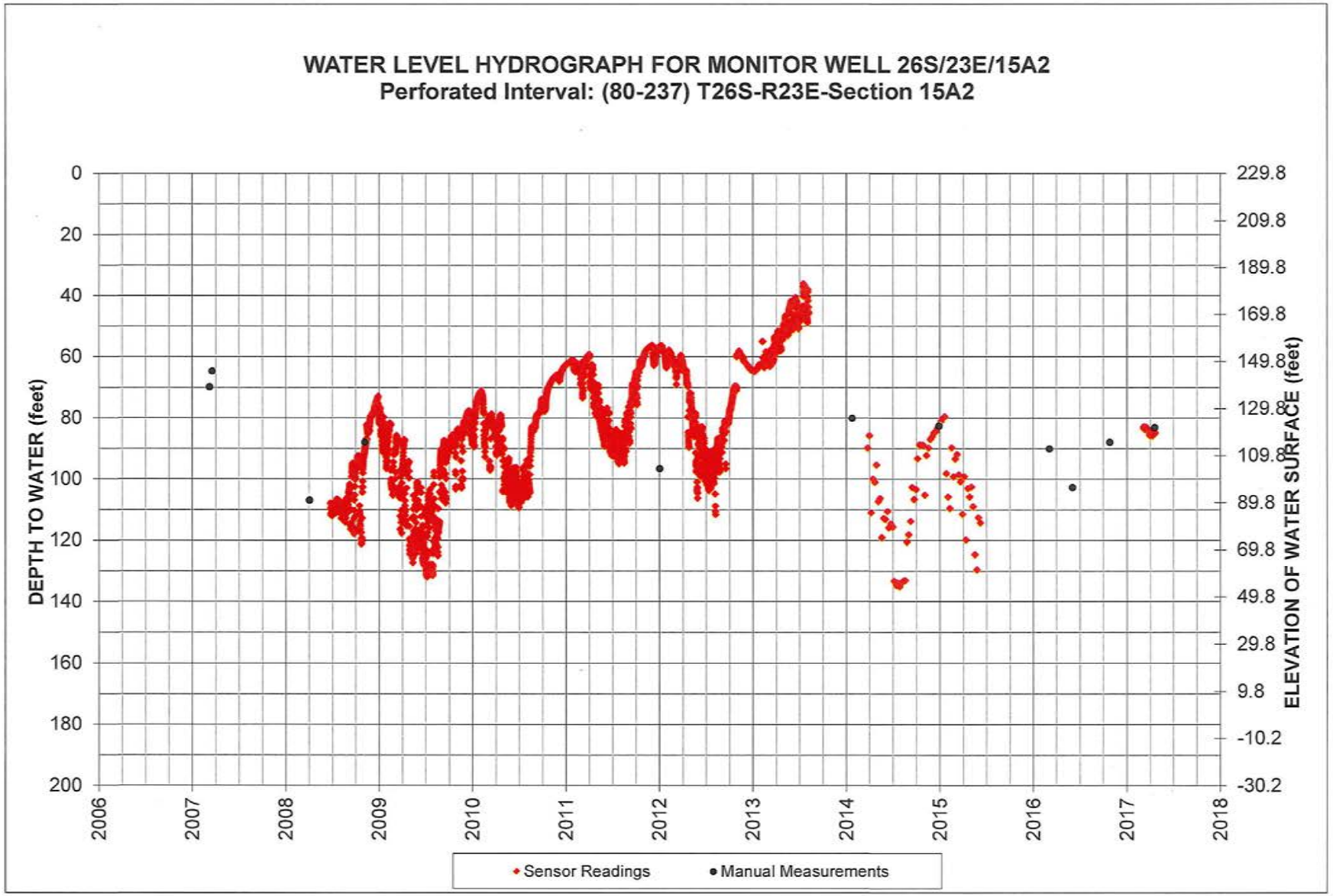
Semitropic Water Storage District
(Manual data from the KCWA)

5/8/2017



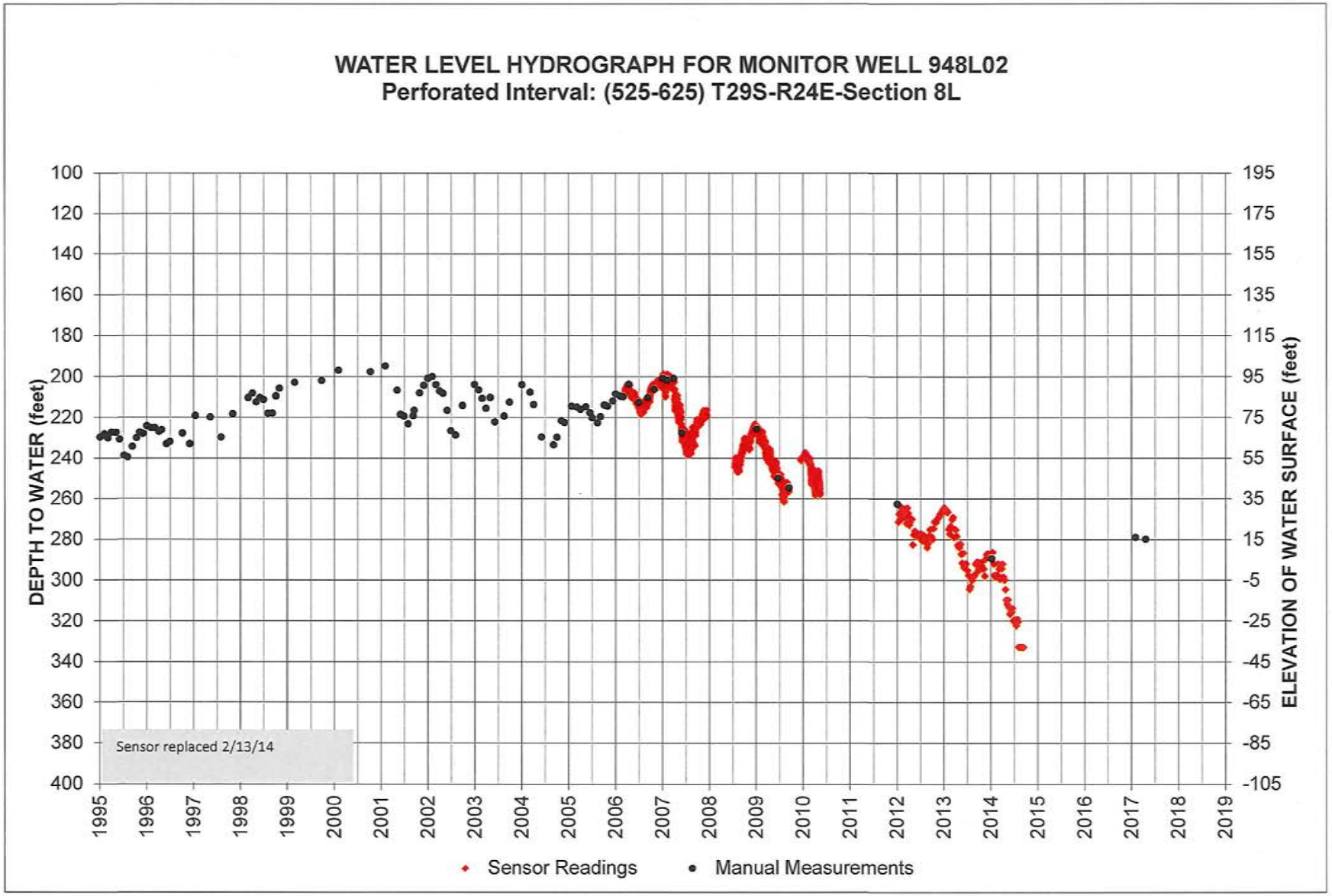
Semitropic Water Storage District
(Manual data from the KCWA)

5/8/2017



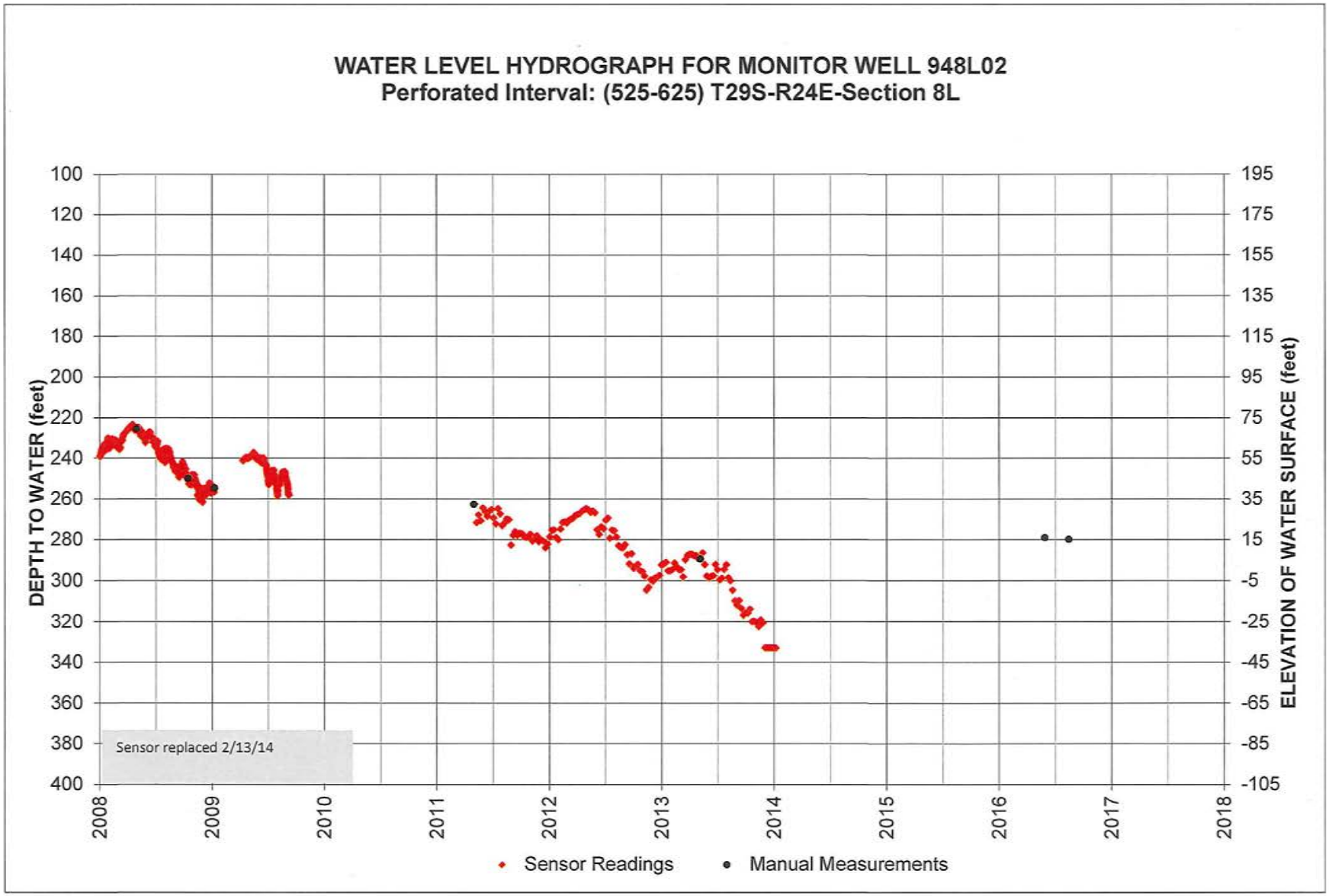
Semitropic Water Storage District
(Manual data from the KCWA)

5/8/2017



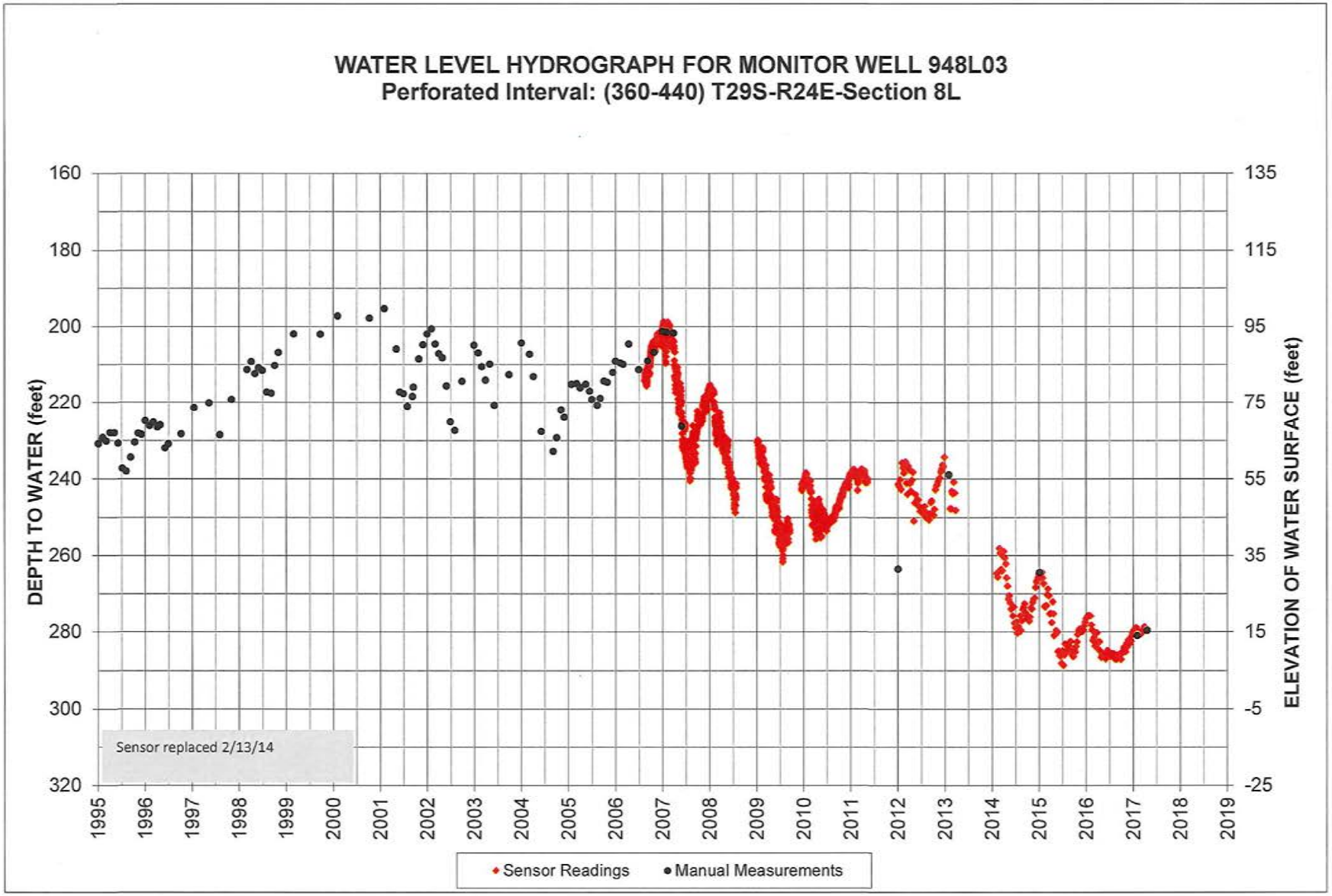
Semitropic Water Storage District
(Manual data from the KCWA)

5/8/2017



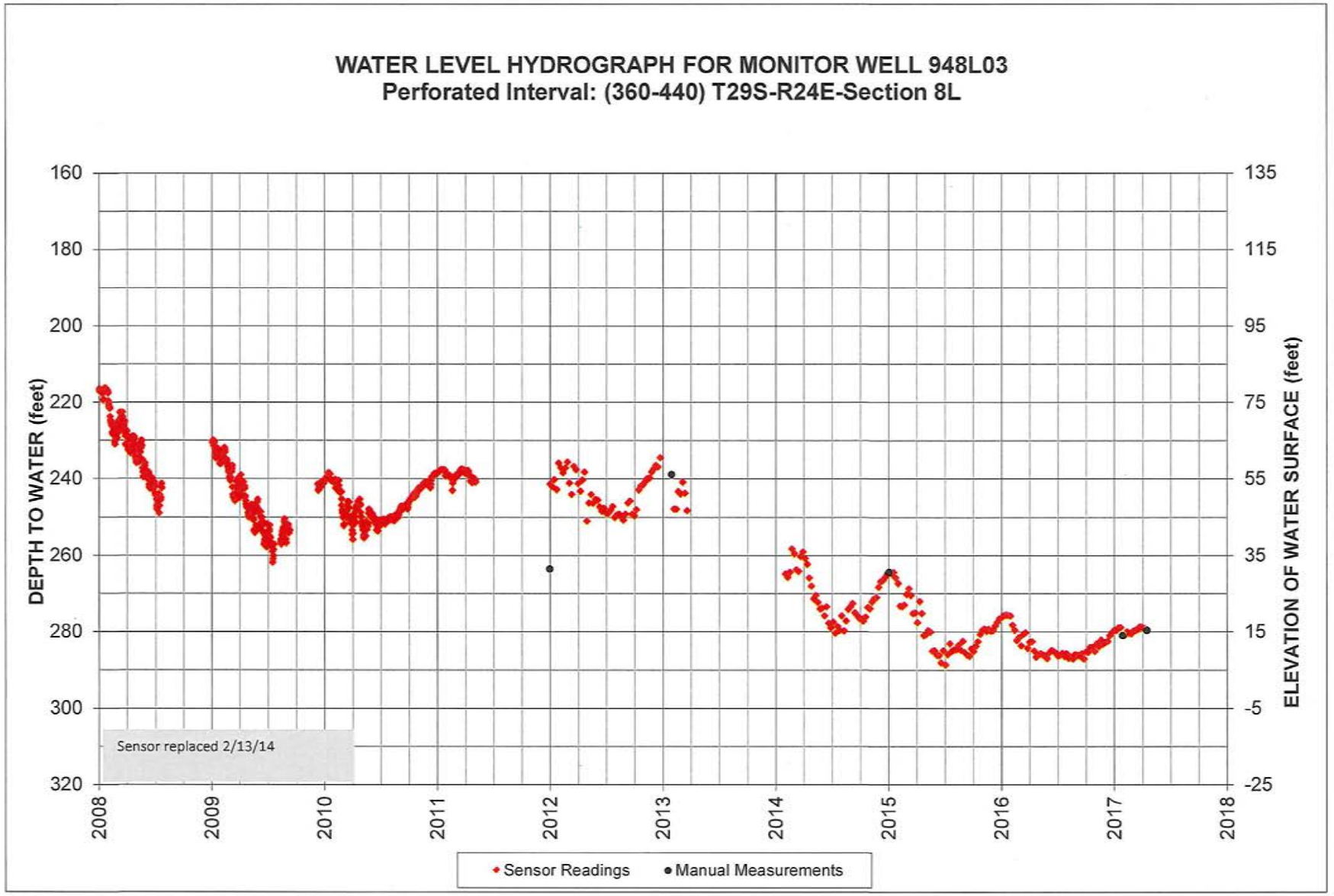
Semitropic Water Storage District
(Manual data from the KCWA)

5/8/2017



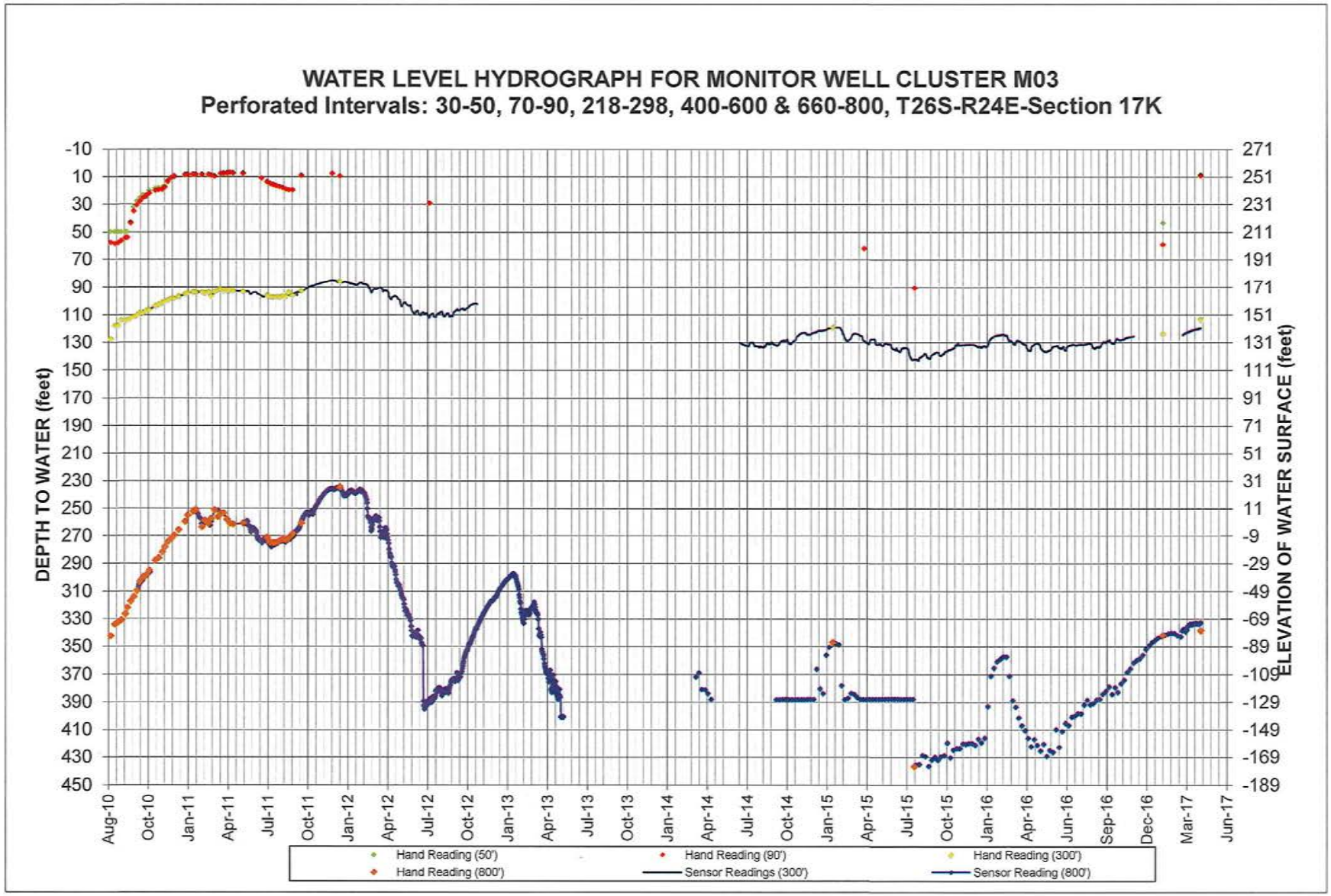
Semitropic Water Storage District
(Manual data from the KCWA)

5/8/2017



Semitropic Water Storage District
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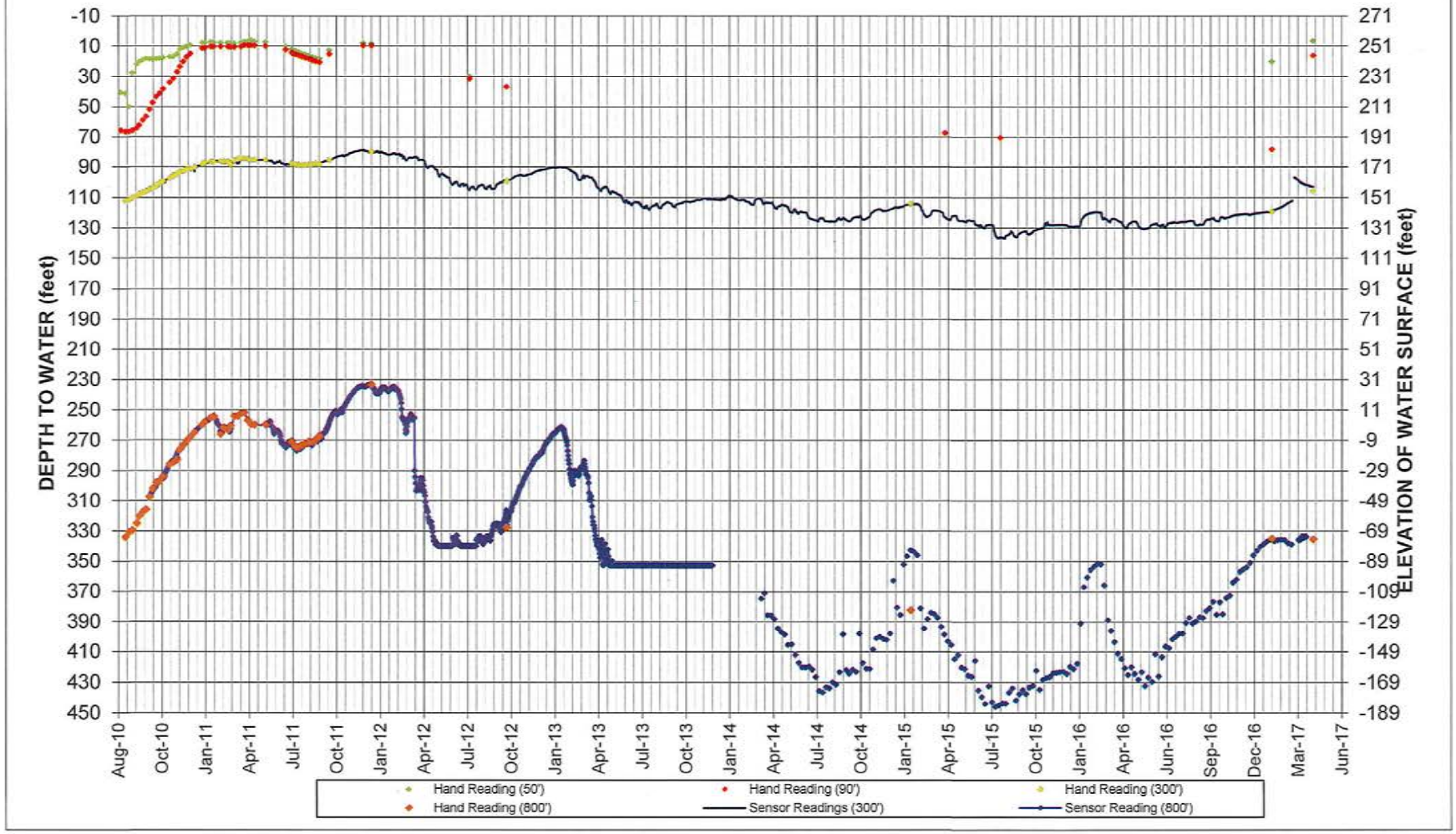
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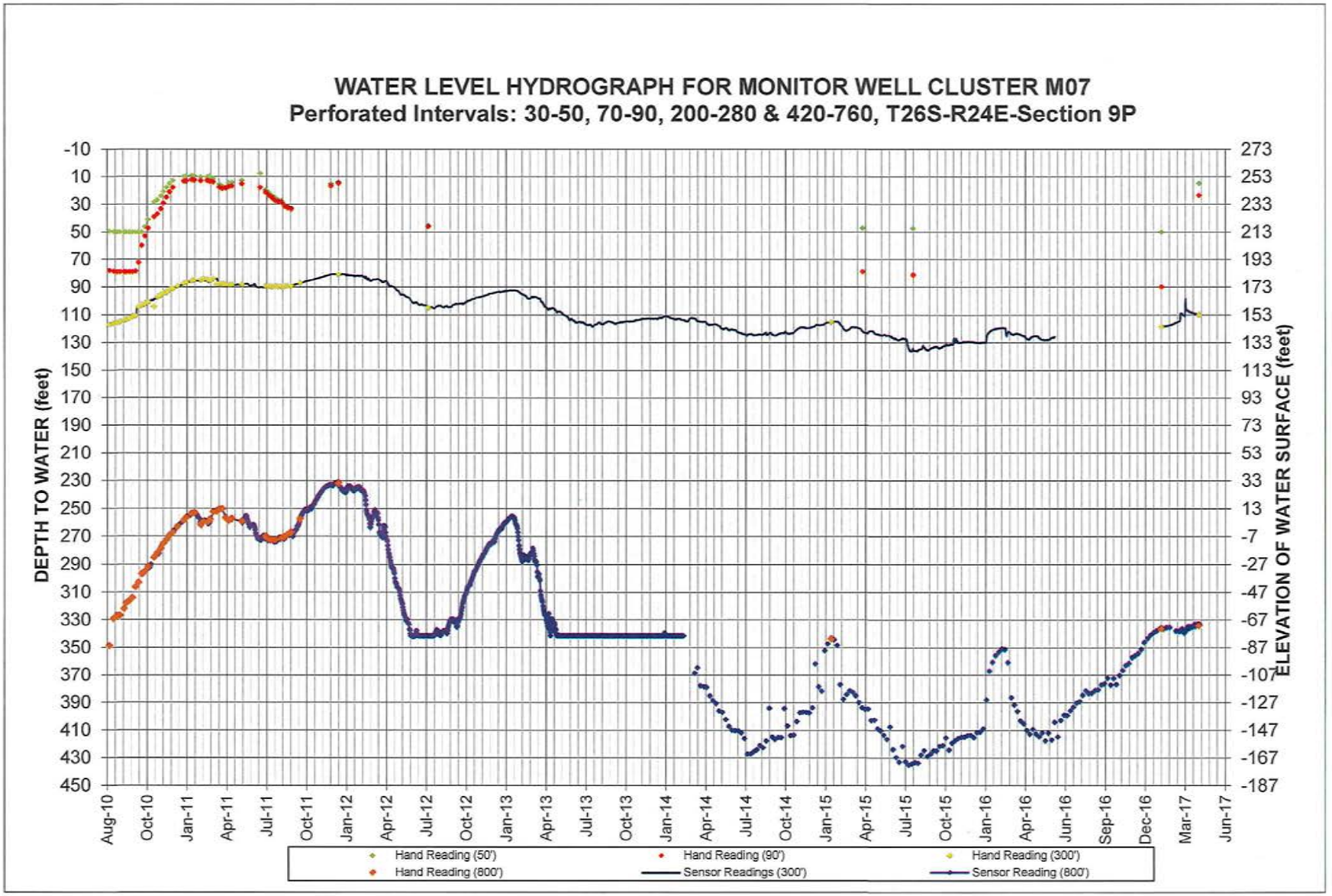
5/8/2017

WATER LEVEL HYDROGRAPH FOR MONITOR WELL CLUSTER M04
Perforated Intervals: 30-50, 70-90, 197-277 & 420-780, T26S-R24E-Section 17H



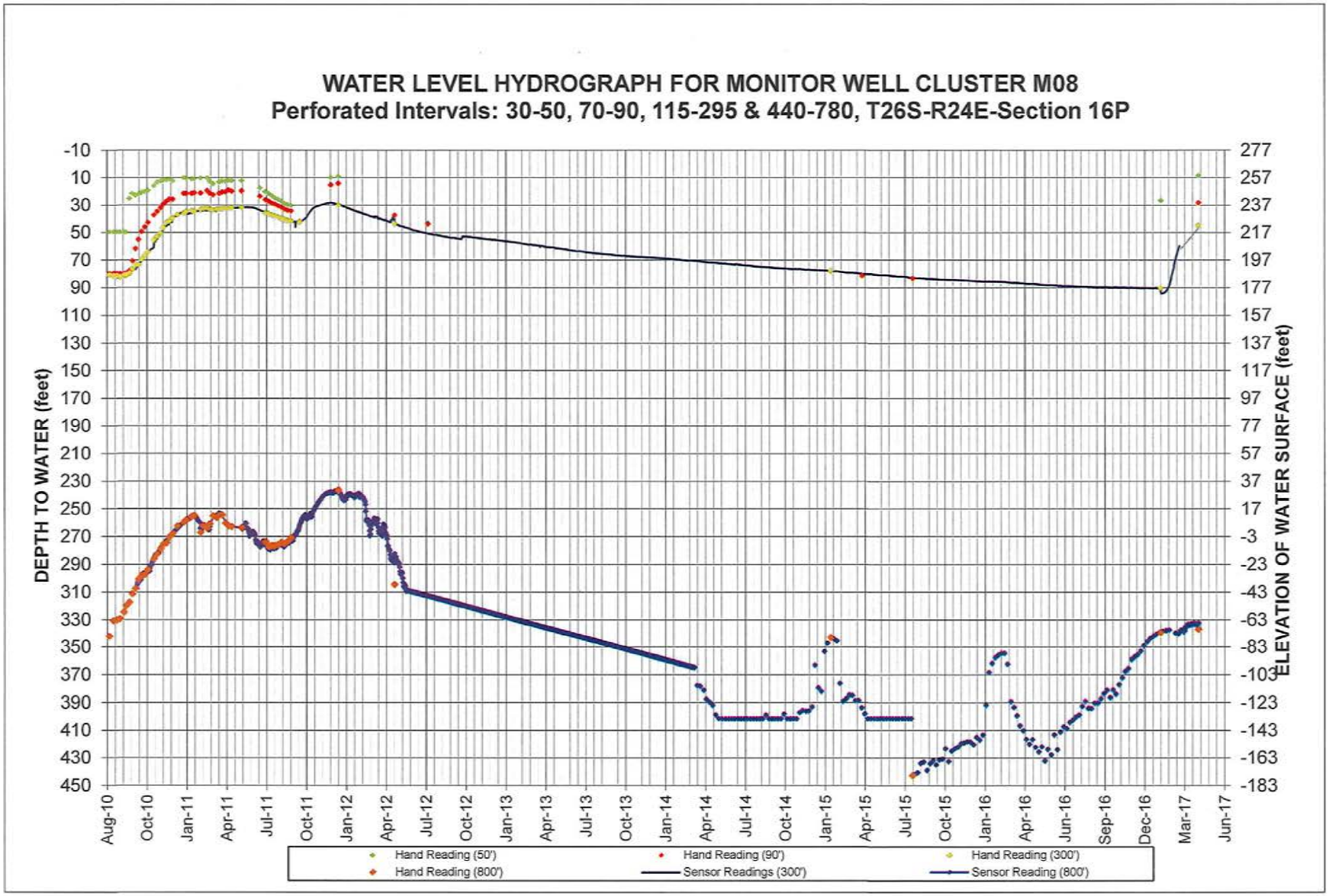
Semitropic Water Storage District

5/8/2017



Semitropic Water Storage District

5/8/2017

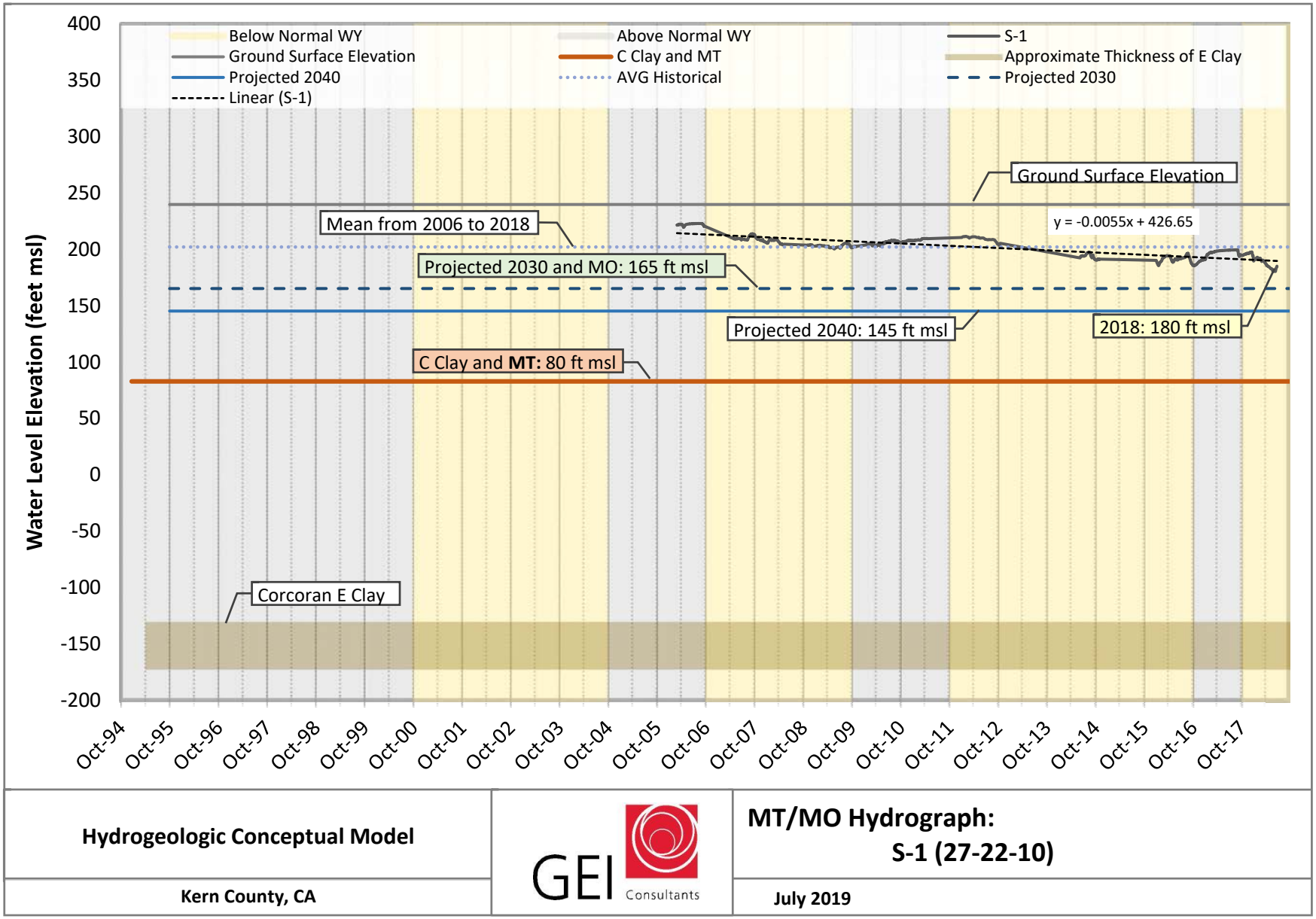


Semitropic Water Storage District

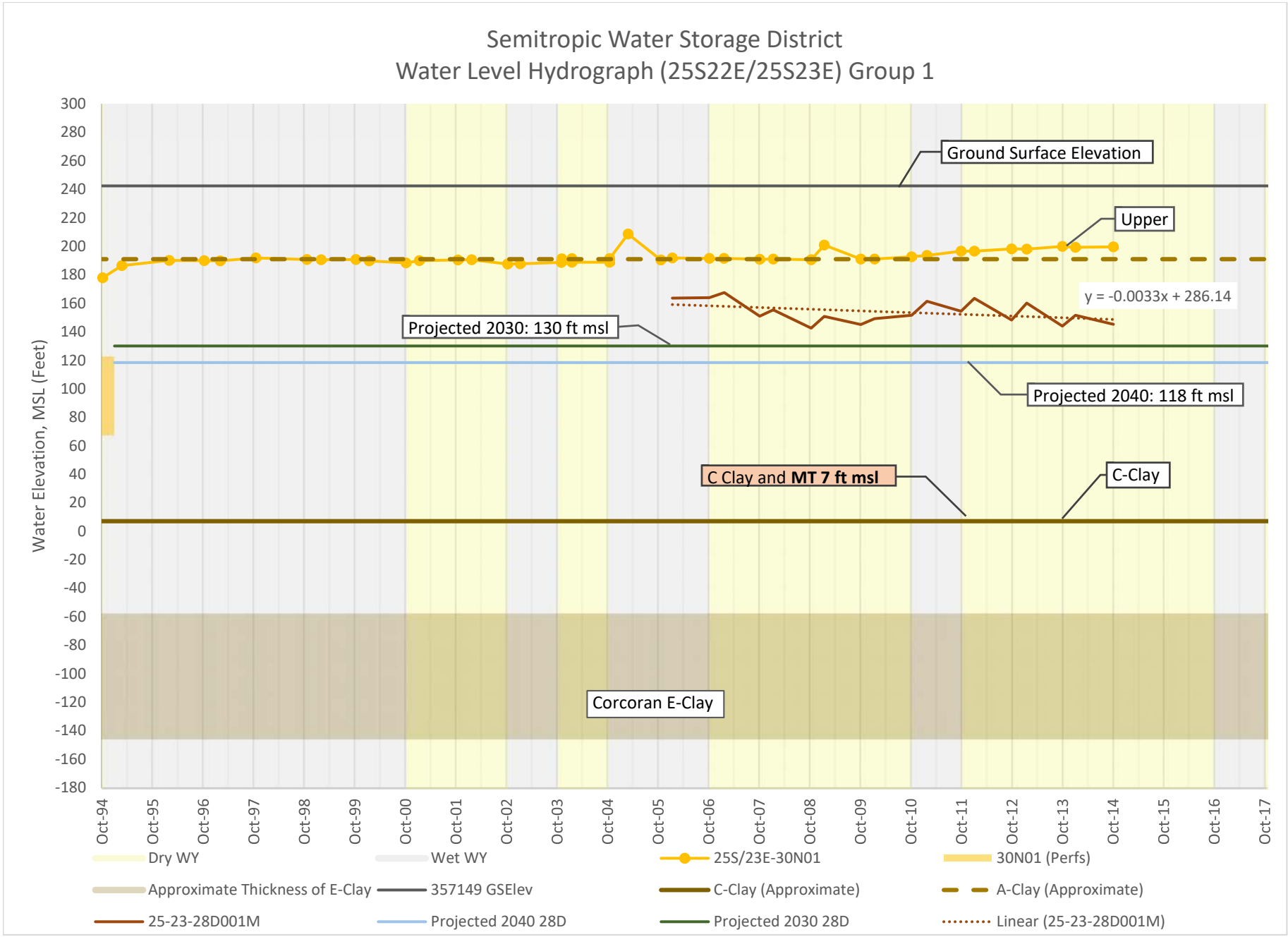
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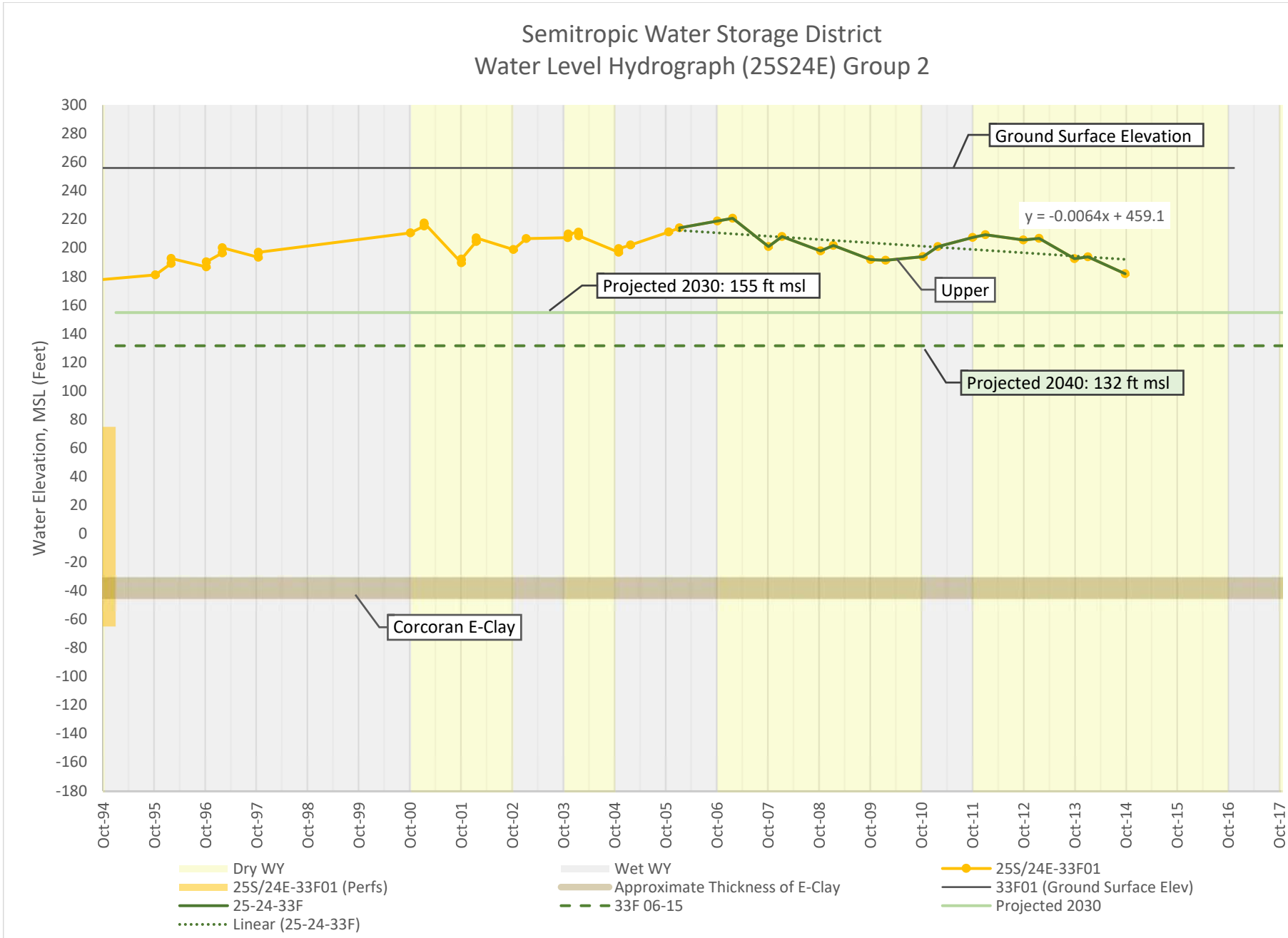
Semitropic Groundwater Sustainability Agency
Final 2020 Groundwater Sustainability Plan

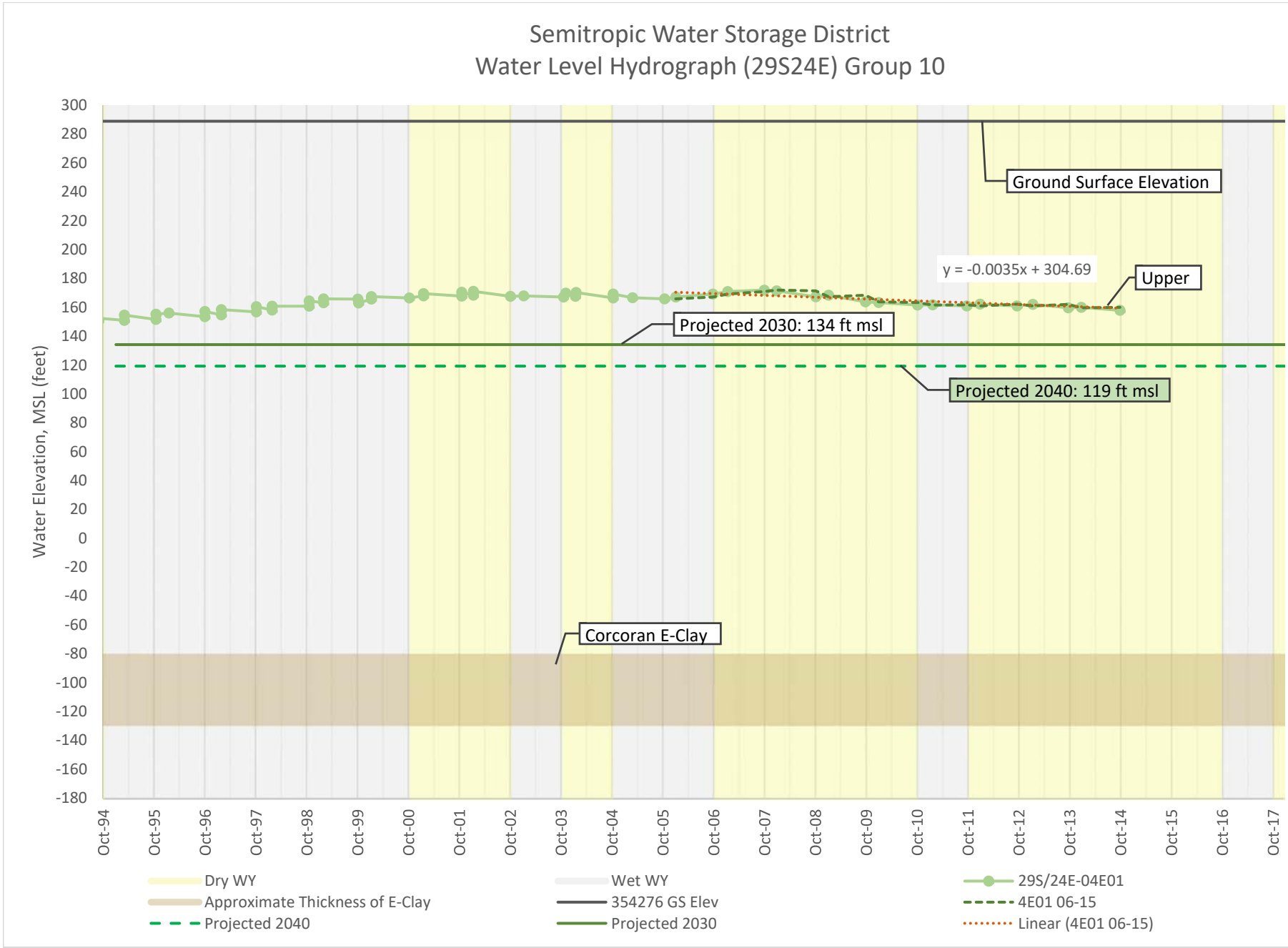
APPENDIX C – TIME SERIES SUBSIDENCE

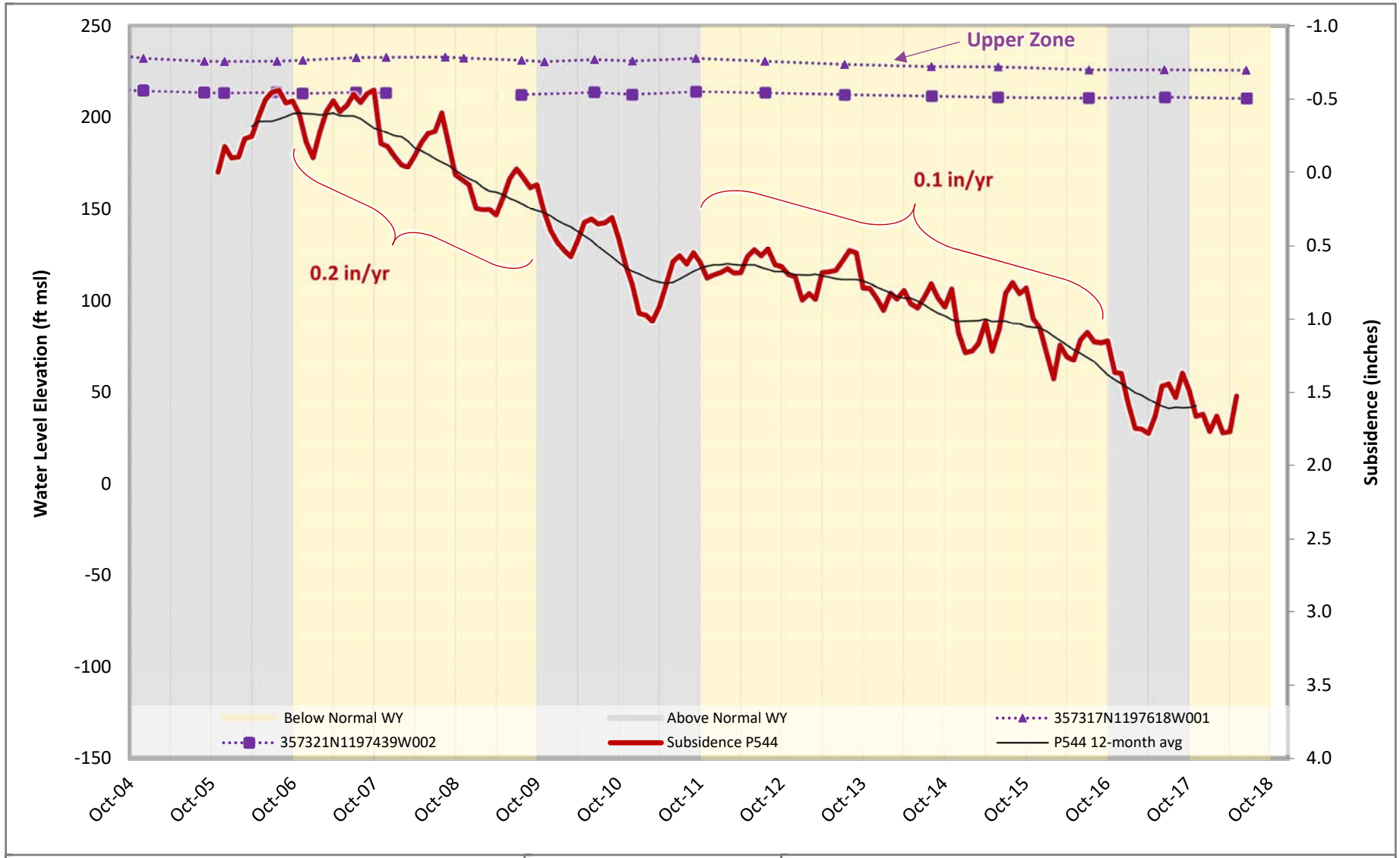


Hydrogeologic Conceptual Model	GEI Consultants	**MT/MO Hydrograph: S-1 (27-22-10)**
Kern County, CA		**July 2019**


Semitropic Water Storage District
Water Level Hydrograph (25S22E/25S23E) Group 1
Water Elevation, MSL (Feet)
300
280
260
240
220
200
180
160
140
120
100
80
60
40
20
0
-20
-40
-60
-80
-100
-120
-140
-160
-180
Oct-94
Oct-95
Oct-96
Oct-97
Oct-98
Oct-99
Oct-00
Oct-01
Oct-02
Oct-03
Oct-04
Oct-05
Oct-06
Oct-07
Oct-08
Oct-09
Oct-10
Oct-11
Oct-12
Oct-13
Oct-14
Oct-15
Oct-16
Oct-17
Ground Surface Elevation
Upper
y = -0.0033x + 286.14
Projected 2030: 130 ft msl
Projected 2040: 118 ft msl
C Clay and MT 7 ft msl
C-Clay
Corcoran E-Clay
Dry WY
Wet WY
25S/23E-30N01
30N01 (Perfs)
Approximate Thickness of E-Clay
357149 GSElev
C-Clay (Approximate)
A-Clay (Approximate)
25-23-28D001M
Projected 2040 28D
Projected 2030 28D
Linear (25-23-28D001M)


Semitropic Water Storage District
Water Level Hydrograph (25S24E) Group 2
Water Elevation, MSL (Feet)
300
280
260
240
220
200
180
160
140
120
100
80
60
40
20
0
-20
-40
-60
-80
-100
-120
-140
-160
-180
Oct-94
Oct-95
Oct-96
Oct-97
Oct-98
Oct-99
Oct-00
Oct-01
Oct-02
Oct-03
Oct-04
Oct-05
Oct-06
Oct-07
Oct-08
Oct-09
Oct-10
Oct-11
Oct-12
Oct-13
Oct-14
Oct-15
Oct-16
Oct-17
Ground Surface Elevation
y = -0.0064x + 459.1
Projected 2030: 155 ft msl
Upper
Projected 2040: 132 ft msl
Corcoran E-Clay
Dry WY
Wet WY
25S/24E-33F01
25S/24E-33F01 (Perfs)
Approximate Thickness of E-Clay
33F01 (Ground Surface Elev)
25-24-33F
33F 06-15
Projected 2030
Linear (25-24-33F)


Semitropic Water Storage District
Water Level Hydrograph (29S24E) Group 10
Water Elevation, MSL (feet)
300
280
260
240
220
200
180
160
140
120
100
80
60
40
20
0
-20
-40
-60
-80
-100
-120
-140
-160
-180
Oct-94
Oct-95
Oct-96
Oct-97
Oct-98
Oct-99
Oct-00
Oct-01
Oct-02
Oct-03
Oct-04
Oct-05
Oct-06
Oct-07
Oct-08
Oct-09
Oct-10
Oct-11
Oct-12
Oct-13
Oct-14
Oct-15
Oct-16
Oct-17
Ground Surface Elevation
y = -0.0035x + 304.69
Upper
Projected 2030: 134 ft msl
Projected 2040: 119 ft msl
Corcoran E-Clay
Dry WY
Wet WY
29S/24E-04E01
Approximate Thickness of E-Clay
354276 GS Elev
4E01 06-15
Projected 2040
Projected 2030
Linear (4E01 06-15)



Hydrogeologic Conceptual Model
Kern County Subbasin

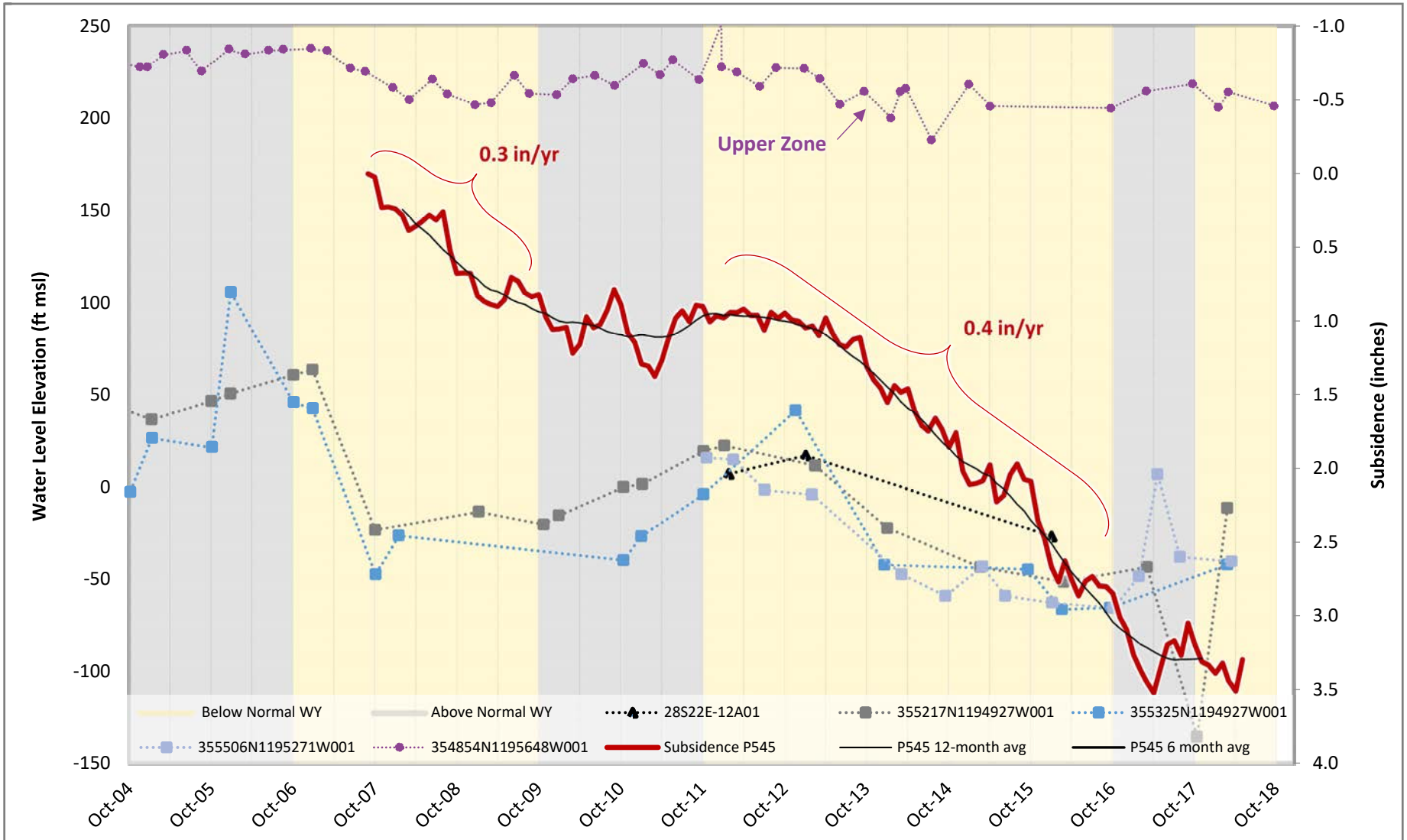
Kern County, CA

GEI Consultants

Time Series Plot:
P544 (Twisselman Road CGPS) Subsidence with Hydrographs

February 2019

Figure 1



Hydrogeologic Conceptual Model
Kern County Subbasin

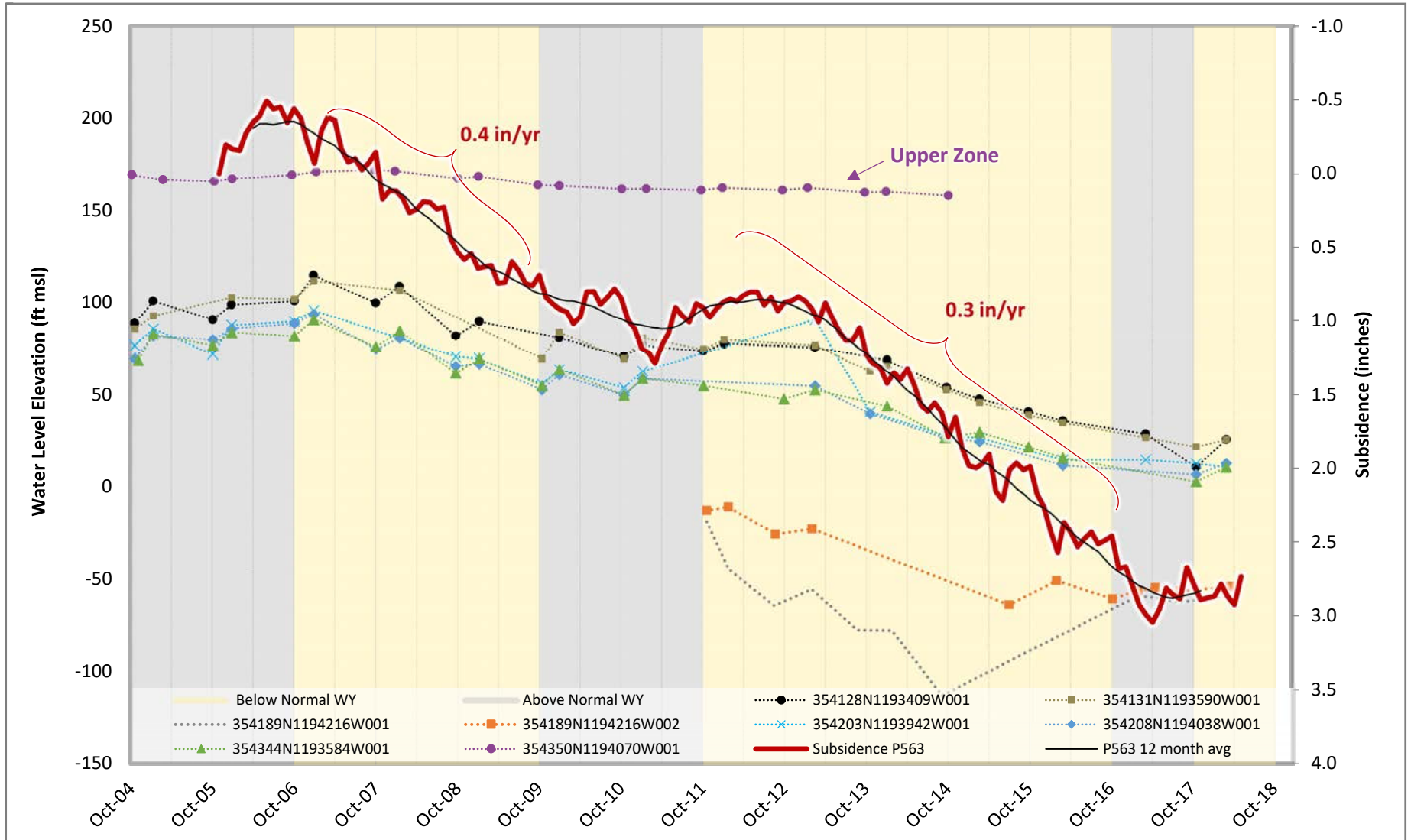
Kern County, CA

GEI Consultants

Time Series Plot:
P545 (Lerdo Highways CGPS) Subsidence with Hydrographs

February 2019

Figure 2



Hydrogeologic Conceptual Model
Kern County Subbasin

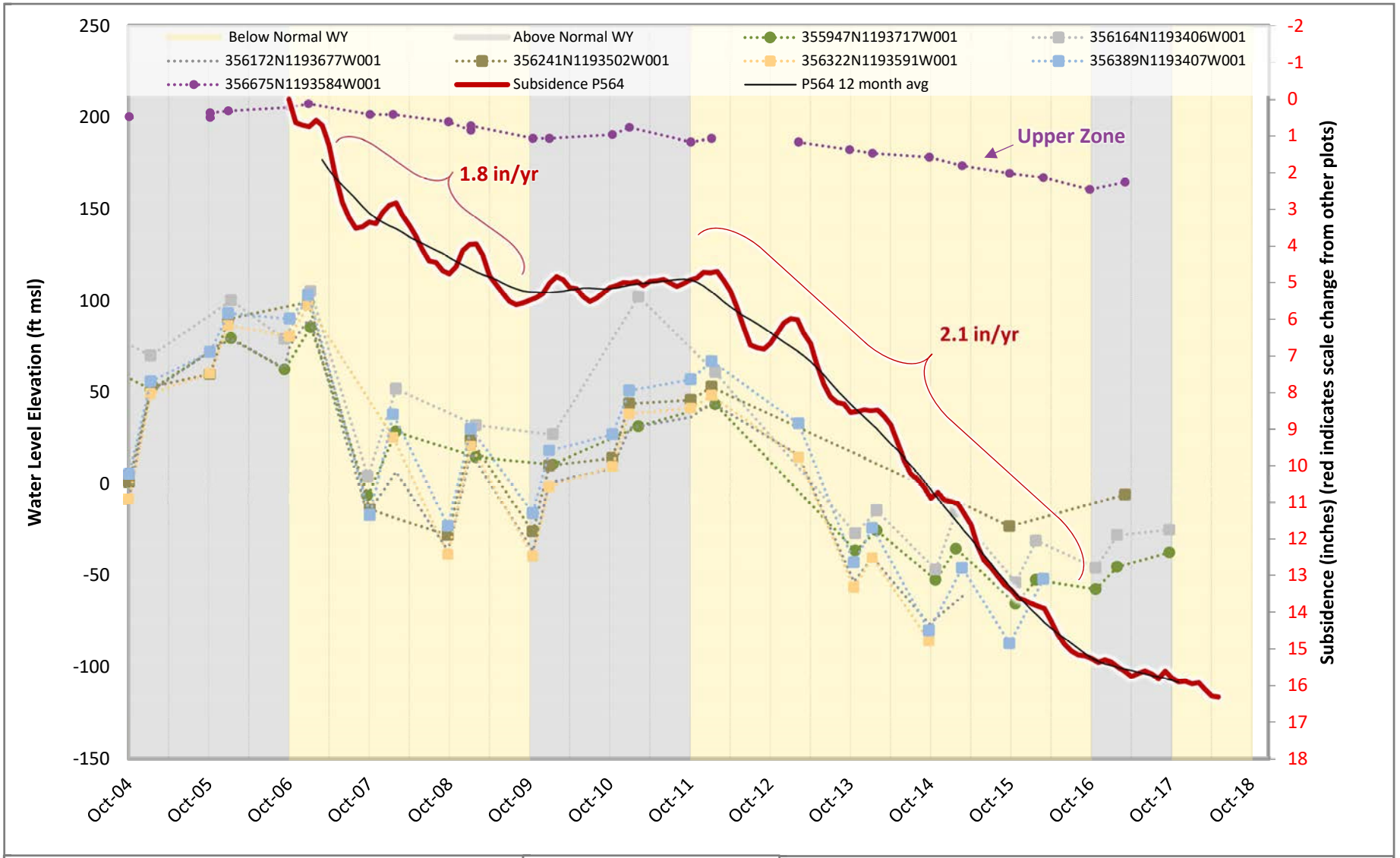
Kern County, CA

GEI Consultants

Time Series Plot:
P563 (Buttonwillow CGPS) Subsidence with Nearby Hydrographs

February 2019

Figure 3



Hydrogeologic Conceptual Model
Kern County Subbasin

Kern County, CA

GEI Consultants

Time Series Plot:
P564 (Wasco CGPS) Subsidence and Nearby Hydrographs

February 2019

Figure 4



Hydrogeologic Conceptual Model
Kern County Subbasin

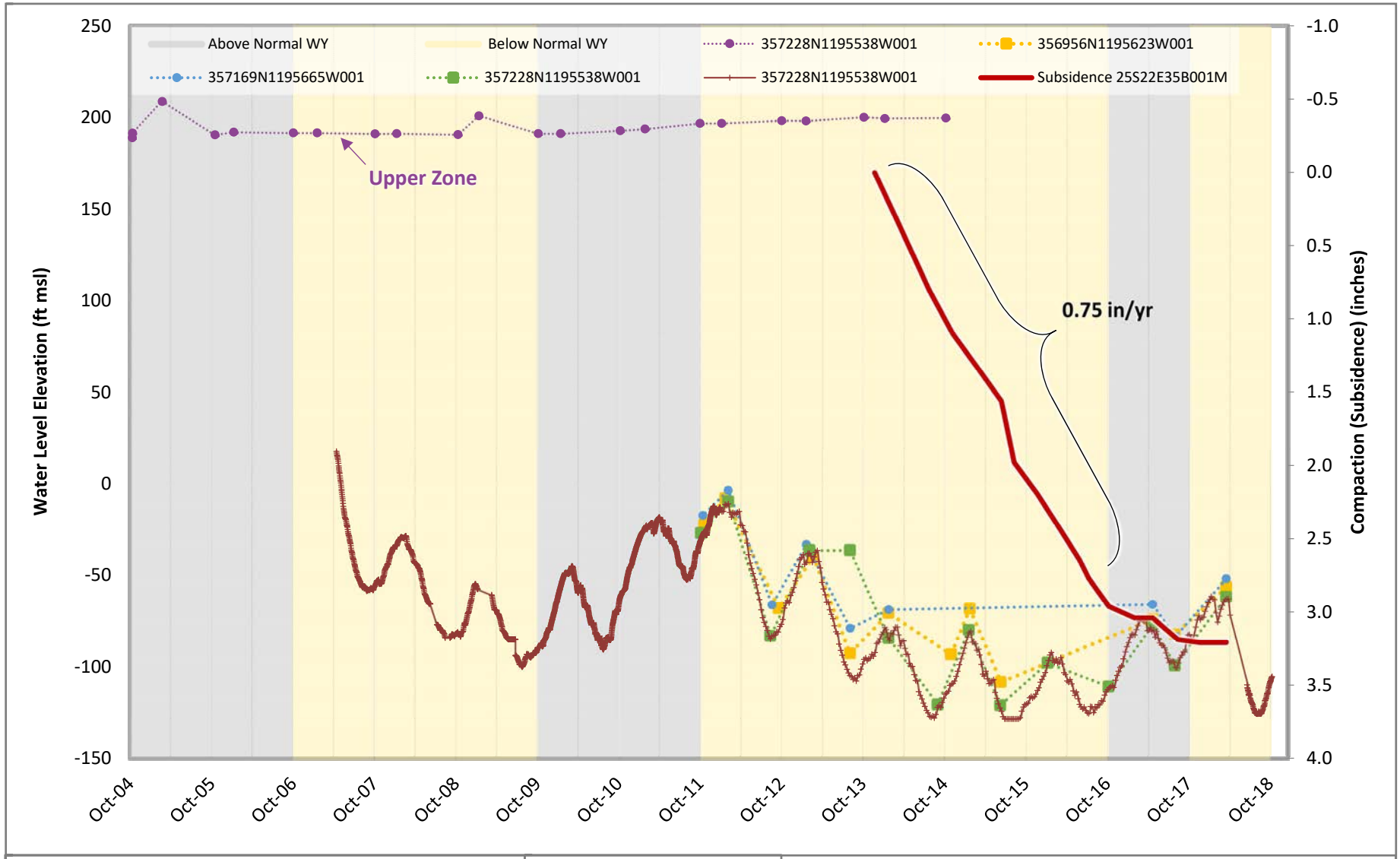
Kern County, CA

GEI Consultants

Time Series Plot:
P565 (Delano CGPS) Subsidence with Nearby Hydrographs

February 2019

Figure 5



Hydrogeologic Conceptual Model
Kern County Subbasin

Kern County, CA

GEI Consultants

Time Series Plot:

SWSD Extensometer and Nearby Hydrographs

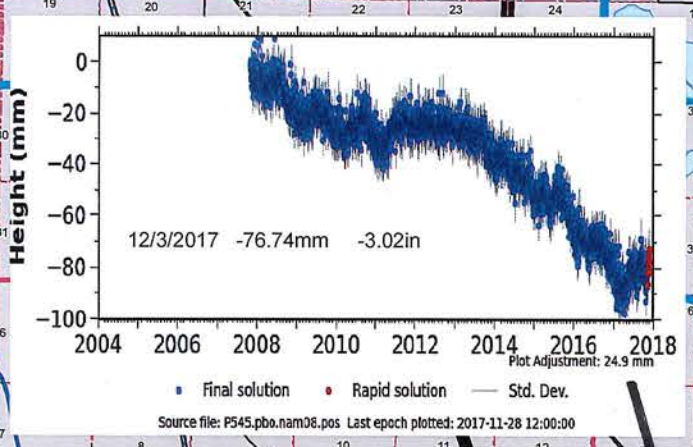
February 2019

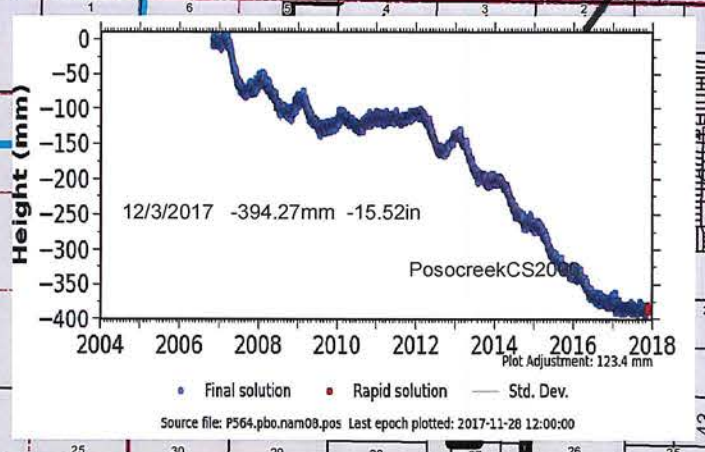
Figure 6

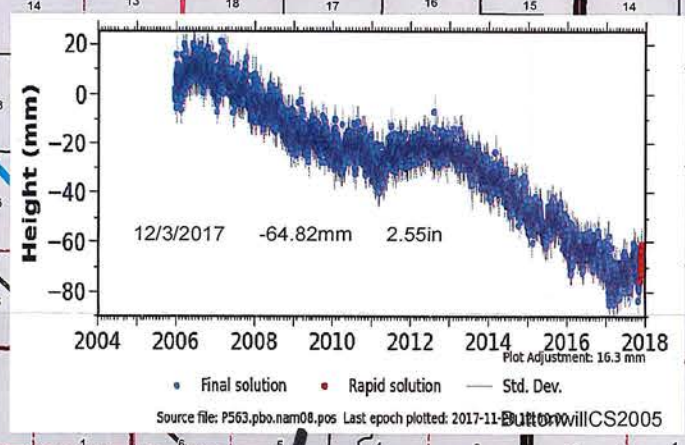
Semitropic Groundwater Sustainability Agency
Final 2020 Groundwater Sustainability Plan

APPENDIX D – LAND SUBSIDENCE MONITORING

Semitropic WSD Extensometer







Data and site GPS locations provided by https://gis.water.ca.gov/app/gicima/

Legend

- Semitropic WSD Extensometer
- GICIMA Extensomete

Figure 14
Location of Land Subsidence Monitoring Stations

APPENDIX E – HYDROGEOLOGIC ZONES

N

COUNTY LINE

047-050-06

HZ03-1

HZ03-2

HZ01-1

HZ01-2

HZ01-3

HZ02-3

HZ05-1

HZ05-2

HZ05-3

HZ06-1

HZ06-2

Delano

Wasco

Shafter

CECIL

ROWLEE

SCOFIELD

CORCORAN

WOOLLOMES

PALM

SCHUSTER

MAGNOLIA

R WASCO POND

POND

JUMPER

BELL

PETERSON

LEONARD

ELMO

SHERWOOD

HANAWALT

GUN CLUB

MC COY

WHISLER

PHILLIPS

WILDWOOD

MC KIBBEN

MC COMBS

OFFUT

GROMER

VALLEY ROSE

1ST

7TH

KURT

POSO

JACKSON

KIMBERLINA

Frantz

B Frantz

DRESSER

MERCED

FREY

CARMEL

DELFINO

CORD

MAIN DRAIN

California Aqueduct

I-5

LERDO

FRESNO

TULARE

WASCO

RIVERSIDE

SCARONI

BURBANK

PERRAL

MILAN

ALGOMA

VLANSIK

SEVENTH STANDARD

BUTTONWILLOW

TRACY

ROB

BRANDT

OLD TRACY

DARGATZ

SNOW

DELFERN

CORN CAMP

SULLIVAN

CANAL

WATKINS

TRACY

ELK GROVE

PALOMAS

MIRASOL

CANNON

JUDD

NOBLE

BANNING

43

46

58

155

Legend

Line_gen

HydroGeologic_Zones_NOR_SubZones_v20181016

<all other values>

HGZ, HGZ_II, HGZ_III

, ,

HZ01-1, ,

HZ01-1, HZ01-1, ; HZ01-1, HZ01-2, ; HZ01-1, HZ03-2, ; HZ01-1, HZ05-1,

HZ01-2,

HZ01-2, HZ01-1, ; HZ01-2, HZ01-2, ; HZ01-2, HZ02-3, ; HZ01-2, HZ05-1,

HZ02-3, ,

HZ02-3, HZ01-2,

HZ03-1, ,

HZ03-1, HZ03-2,

HZ03-2, ,

HZ03-2, HZ01-1, ; HZ03-2, HZ03-1, ; HZ03-2, HZ05-1,

HZ03-2, HZ05-1, HZ03-1

HZ05-1, ,

HZ05-1, HZ01-1, ; HZ05-1, HZ03-2, ; HZ05-1, HZ05-1, ; HZ05-1, HZ05-2,

HZ05-1, HZ01-1, HZ03-2

HZ05-2, ,

HZ05-2, HZ05-1, ; HZ05-2, HZ05-3, ; HZ05-2, HZ06-2,

HZ05-3, ,

HZ05-3, HZ05-2, ; HZ05-3, HZ06-1,

HZ06-1, ,

HZ06-1, HZ05-3, ; HZ06-1, HZ06-2,

HZ06-1, HZ05-3, HZ06-2; HZ06-1, HZ06-2, HZ05-3

HZ06-2, ,

HZ06-2, HZ05-2, ; HZ06-2, HZ06-1,

CityLimits

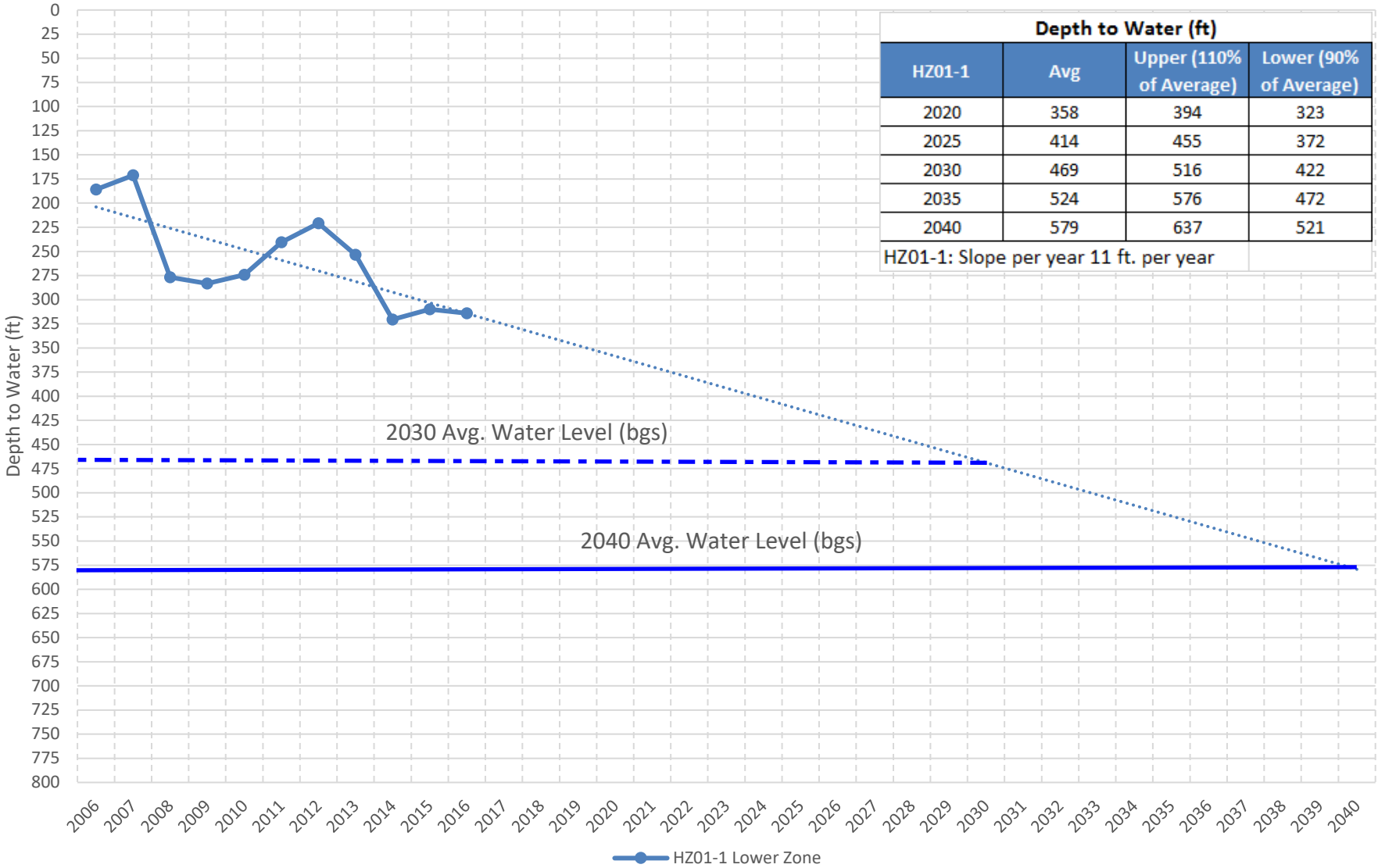
Roads

SWSD Boundary

0 0.5 1 2 3 4 Miles

SEMITROPIC GROUNDWATER BANKING WATER STORAGE DISTRICT

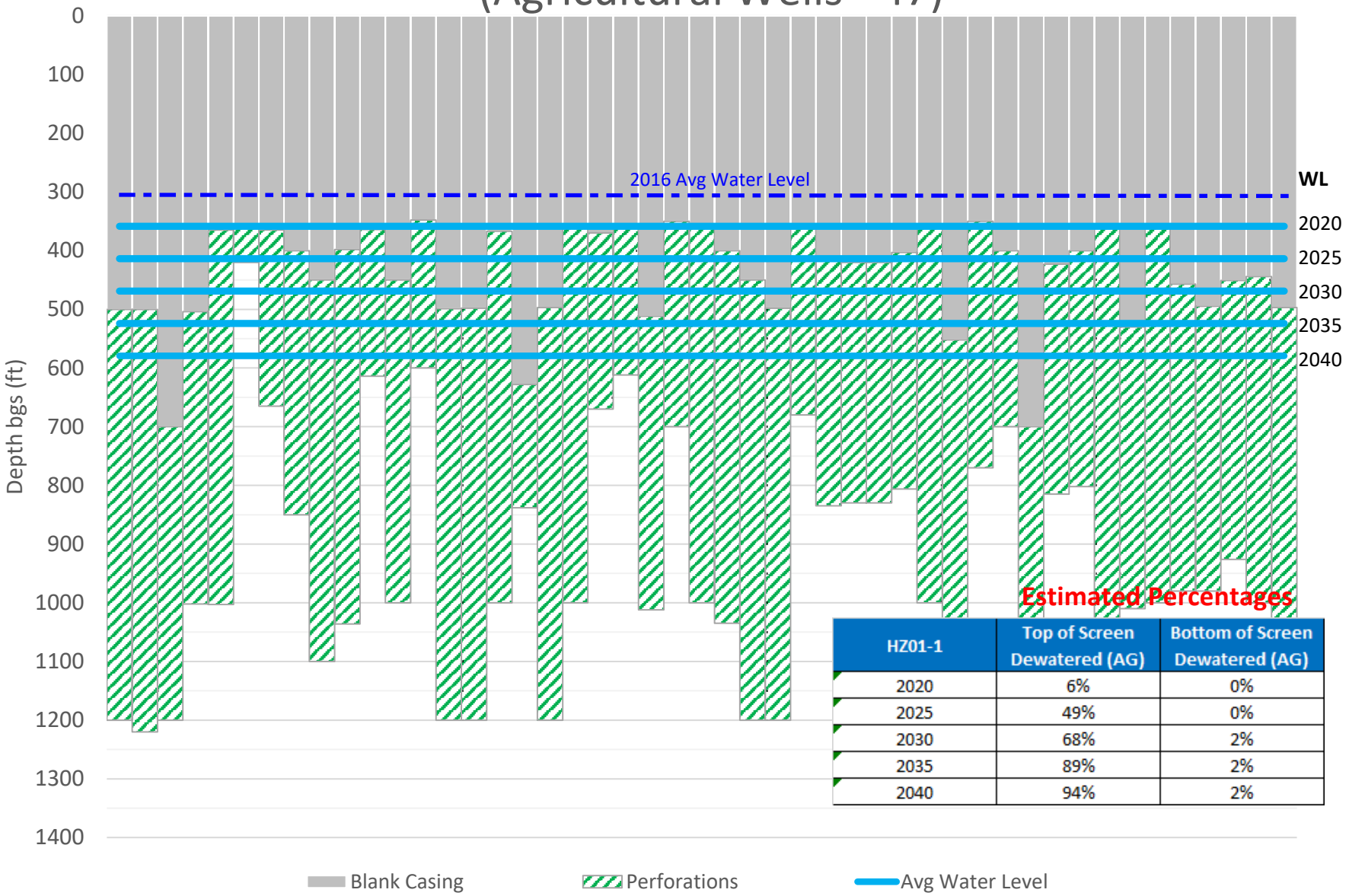
Hydrogeologic Zone 01 - 1
(Average Spring Measurements)



Depth to Water (ft)			
HZ01-1	Avg	Upper (110% of Average)	Lower (90% of Average)
2020	358	394	323
2025	414	455	372
2030	469	516	422
2035	524	576	472
2040	579	637	521
HZ01-1: Slope per year 11 ft. per year			

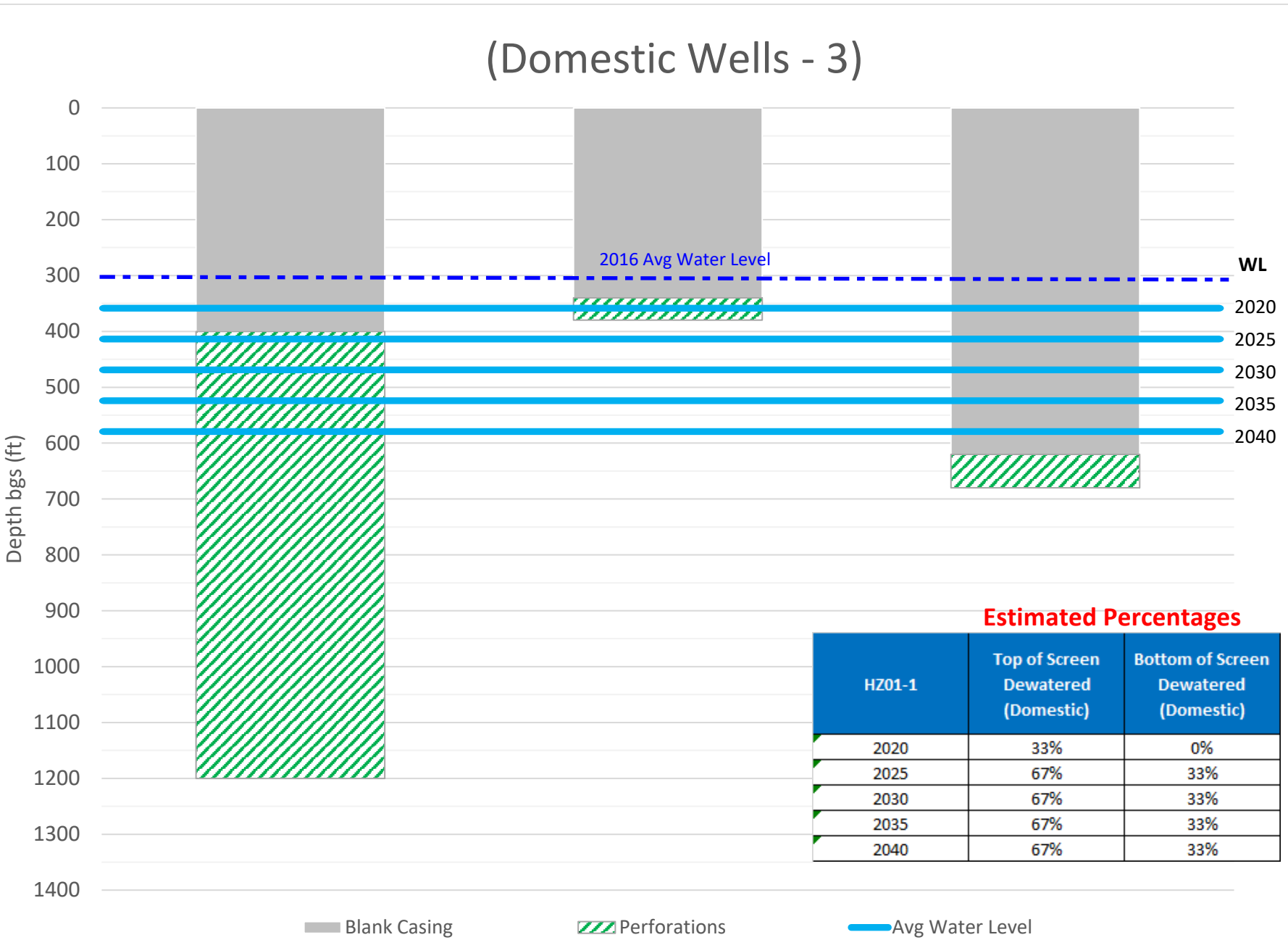
HZ 01- 01 Well Dewatering

(Agricultural Wells - 47)



Estimated Percentages

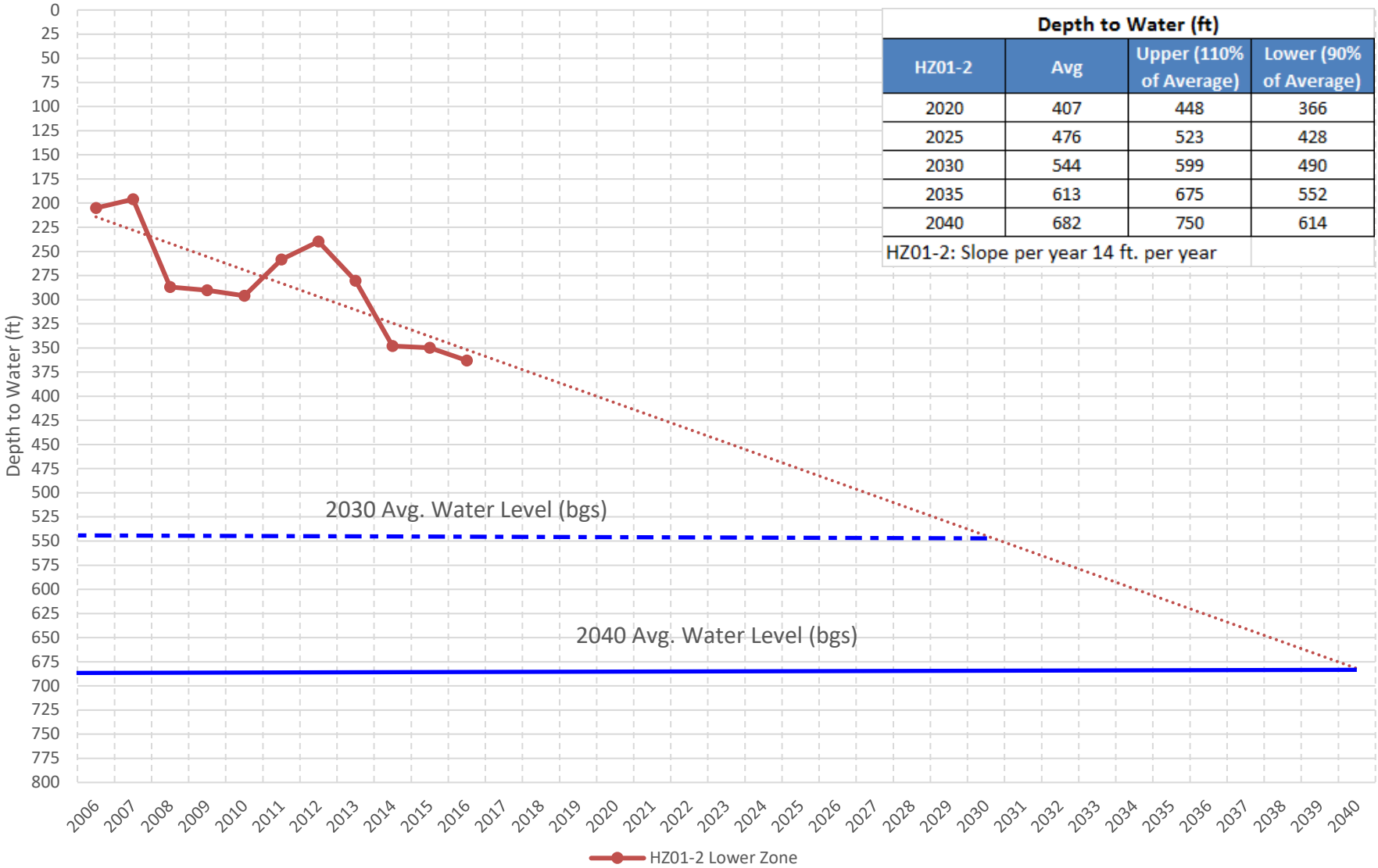
HZ01-1	Top of Screen Dewatered (AG)	Bottom of Screen Dewatered (AG)
2020	6%	0%
2025	49%	0%
2030	68%	2%
2035	89%	2%
2040	94%	2%



Estimated Percentages

HZ01-1	Top of Screen Dewatered (Domestic)	Bottom of Screen Dewatered (Domestic)
2020	33%	0%
2025	67%	33%
2030	67%	33%
2035	67%	33%
2040	67%	33%

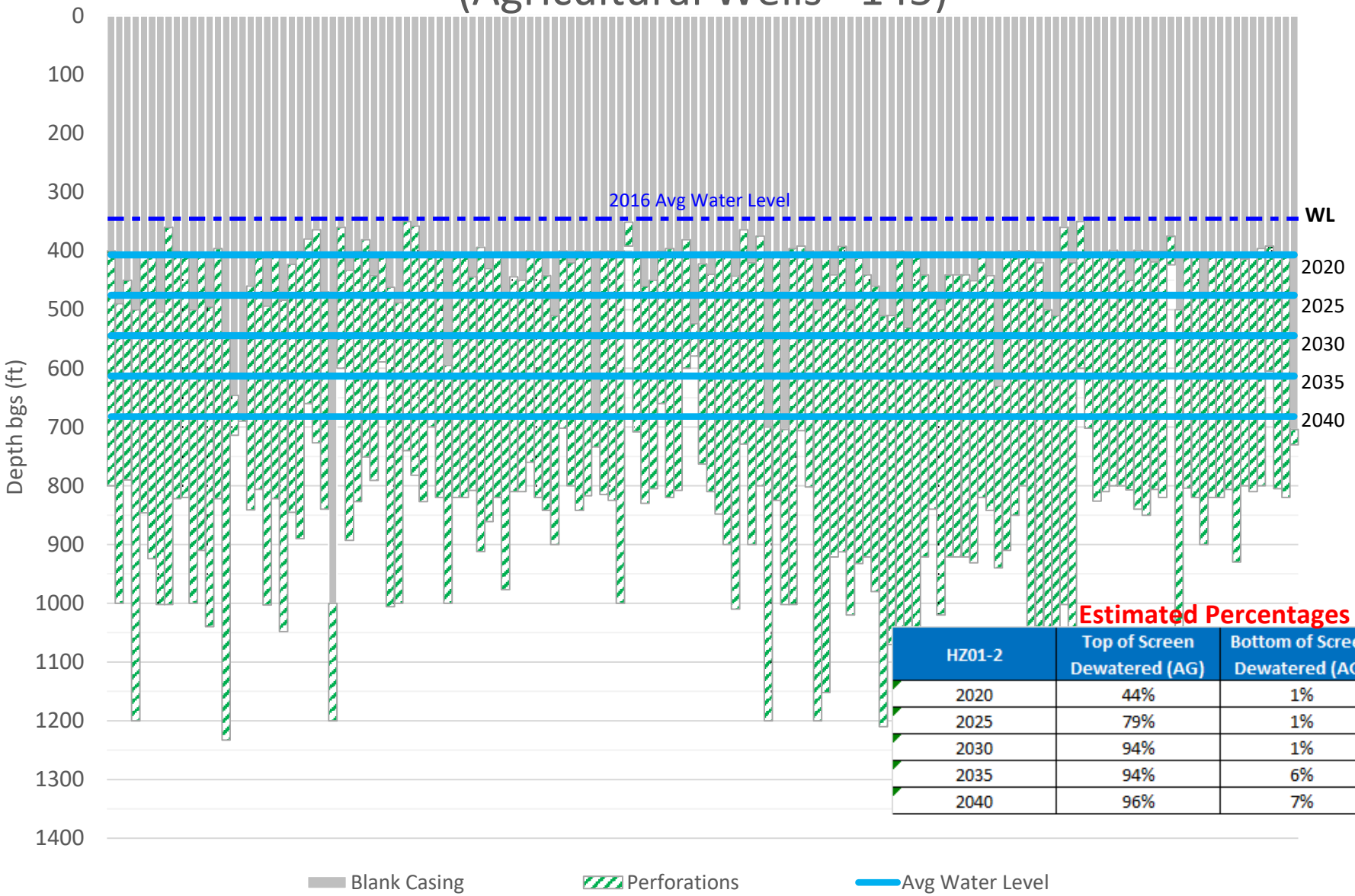
Hydrogeologic Zone 01 -2
(Average Spring Measurements)



Depth to Water (ft)			
HZ01-2	Avg	Upper (110% of Average)	Lower (90% of Average)
2020	407	448	366
2025	476	523	428
2030	544	599	490
2035	613	675	552
2040	682	750	614
HZ01-2: Slope per year 14 ft. per year			

HZ 01- 02 Well Dewatering

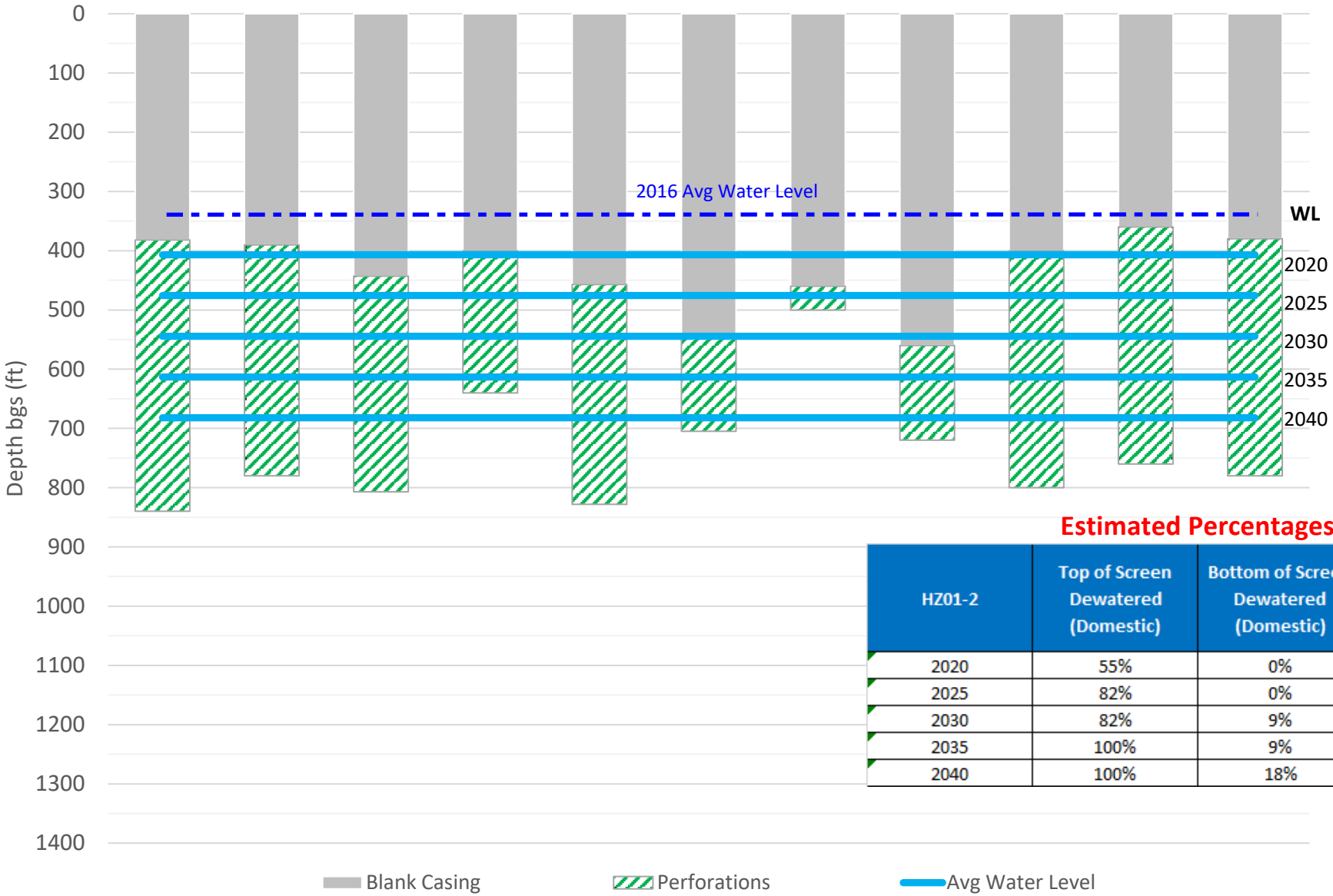
(Agricultural Wells - 145)



Estimated Percentages

HZ01-2	Top of Screen Dewatered (AG)	Bottom of Screen Dewatered (AG)
2020	44%	1%
2025	79%	1%
2030	94%	1%
2035	94%	6%
2040	96%	7%

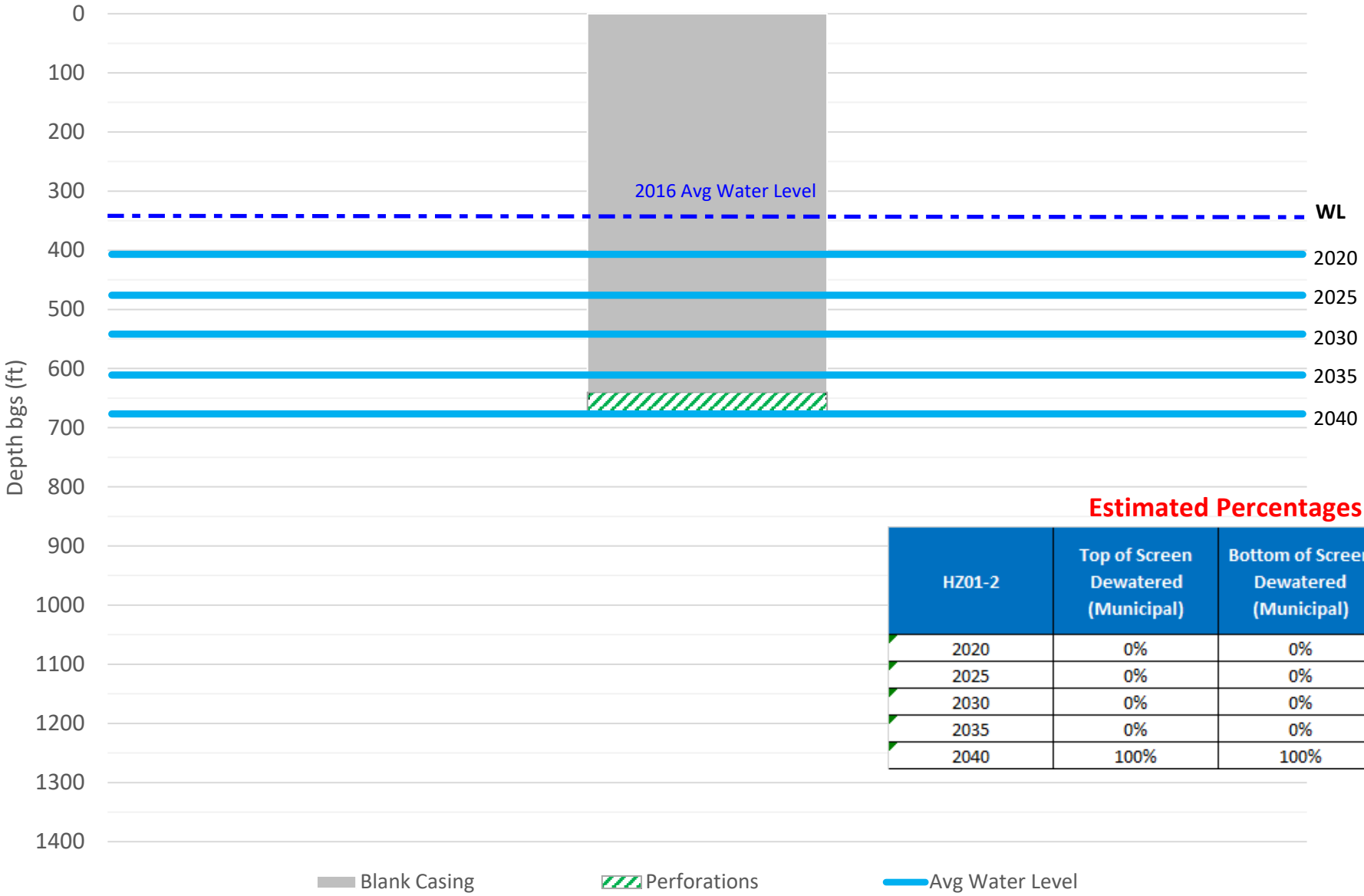
(Domestic Wells - 11)



Estimated Percentages

HZ01-2	Top of Screen Dewatered (Domestic)	Bottom of Screen Dewatered (Domestic)
2020	55%	0%
2025	82%	0%
2030	82%	9%
2035	100%	9%
2040	100%	18%

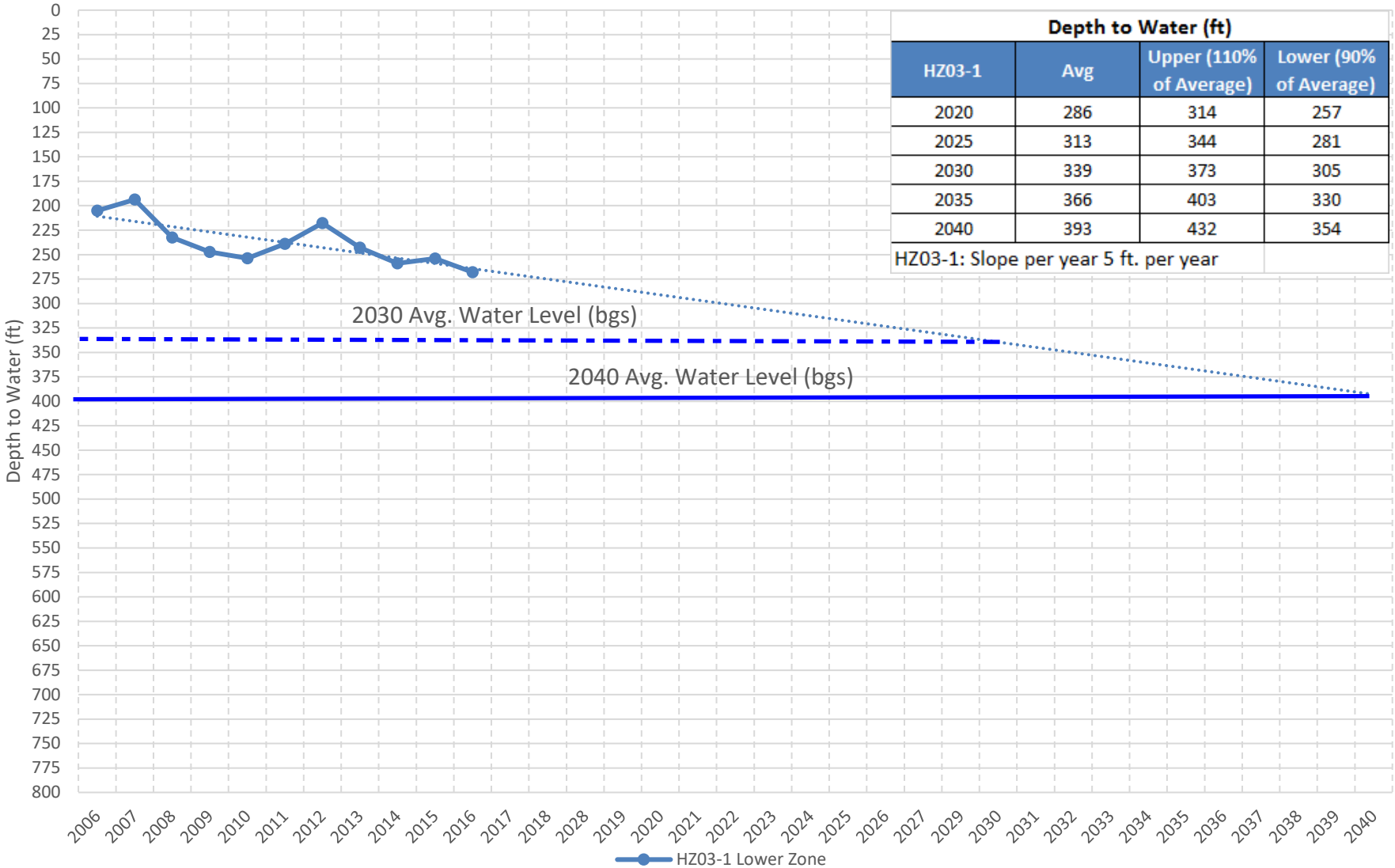
(Municipal Wells - 1)



Estimated Percentages

HZ01-2	Top of Screen Dewatered (Municipal)	Bottom of Screen Dewatered (Municipal)
2020	0%	0%
2025	0%	0%
2030	0%	0%
2035	0%	0%
2040	100%	100%

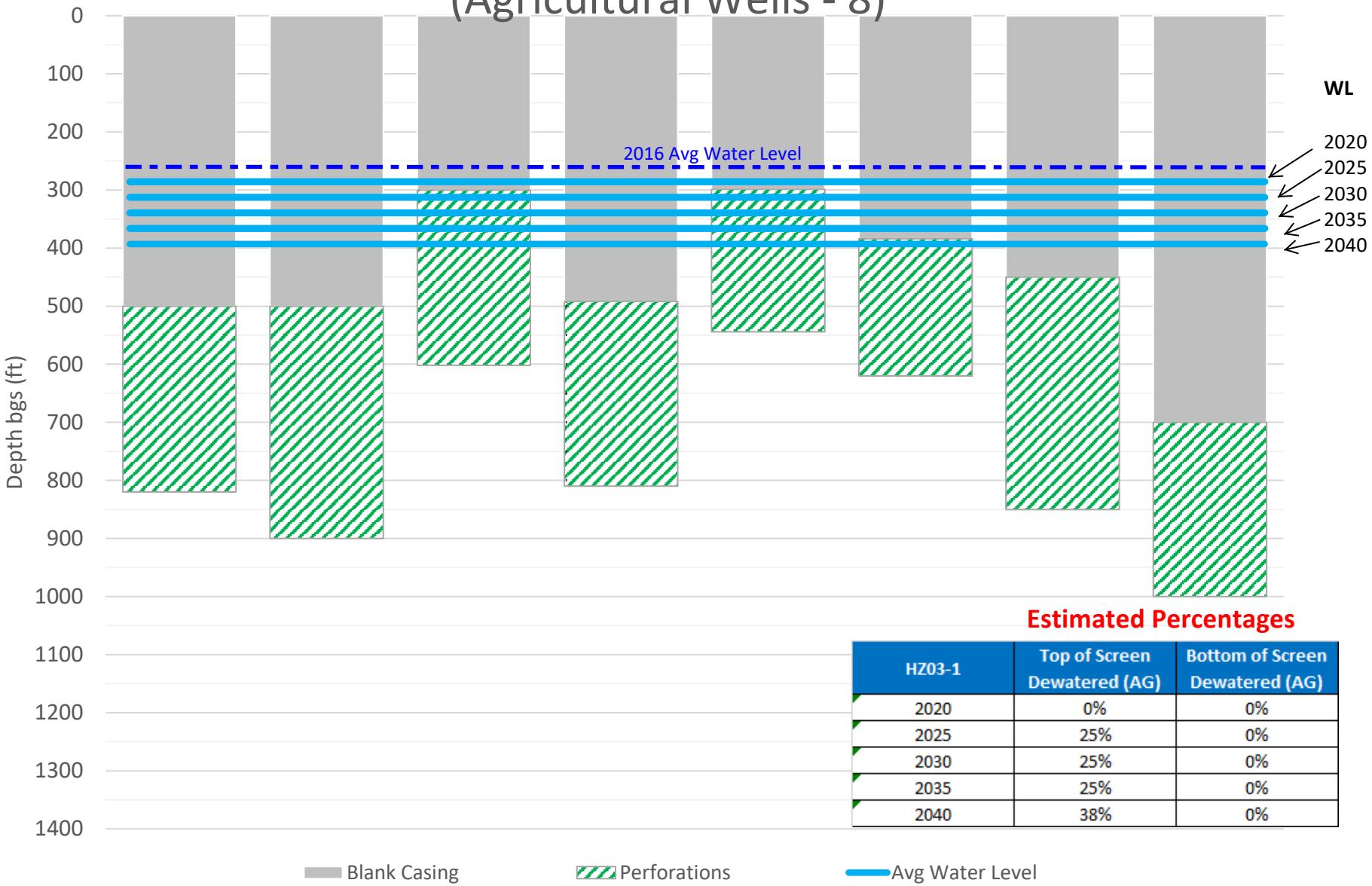
Hydrogeologic Zone 03 - 1
(Average Spring Measurements)



Depth to Water (ft)			
HZ03-1	Avg	Upper (110% of Average)	Lower (90% of Average)
2020	286	314	257
2025	313	344	281
2030	339	373	305
2035	366	403	330
2040	393	432	354
HZ03-1: Slope per year 5 ft. per year			

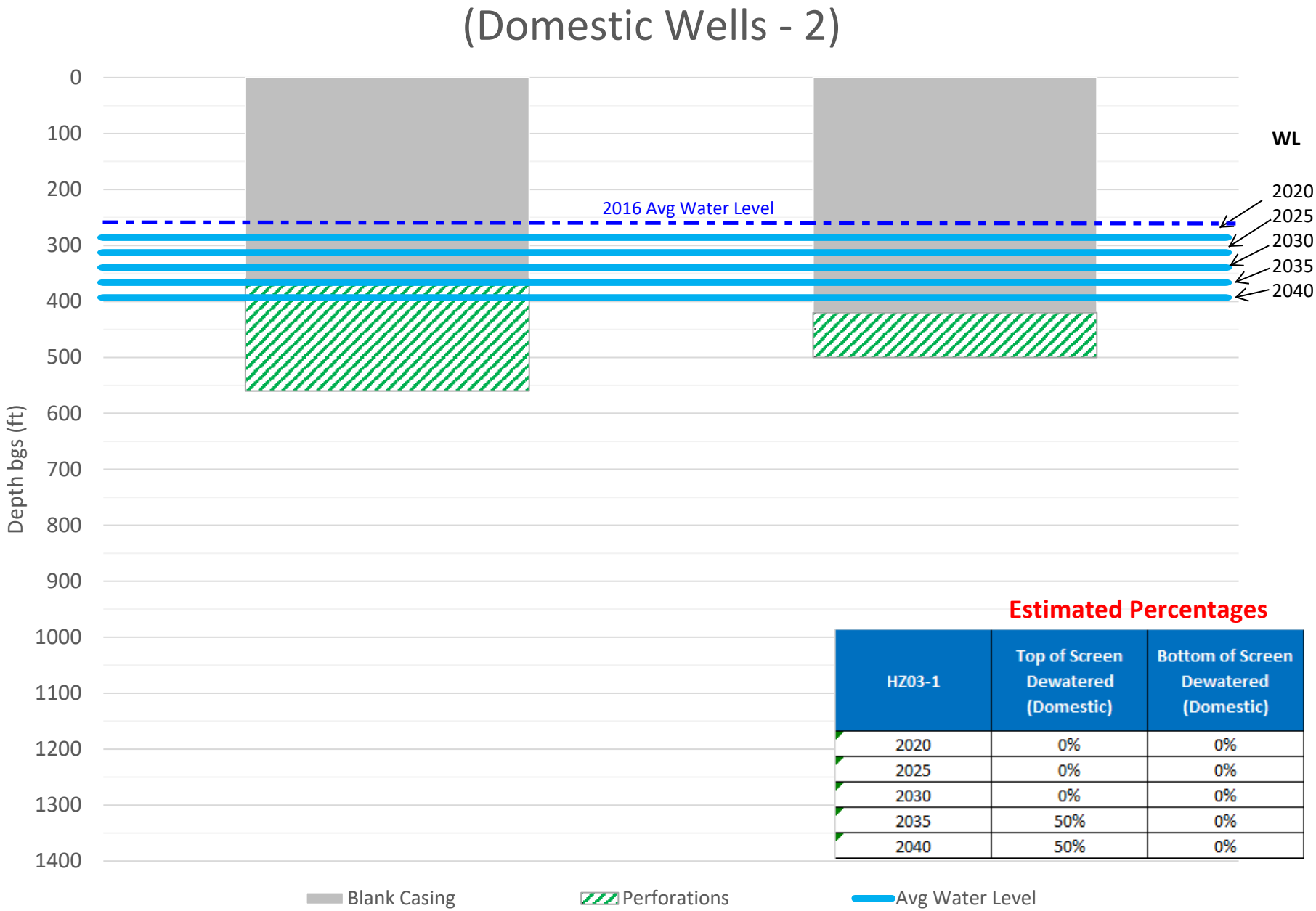
HZ 03- 01 Well Dewatering

(Agricultural Wells - 8)



Estimated Percentages

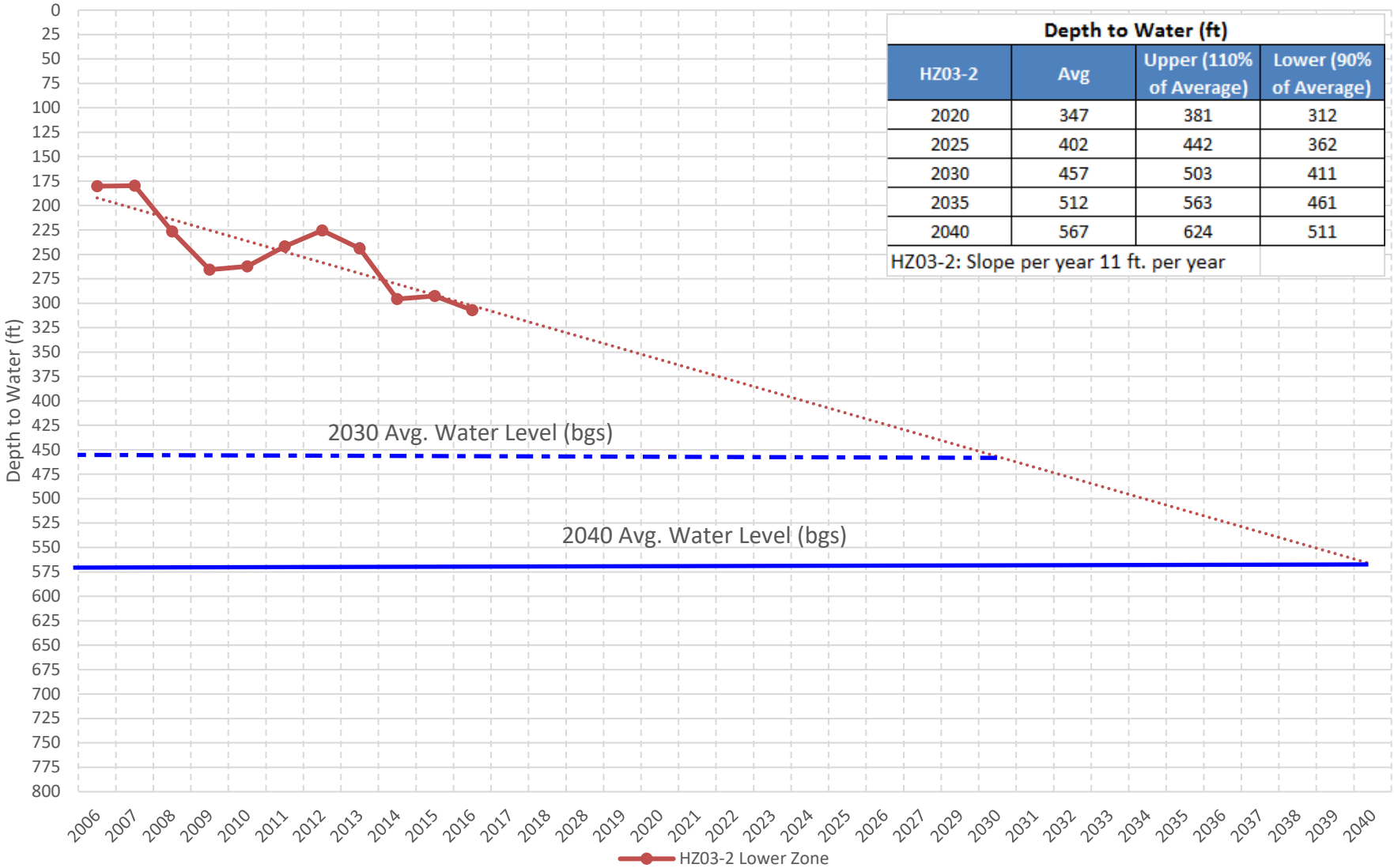
HZ03-1	Top of Screen Dewatered (AG)	Bottom of Screen Dewatered (AG)
2020	0%	0%
2025	25%	0%
2030	25%	0%
2035	25%	0%
2040	38%	0%



Estimated Percentages

HZ03-1	Top of Screen Dewatered (Domestic)	Bottom of Screen Dewatered (Domestic)
2020	0%	0%
2025	0%	0%
2030	0%	0%
2035	50%	0%
2040	50%	0%

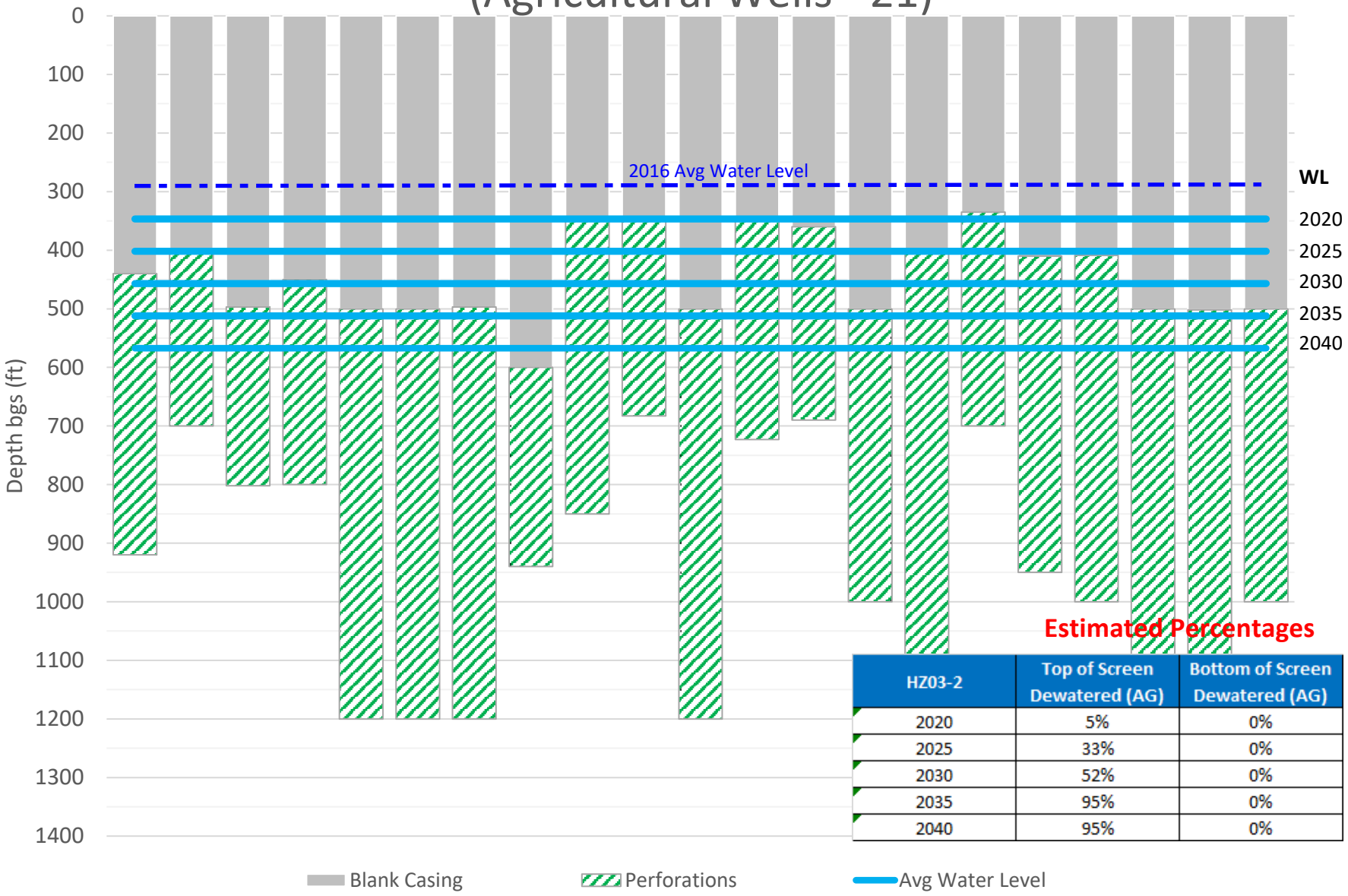
Hydrogeologic Zone 03 - 2
(Average Spring Measurements)



Depth to Water (ft)			
HZ03-2	Avg	Upper (110% of Average)	Lower (90% of Average)
2020	347	381	312
2025	402	442	362
2030	457	503	411
2035	512	563	461
2040	567	624	511
HZ03-2: Slope per year 11 ft. per year			

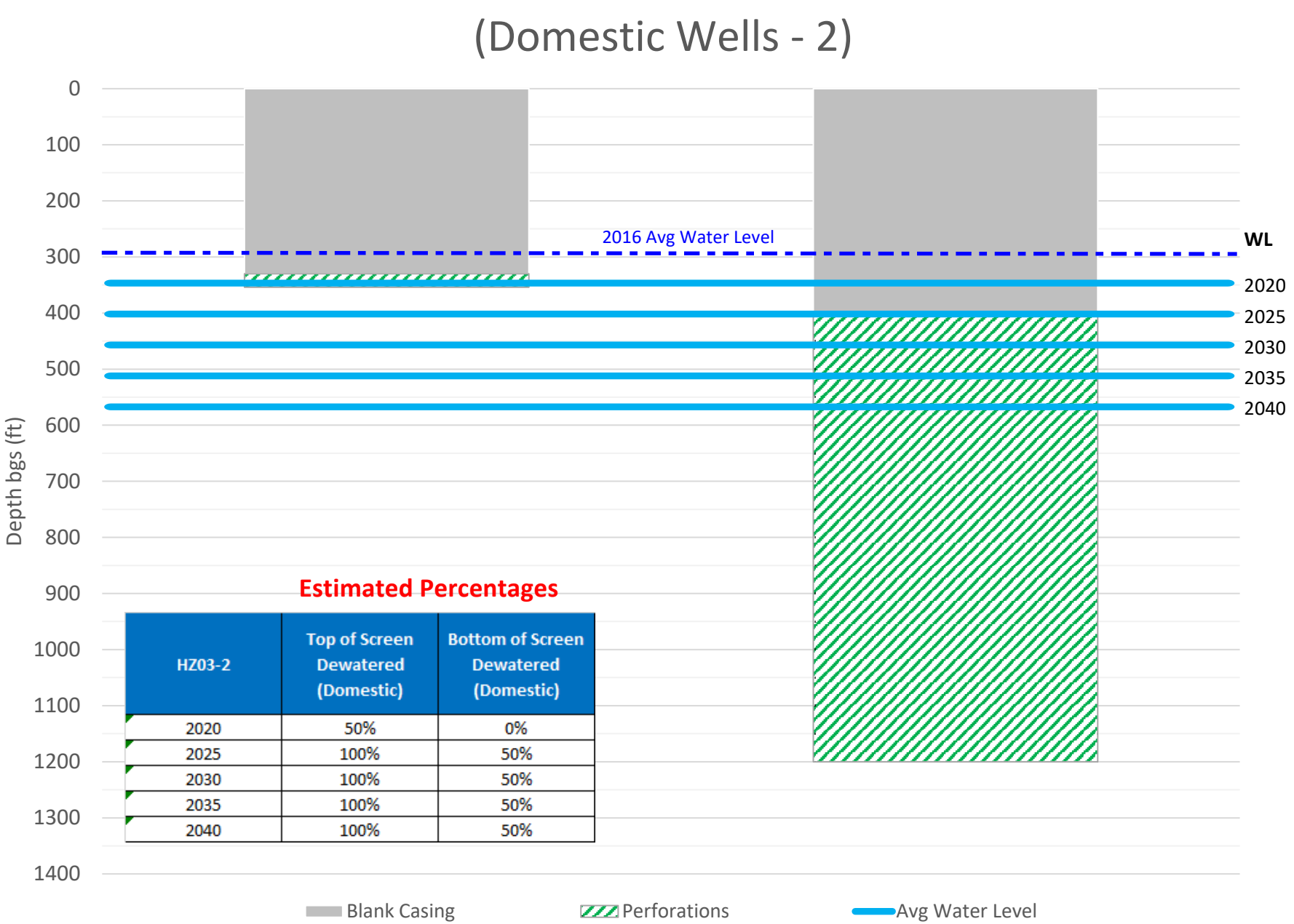
HZ 03- 02 Well Dewatering

(Agricultural Wells - 21)



Estimated Percentages

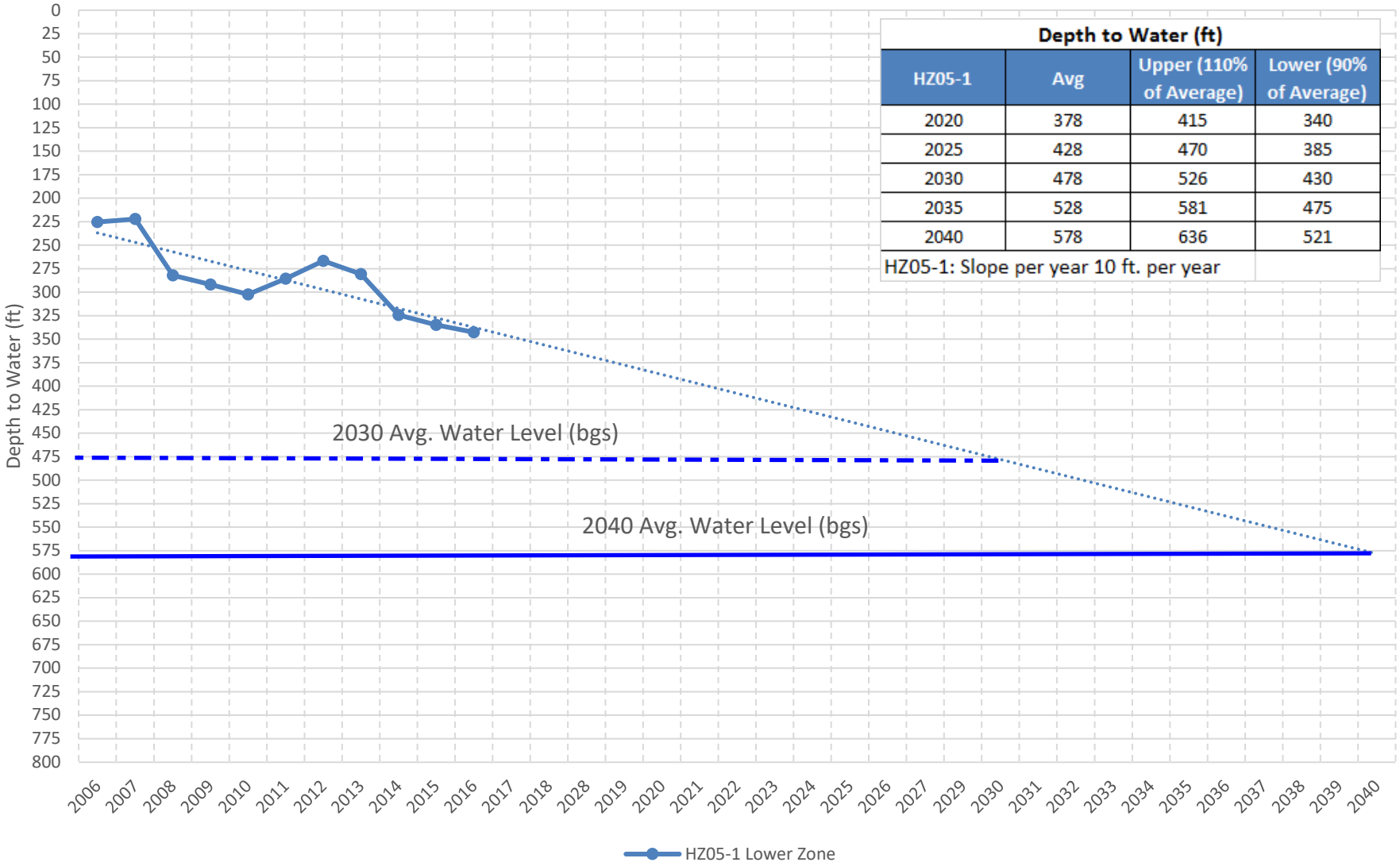
HZ03-2	Top of Screen Dewatered (AG)	Bottom of Screen Dewatered (AG)
2020	5%	0%
2025	33%	0%
2030	52%	0%
2035	95%	0%
2040	95%	0%



Estimated Percentages

HZ03-2	Top of Screen Dewatered (Domestic)	Bottom of Screen Dewatered (Domestic)
2020	50%	0%
2025	100%	50%
2030	100%	50%
2035	100%	50%
2040	100%	50%

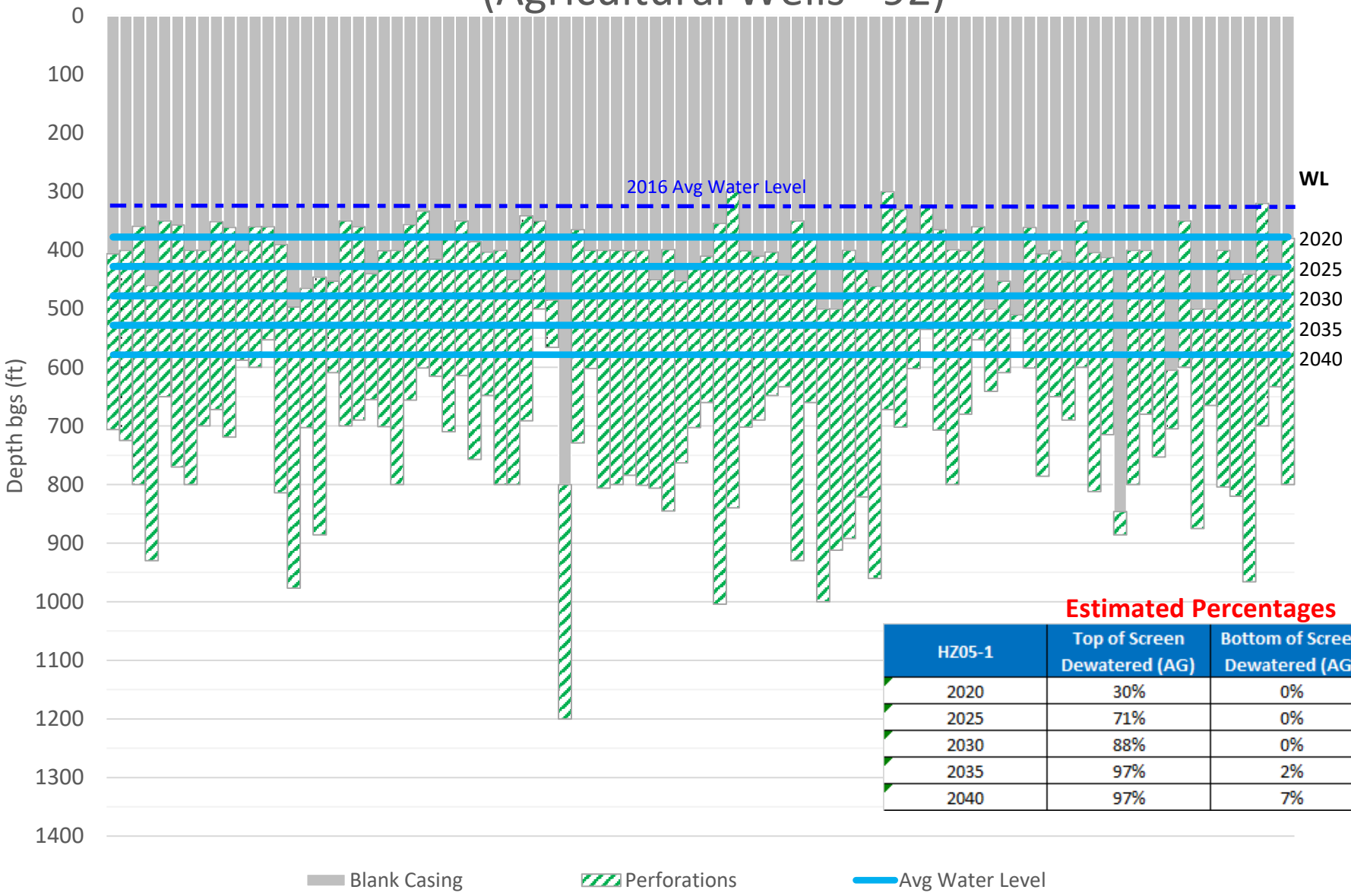
Hydrogeologic Zone 05 - 1
(Average Spring Measurements)



Depth to Water (ft)			
HZ05-1	Avg	Upper (110% of Average)	Lower (90% of Average)
2020	378	415	340
2025	428	470	385
2030	478	526	430
2035	528	581	475
2040	578	636	521
HZ05-1: Slope per year 10 ft. per year			

HZ 05- 01 Well Dewatering

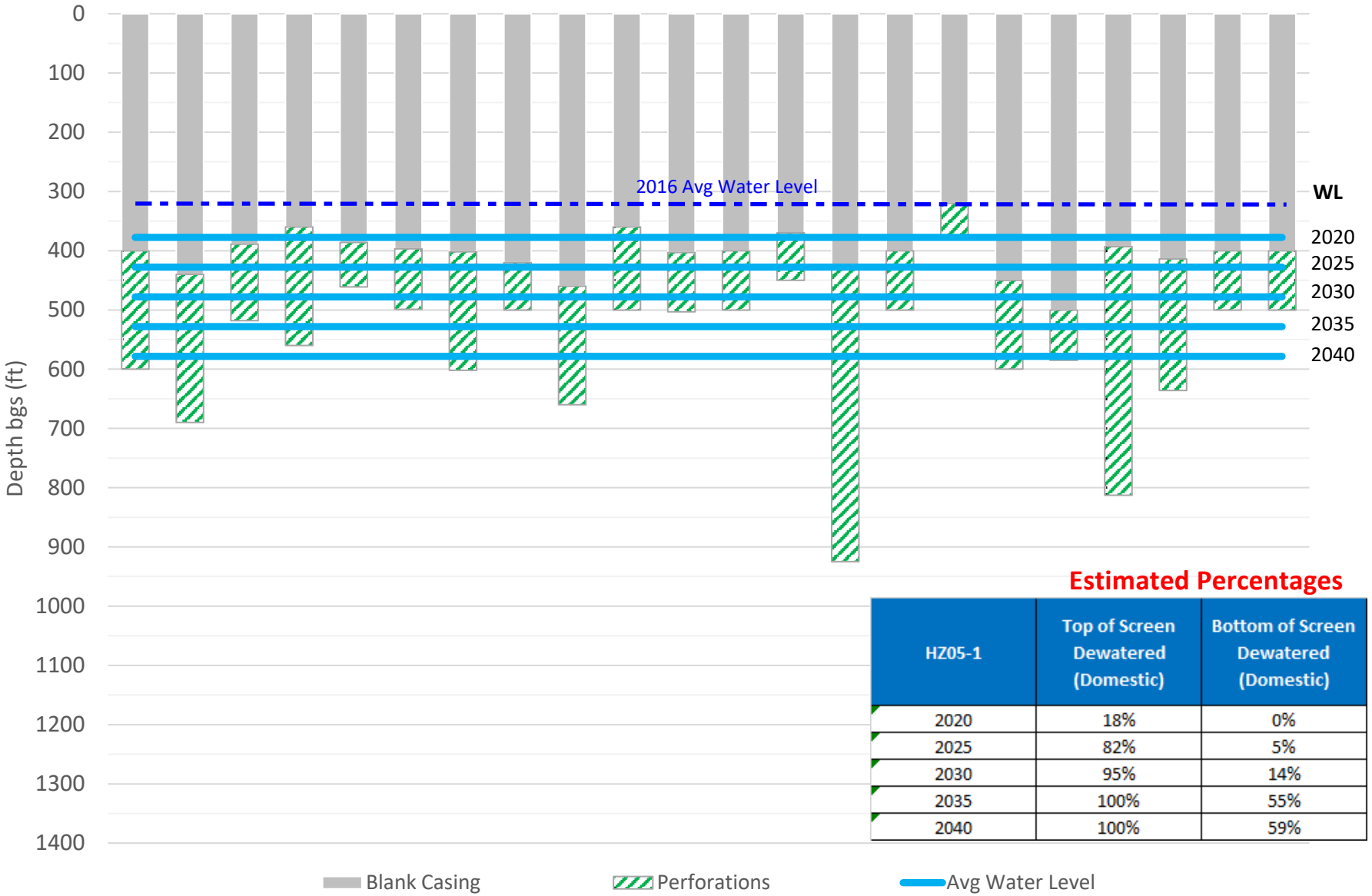
(Agricultural Wells - 92)



Estimated Percentages

HZ05-1	Top of Screen Dewatered (AG)	Bottom of Screen Dewatered (AG)
2020	30%	0%
2025	71%	0%
2030	88%	0%
2035	97%	2%
2040	97%	7%

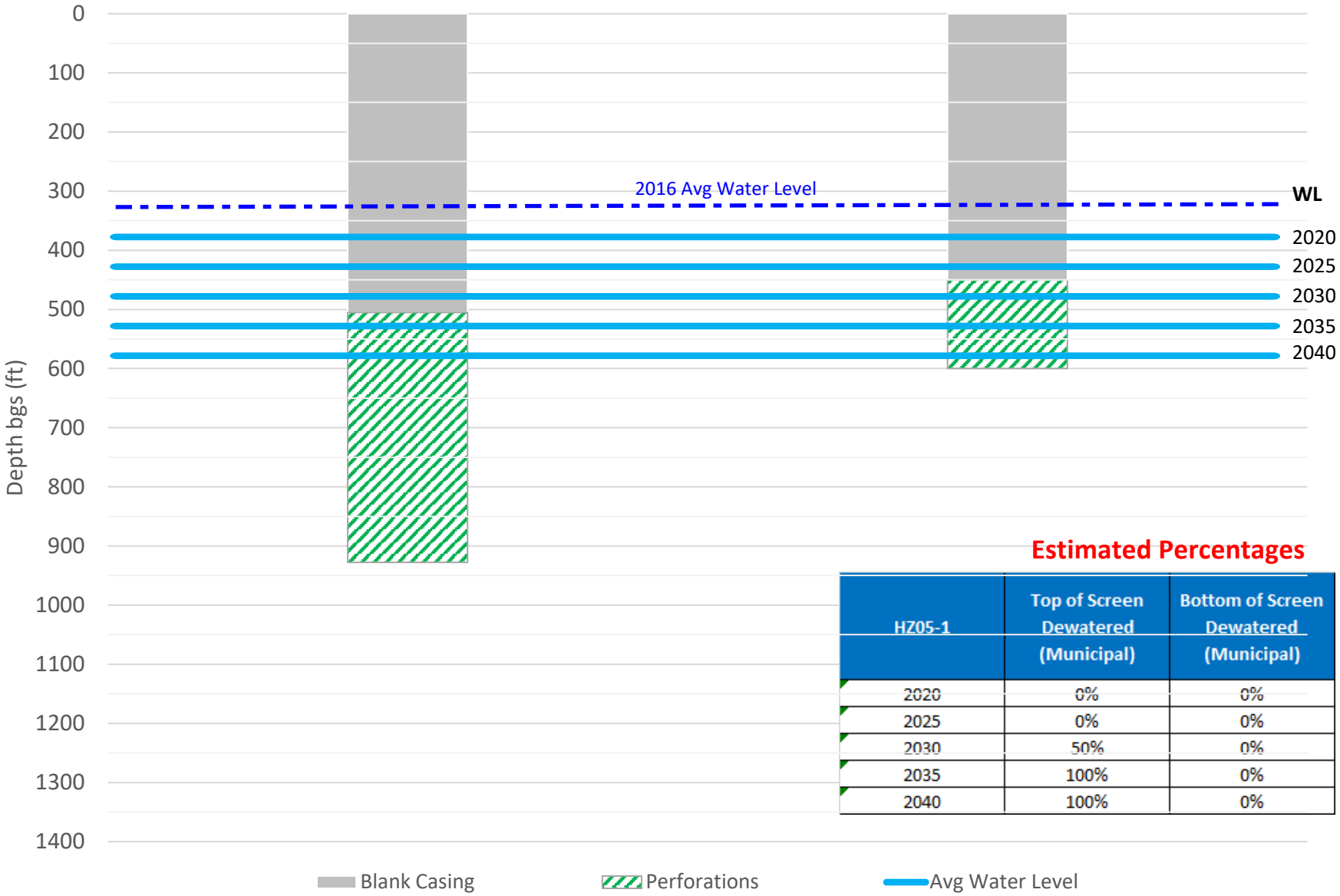
(Domestic Wells - 22)



Estimated Percentages

HZ05-1	Top of Screen Dewatered (Domestic)	Bottom of Screen Dewatered (Domestic)
2020	18%	0%
2025	82%	5%
2030	95%	14%
2035	100%	55%
2040	100%	59%

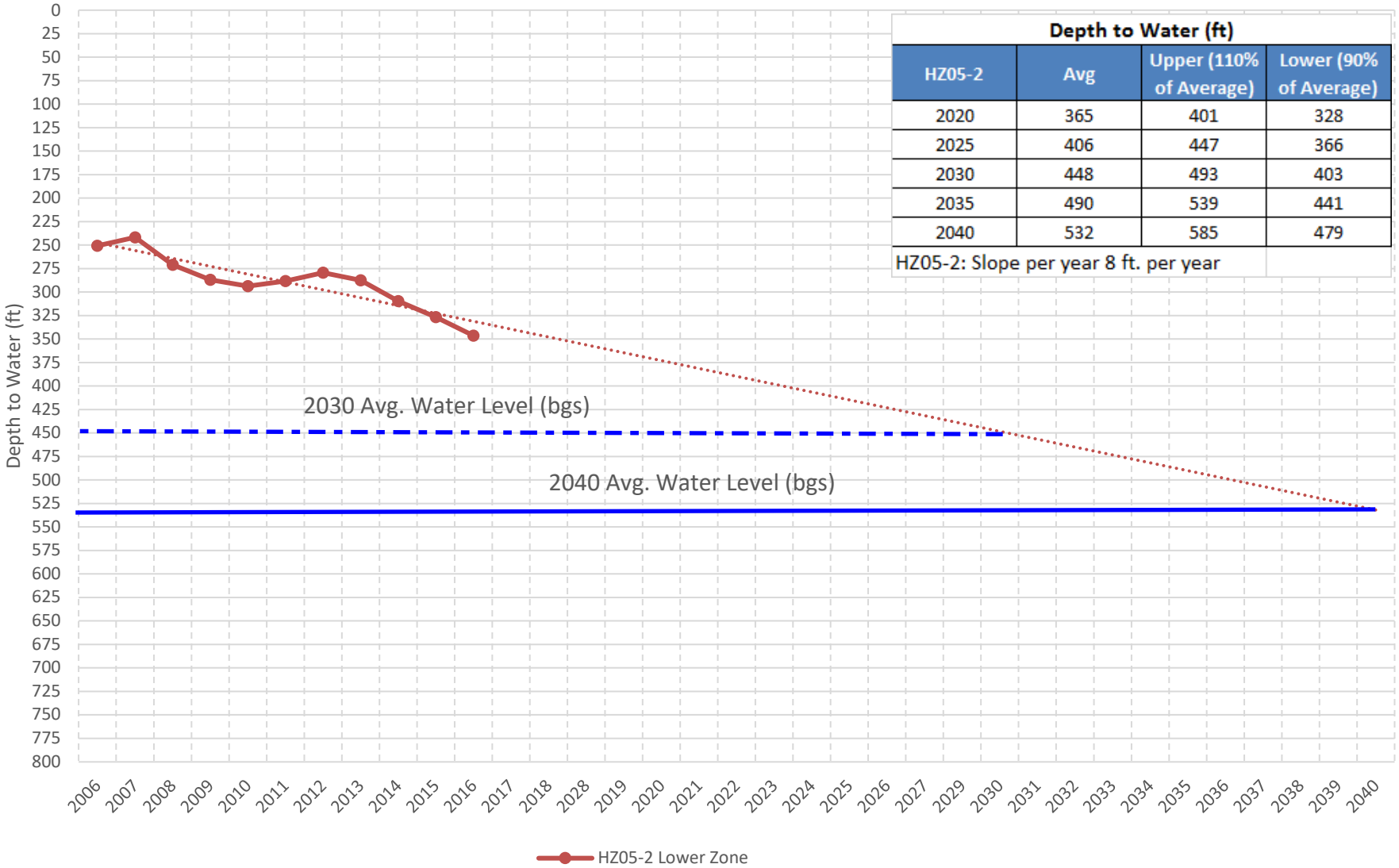
(Municipal Wells - 2)



Estimated Percentages

HZ05-1	Top of Screen Dewatered (Municipal)	Bottom of Screen Dewatered (Municipal)
2020	0%	0%
2025	0%	0%
2030	50%	0%
2035	100%	0%
2040	100%	0%

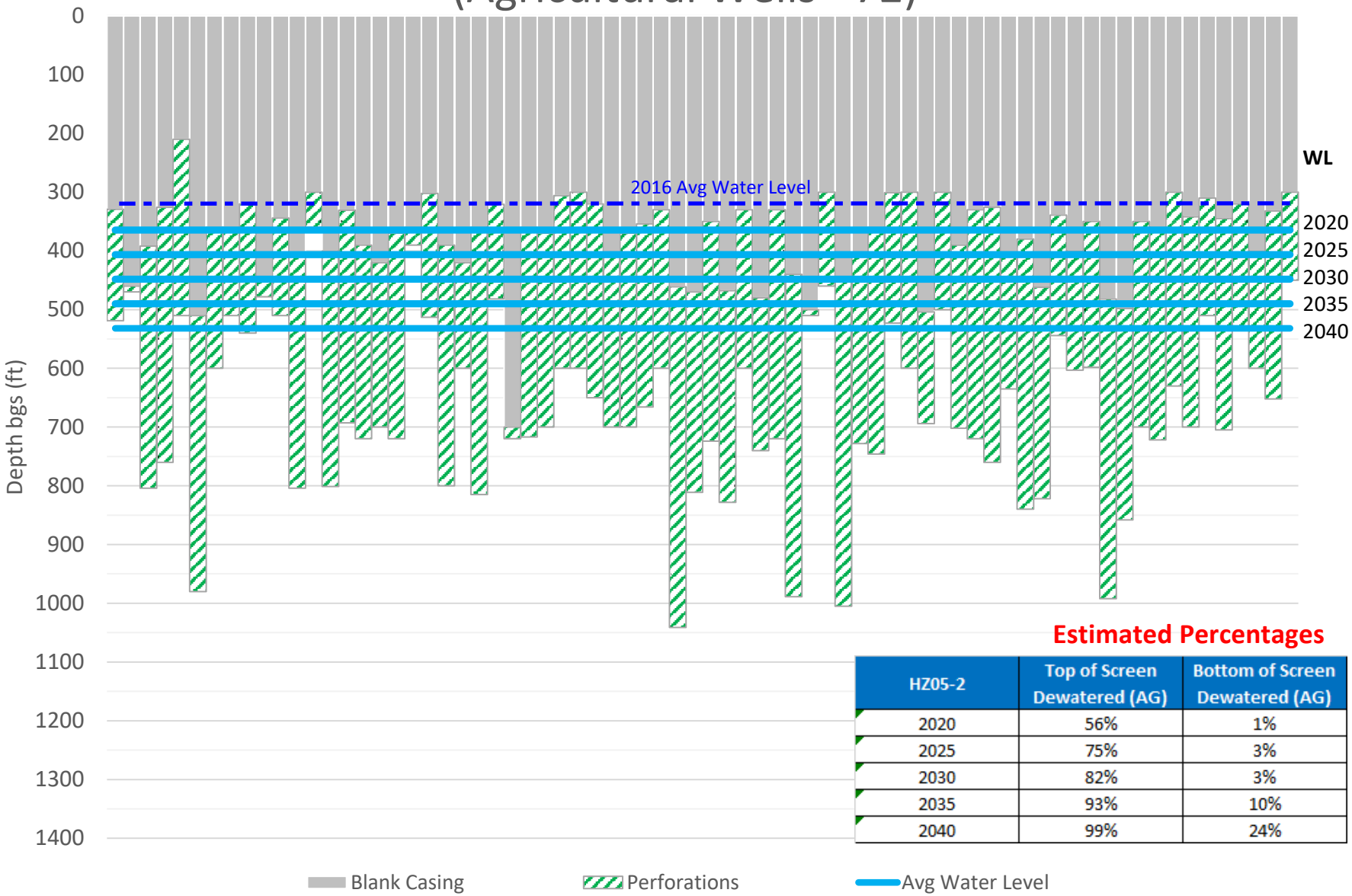
Hydrogeologic Zone 05 - 2
(Average Spring Measurements)



Depth to Water (ft)			
HZ05-2	Avg	Upper (110% of Average)	Lower (90% of Average)
2020	365	401	328
2025	406	447	366
2030	448	493	403
2035	490	539	441
2040	532	585	479
HZ05-2: Slope per year 8 ft. per year			

HZ 05- 02 Well Dewatering

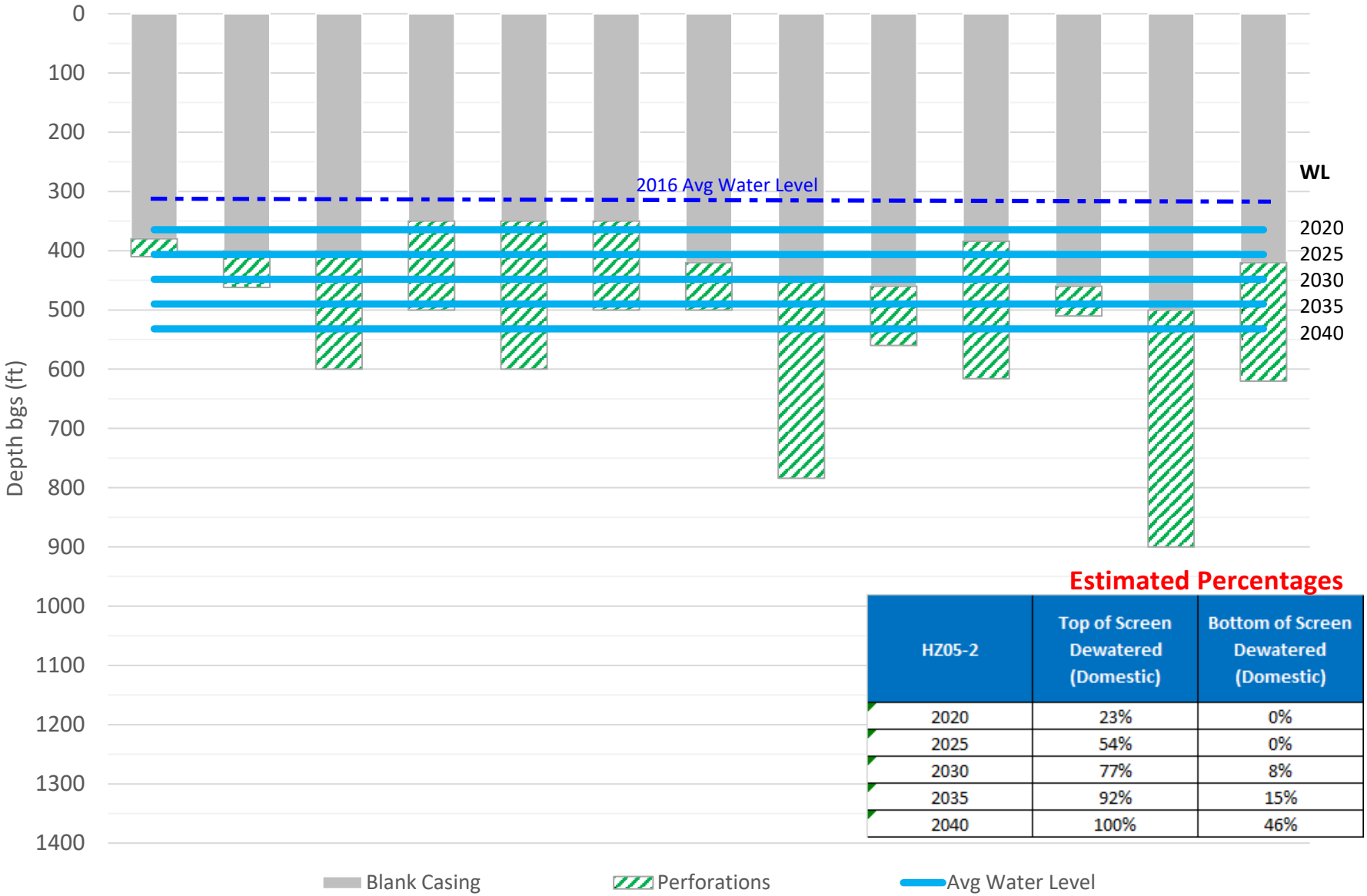
(Agricultural Wells - 72)



Estimated Percentages

HZ05-2	Top of Screen Dewatered (AG)	Bottom of Screen Dewatered (AG)
2020	56%	1%
2025	75%	3%
2030	82%	3%
2035	93%	10%
2040	99%	24%

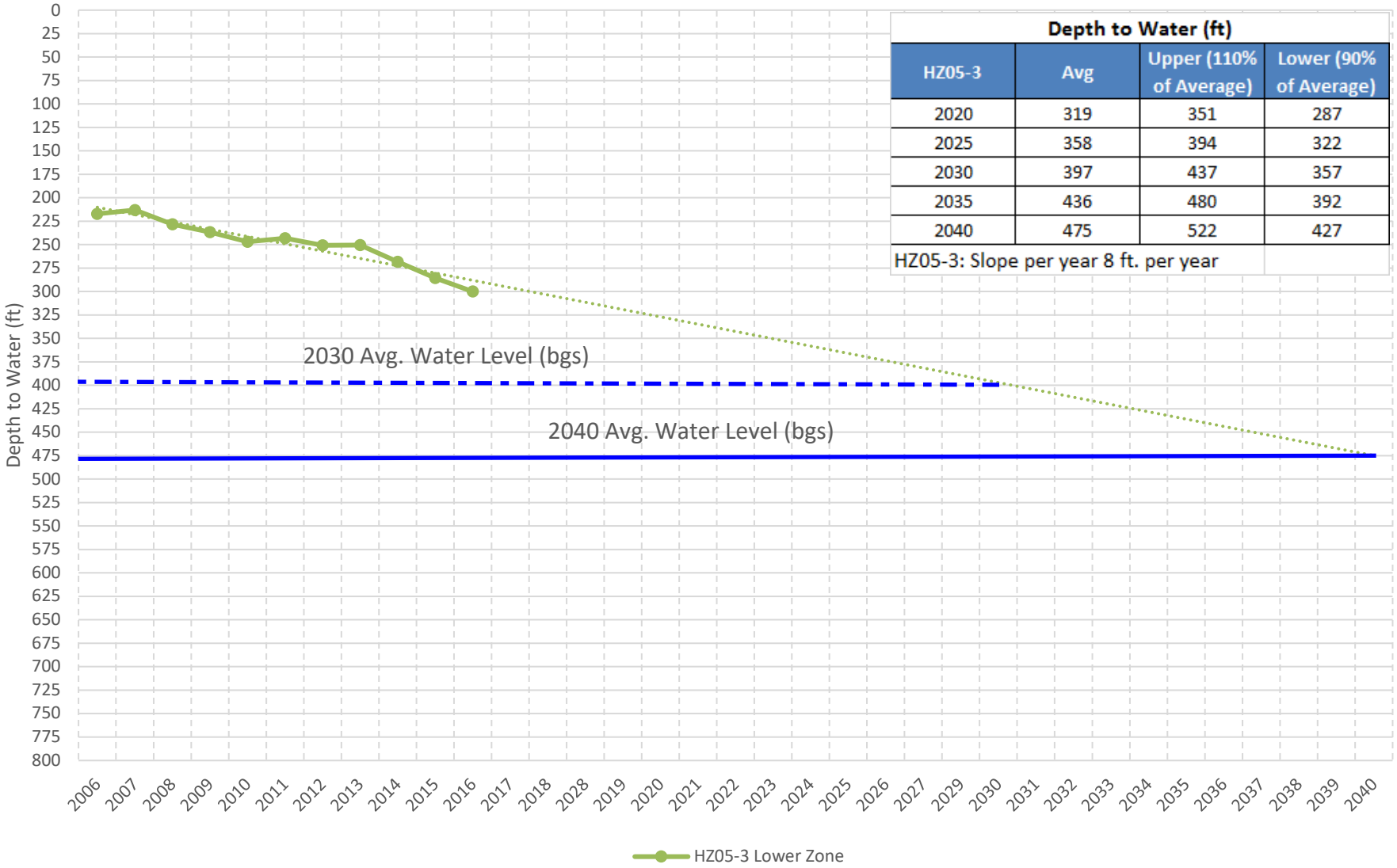
(Domestic Wells - 13)



Estimated Percentages

HZ05-2	Top of Screen Dewatered (Domestic)	Bottom of Screen Dewatered (Domestic)
2020	23%	0%
2025	54%	0%
2030	77%	8%
2035	92%	15%
2040	100%	46%

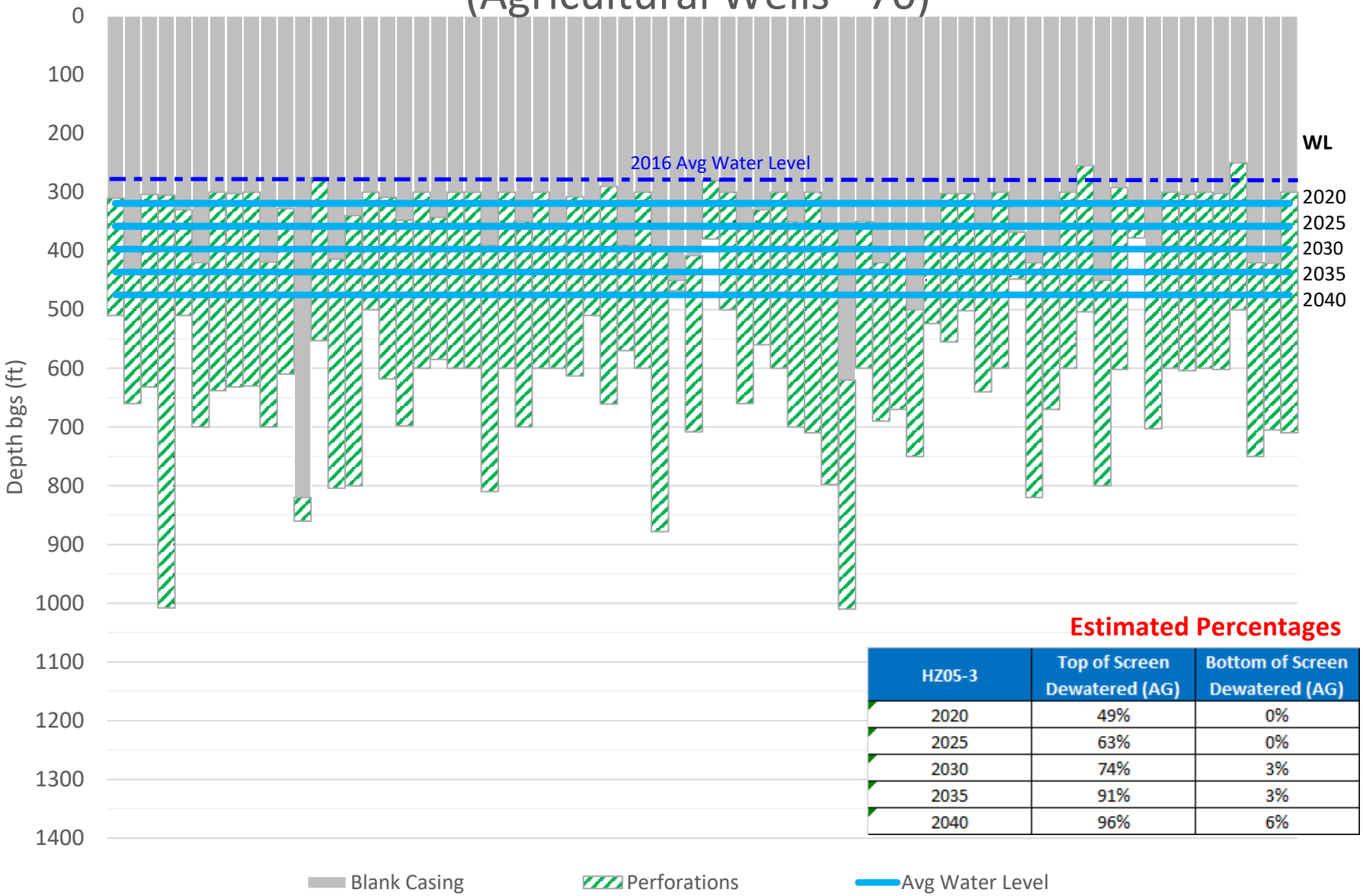
Hydrogeologic Zone 05 - 3
(Average Spring Measurements)



Depth to Water (ft)			
HZ05-3	Avg	Upper (110% of Average)	Lower (90% of Average)
2020	319	351	287
2025	358	394	322
2030	397	437	357
2035	436	480	392
2040	475	522	427
HZ05-3: Slope per year 8 ft. per year			

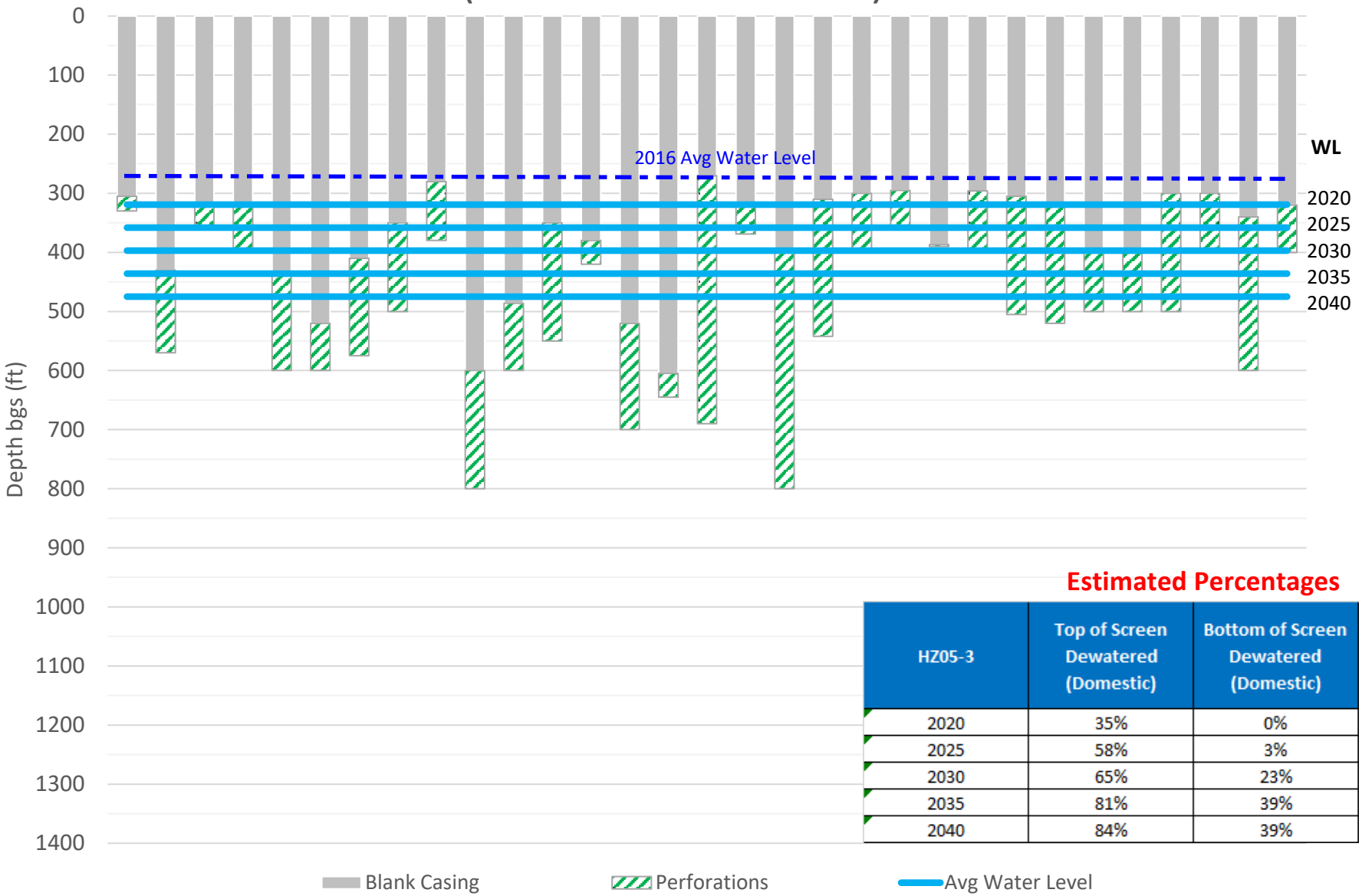
HZ 05- 03 Well Dewatering

(Agricultural Wells - 70)



Estimated Percentages

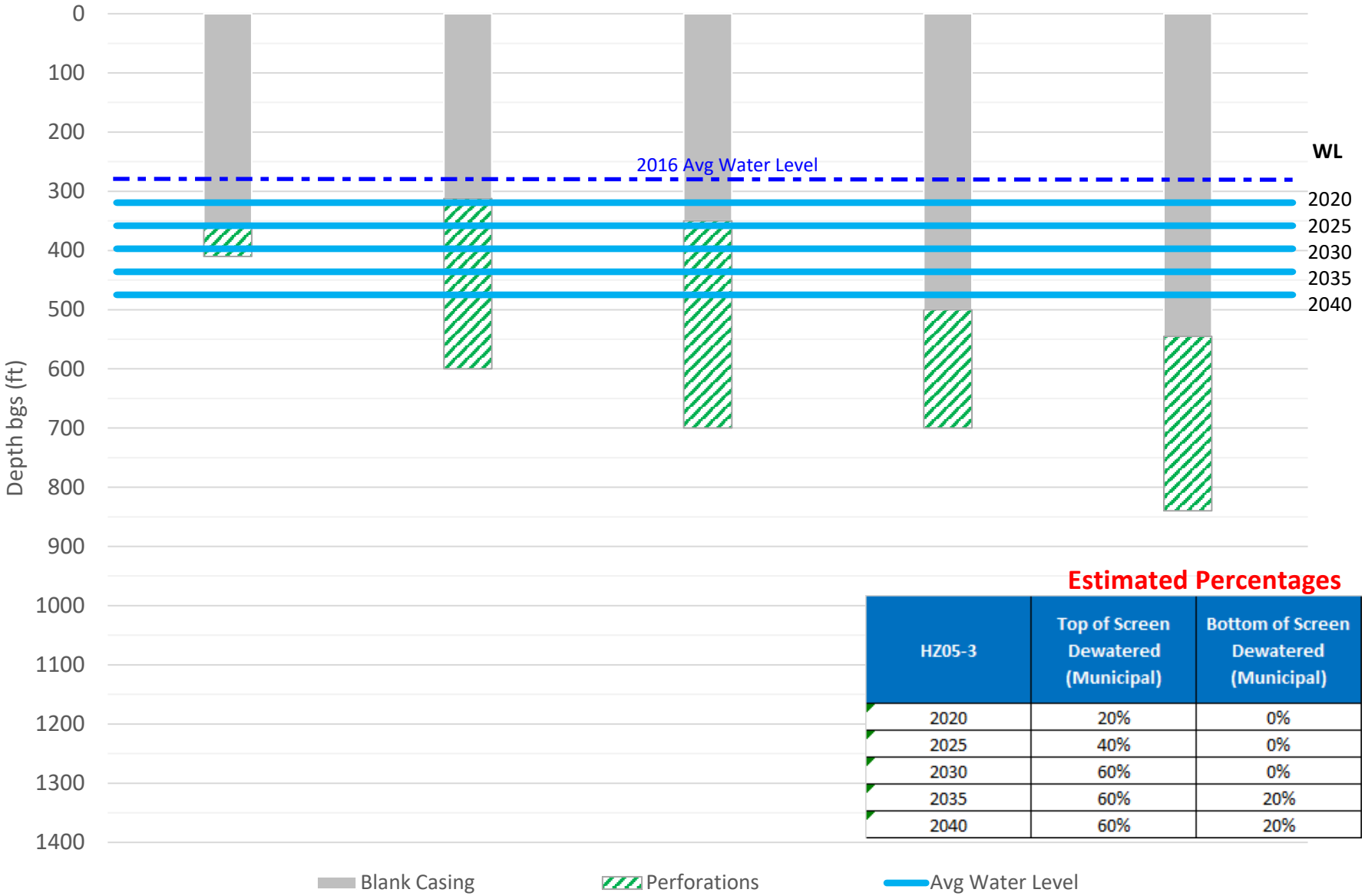
HZ05-3	Top of Screen Dewatered (AG)	Bottom of Screen Dewatered (AG)
2020	49%	0%
2025	63%	0%
2030	74%	3%
2035	91%	3%
2040	96%	6%



Estimated Percentages

HZ05-3	Top of Screen Dewatered (Domestic)	Bottom of Screen Dewatered (Domestic)
2020	35%	0%
2025	58%	3%
2030	65%	23%
2035	81%	39%
2040	84%	39%

(Municipal Wells - 5)



Estimated Percentages

HZ05-3	Top of Screen Dewatered (Municipal)	Bottom of Screen Dewatered (Municipal)
2020	20%	0%
2025	40%	0%
2030	60%	0%
2035	60%	20%
2040	60%	20%