From: Norman Huff
To: FCGMA
Subject: Comments on the First Periodic Evaluation, Groundwater Sustainability Plan for the PVB
Date: Monday, October 7, 2024 1:54:10 PM
Attachments: 20241007 SUBMITTED CWD COMMENTS ON PVBGSP EVAL.pdf

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FCGMA Board of Directors,
Please find attached, Camrosa Water District's comments on the "First Periodic Evaluation, Groundwater Sustainability Plan for the Pleasant Valley Basin"
Sincerely,
Norman Huff

Norman Huff
General Manager
[redacted]
CAMROSA WATER DISTRICT
BUILDING WATER SELF-RELIANCE

CAMROSA WATER DISTRICT
BUILDING WATER SELF-RELIANCE

Board of Directors
Fox County Groundwater Management Agency
800 South Victoria Avenue
Ventura, CA 93009-1600

Submitted via email to: FCGMA@ventura.org

October 7, 2024

Re: Comments on the "First Periodic Evaluation, Groundwater Sustainability Plan for the Pleasant Valley Basin"

Board of Directors:

Attached please find Camrosa Water District's comments on the "First Periodic Evaluation, Groundwater Sustainability Plan for the Pleasant Valley Basin" dated August 2024.

Camrosa would like to commend the GMA Board, GMA Staff, UWCD Staff, and Dudek for all the effort that went into completing the Draft GSP Evaluation. We appreciate the outreach, communication, and collaboration that went into developing a better understanding of the basin and how recent climate events, projects, and management actions have impacted the health of the basin. It has been insightful to use the UWCD modeling efforts as a tool to look forward so that all basin stakeholders may begin to collaborate on the implementation of sustainability initiatives.

In connection with our comments, we would also like to note some general issues related to the processes used to arrive at this stage in the development of the evaluation.

1. Leadership and Coordination. It seems that the evaluation process could have been improved through clear, centralized leadership in guiding the data collection, coordinating stakeholder engagement, and developing a suite of scenarios with the goal of achieving sustainability. We believe that a more thorough understanding of the interconnected relationships between stakeholders and water resources within the basins could have enhanced the approach. We recognize that constraints around deadlines, workload, personnel continuity, limited scope, and budget limitations, may have impacted the ability of key personnel to engage more fully with stakeholders in this aspect of the process.
2. Collaboration and Transparency. Some foundational inputs and assumptions used in developing the modeling, scenarios, and ultimate conclusions were not readily provided to stakeholders making it challenging to offer timely feedback or thoroughly assess evaluation conclusions. We sincerely appreciate the information that was provided to

assist us in the evaluation of the modeling work and conclusions presented in the draft, but on many occasions, we had to request the information as it was not readily available. Without these requests, we may not have been aware of important changes in model inputs, assumptions, and related iterations. We would recommend a commitment to increased transparency and availability of information and data, especially concerning the inputs and assumptions guiding the modeling. We understand that some of these explanations and documentation are forthcoming, but not in time to evaluate and include in this comment period. It would be beneficial for the GMA to ensure that stakeholders have ample opportunity to review and provide feedback on the final draft of the evaluation once this information is made available.

Considering these points, we would respectfully suggest the following:

1. Further stakeholder collaboration and analysis are needed to ensure that this evaluation provides a solid, science-based foundation for future policy decisions. While it is an important step forward, it would benefit from additional input and scrutiny to provide the soundest basis for decision-making.
2. Adjustments to key thresholds and objectives should be approached cautiously. Any revisions to Minimum Thresholds, Measurable Objectives, Sustainable Yield, or potential pumping reductions should be based on thorough, physical data and analysis. Hypothetical models that rely on assumptions not yet fully documented or vetted should not be the sole basis for these critical policy decisions.

In summary, we commend the GMA on its efforts thus far. The work done on the GSP Evaluation is a significant step towards further understanding of basin dynamics and achieving sustainability. The current evaluation offers valuable concepts and some potential projects and management actions, which, in our opinion, remain somewhat conceptual and need further development. We believe that the GMA could play an important leadership role in collaborating with stakeholders to develop a comprehensive Master Plan, with clear, vetted, science-driven objectives, actionable projects, and management actions centered around sound policy that will guide the path forward toward sustainability. We look forward to this collaborative effort with the GMA and other stakeholders.

Please contact me by email or phone with any questions or concerns.

Sincerely,

Norman Huff
General Manager
Email: normanh@camrosa.com
Phone: (805) 256-3318

COMMENTS ON "FIRST PERIODIC EVALUATION, GROUNDWATER SUSTAINABILITY PLAN FOR THE PLEASANT VALLEY BASIN" DATED August 2024

By
Camrosa Water District
October 7, 2024

GENERAL COMMENTS.

1. Camrosa does not agree with the statement that "Groundwater production for agricultural, municipal, and industrial use in the PVB, specifically near the boundary with the Oxnard Subbasin, has contributed to seawater intrusion in both the UAS and LAS of the Oxnard Subbasin (FCGMA, 2019)." We do not believe this statement is supported by the simulations conducted by UWCD using their Coastal Plain Model. We provide specific comments below in support of our viewpoint.

2. We think that the pumping rate (15,400 AFY) used in the UWCD calibrated Coastal Plain Model and the Future Baseline scenario pumping (14,600 AFY) are reasonable approximations of long-term sustainable yield for the PVB and that any uncertainties should be applied to these pumping values.

3. It is apparent from the various scenarios analyzed using UWCD's Coastal Plain Model that pumping reductions alone are not a reasonable approach to achieving sustainability. It seems clear that the challenge to maintain a landward to seaward hydraulic gradient in the LAS is not going to be achieved by recharge in the Oxnard Forebay only. Groundwater flow from the Oxnard Forebay recharge basins will take the path of least resistance and in response to local hydraulic gradients to discharge in advance of flowing the great distance required to supply the far reaches of the Oxnard Subbasin LAS aquifer. In order to maintain controls on groundwater gradients at the coastline, especially in the LAS, a hydraulic barrier will be required; an injection barrier, which is the conventional approach used in Southern California Coastal Basins, or an extraction barrier, which is a novel approach, as proposed by UWCD. We encourage the GMA to explore these alternatives as part of the solution to reach sustainability in the Oxnard Subbasin.

4. We do not agree with how sustainable yield pumping rates are determined through the application of an implementation period (first 17 years) and a sustaining period (last 30 years), where average pumping over the sustaining period is used to estimate sustainable pumping rates. As described below in our comments, the whole 47-year period is considered a representative period of long-term hydrology for the region, not the last 30 years. We provided our objection to this approach in our comments on the original GSP and provide further comments below.

5. The GSP evaluation does not acknowledge Camrosa's pumping credits accrued through Ordinance 2014-01. Camrosa has accrued 31,078 AF of credits through December 2023.

6. Camrosa retained Intera, Inc. to review UWCD's original Ventura Regional Groundwater Flow Model (VRGWFM) and make recommendations to modify and refine the model for use in assessing Camrosa's pumping in the northeastern PVB in order to demonstrate sustainability while pumping the credits accrued under Ordinance 2014-01. Intera has completed their review, including their recommendations for model improvements, which we are happy to share with the GMA. We think implementing these recommendations, along with additional data collection and analysis by Camrosa, will improve all stakeholders' understanding of the sustainable yield of the PVB.

7. There are references to a forthcoming document from UWCD that documents the Coastal Plain Model used for the GSP evaluation. Upon request, we were provided the water budget tables from UWCD's updated calibrated model. We compared selected water budget components between the two calibrations and there are significant differences that need explanation and review by stakeholders. We provide a slide deck herein showing our comparisons. (Attachment A)

8. There is no documentation of future scenarios presented in the GSP. The sustainable yields of each basin cannot be reviewed critically because of the gaps in documentation. Groundwater model assumptions and inputs used for the simulation of future scenarios have not been documented. Documentation, similar to that prepared for groundwater models of historical conditions in the original GSP, is required for the following: boundary conditions, projected stream flows including stream leakage (e.g., Santa Clara River, Arroyo Las Posas, Conejo Creek, and Calleguas Creek), operations (including rules) of diversion of surface water for direct deliveries and managed recharge, location and timing of applied waters (e.g., imported water, surface water, recycled water, and groundwater), mountain front recharge, recharge from precipitation, groundwater flow between basins, location (including aquifer) and timing of groundwater pumping and location of discharge to streams, seawater (coastal groundwater) intrusion/outflow, conjunctive use operations, etc. All water budget components simulated in the models, including assumptions and methods used, need to be documented. Such documentation has not been presented for stakeholder review and understanding of the basis of the presented sustainable yields.

9. The GSP Evaluation report presents a very narrow review of the groundwater model simulation results for each pumping scenario, focusing solely on changes in seawater intrusion and interbasin flows. We think the authors reach unsupportable conclusions regarding sustainable yield and miss identification of key issues by ignoring all other changes that occur from changing pumping. Changing areal and vertical pumping distributions and pumping rates create completely different groundwater flow regimes. For example, there are changes in groundwater flow between aquifers, groundwater discharges to streams, groundwater discharges to drains, groundwater discharges to ET, etc. as described below. Additionally, while the Basin Optimization scenario recognizes that shifting pumping locations in the Oxnard subbasin affects seawater intrusion and the sustainable yield, the GSP evaluation fails to apply this concept to conclusions presented for the PVB. One of the more significant beneficial purposes of Camrosa's Conejo Creek Project (CCP) was that deliveries of that supplemental water would offset "Groundwater production for agricultural, municipal, and industrial use in the PVB, specifically near the boundary with the Oxnard Subbasin,… " (FCGMA, 2019) thereby shifting pumping away from the coast which helps to mitigate seawater intrusion. Where pumping occurs matters. With that said, there should be a more comprehensive discussion of each scenario, so that stakeholders can understand how groundwater flow is affected by changes

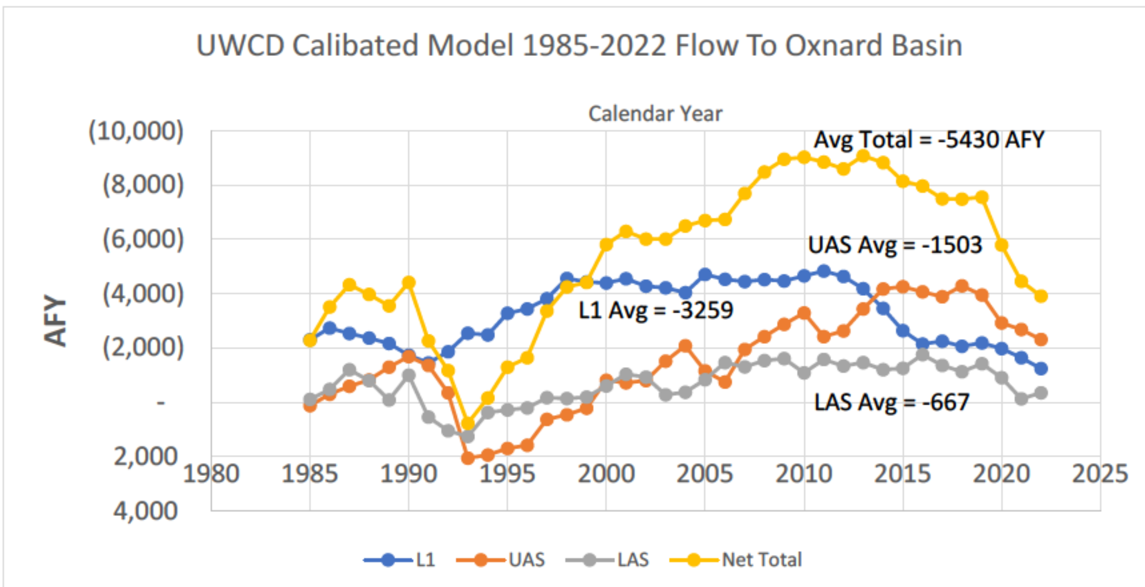
in pumping locations, patterns, and rates in *both* the Oxnard and Pleasant Valley subbasins, which could aid in identifying projects and management actions to achieve sustainability.

10. There is not a specific plan to achieve sustainability. The GSP evaluation provides information regarding the potential to move toward sustainability by various changes in areal and vertical pumping distributions as well as reductions in pumping rates. However, there needs to be a specific plan to achieve sustainability as required by the groundwater sustainability regulations. We think that a master plan should be developed that provides a road map to achieve sustainability in the remaining time. There needs to be a process to identify the necessary physical facilities and management actions required to achieve sustainability that is acceptable to stakeholders. This process would include analysis of specific projects or collection of projects, including technical, economic, and environmental feasibility. Once specific projects and management actions are identified (selected), then an implementation plan can be developed that lays out the funding and institutional responsibilities, with specific milestones and timelines. UWCD is doing this work relative to the Extraction Barrier Brackish Water Treatment (EBB) project, so, should the GMA and stakeholders agree, this project could be a core part of the Master Plan, but the GMA needs to provide the overarching framework for a comprehensive Master Plan.

11. Camrosa obtained water budget tables around the end of June 2024 from UWCD staff. These water budget tables are generated from simulation results of various pumping scenarios used in the GSP Evaluation. These water budget tables are used as the basis of our comments herein. We understand that additional groundwater model simulations may have been completed and therefore, the water budget tables we have reviewed may be outdated. We also understand that all the scenarios will be updated due to an error in double counting of recycled water supplies. Therefore, we reserve the right to update our comments based on these updated simulations and revisions to the GSP Evaluation report.

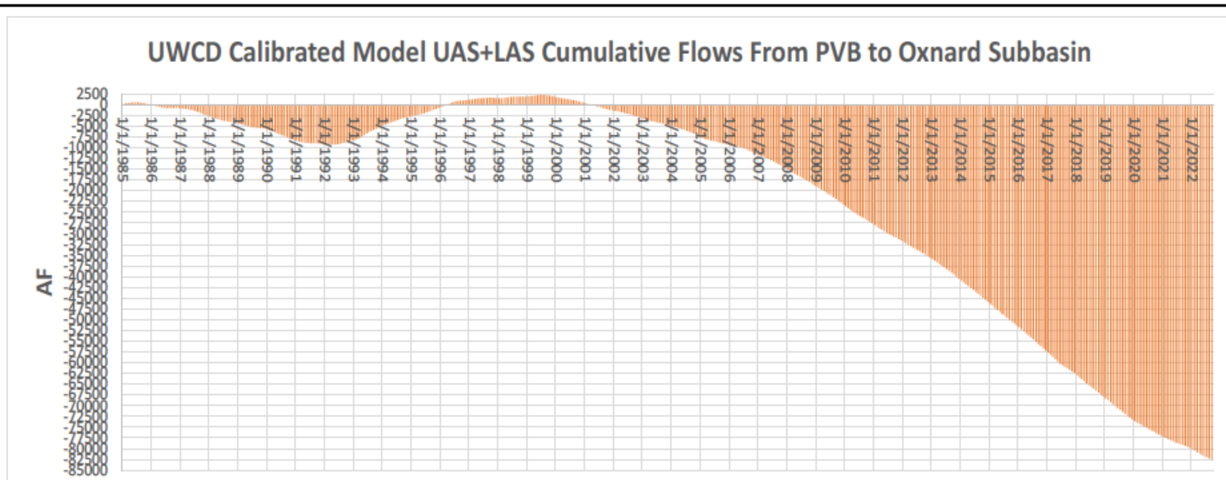
SPECIFIC COMMENTS.

p. ES-2, Section "Current Groundwater Conditions." The statement that "Groundwater production for agricultural, municipal and industrial use in the PVB, specifically near the boundary with the Oxnard Subbasin, has contributed to seawater intrusion in both the UAS and LAS of the Oxnard Subbasin (FCGMA, 2019)" has not been demonstrated. In fact, the UWCD calibrated model (covering 37.75 years) used for the GSP and updated through September 2022 shows that an average of approximately 5,430 AFY of groundwater flow occurred from the PVB to the Oxnard Subbasin. This is about 22 percent of the total average annual recharge to the PVB over the calibration period. Following is a plot showing the flow from PVB to Oxnard Subbasin by aquifer over the 1985 to 2022 period.

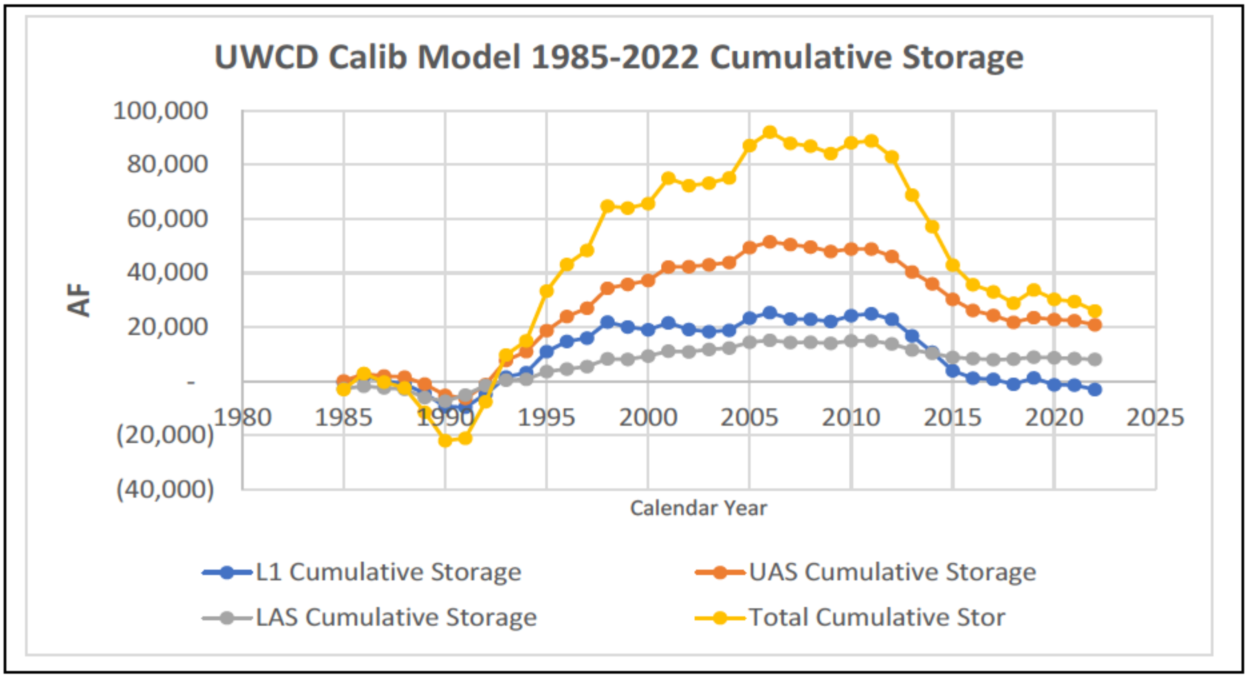


Note: Negative values indicate flow from PVB to Oxnard Subbasin.

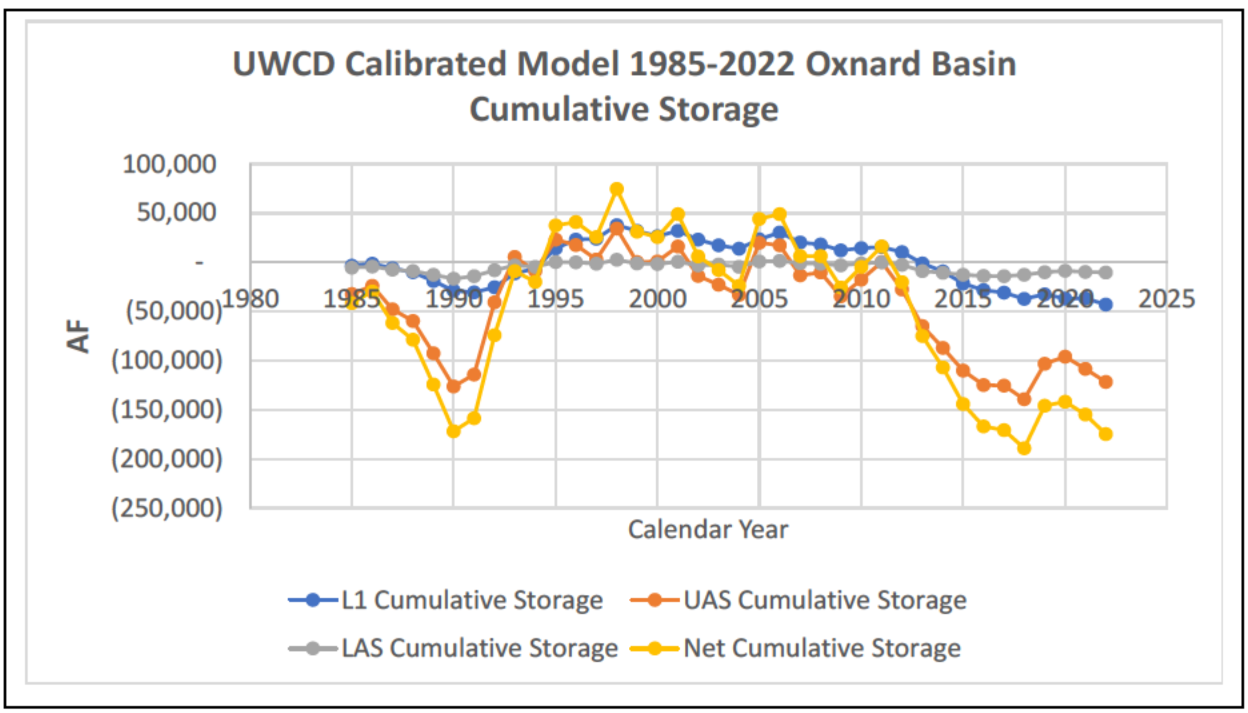
UWCD's calibrated groundwater flow model also shows that, with minor exceptions from about 1996 to 2001, there was a surplus of cumulative flows from the UAS+LAS aquifers in the PVB to Oxnard Subbasin such that the cumulative flow from PVB to the Oxnard Subbasin totals about 83,000 AF in those two aquifer systems. See plot below.



This section should acknowledge that, on average, the Oxnard Subbasin is in a state of critical overdraft, where sources of recharge are insufficient to support average annual groundwater discharges, including pumping, from the Subbasin, and that mostly, groundwater flow is from the PVB to the Oxnard Subbasin. During wet periods, pumping in the Oxnard Subbasin is reduced somewhat and the Subbasin's groundwater is recharged, increasing groundwater levels, which results in reductions in groundwater flow from the PVB to the Oxnard Subbasin. There is no demonstration that groundwater pumping in the PVB contributed to seawater intrusion in the Oxnard Subbasin. In fact, the UWCD calibrated groundwater model results show that cumulative storage of the PVB is nearly always positive, especially in the UAS and LAS aquifers, as shown in the following plot.



In contrast, cumulative storage in the Oxnard Subbasin is depleted over extended periods of time, even though seawater intrusion mitigates storage losses near the coast.



p. ES-2, Section "Relationship to the Sustainable Management Criteria." The statement "Additionally, groundwater elevations below these SMCs have the potential to exacerbate seawater intrusion in the Oxnard Subbasin" has not been demonstrated as discussed in the previous comment.

p. ES-3 – This table needs to be updated based on clarifications provided by Camrosa about its water supplies and their uses.

p. ES-3, Section "State of Overdraft." The statement "overdraft in the PVB has contributed to seawater intrusion and the migration of saline water in the adjacent Oxnard Subbasin" is not supported as discussed in earlier comments above.

p. ES-3, last para. The sustainable yield value of 13,400 AFY is not consistent with the value computed from UWCD's groundwater model water budget tables. The value computed from UWCD's water budget tables for Scenario NNP3 is 12,418 AFY, based on water years 2040 through 2069. However, we think this value is an underestimation of the Sustainable Yield and that the UWCD's calibrated model and Future Baseline scenario pumping are more representative of the PVB sustainable yield.

p. ES-4, second para. The first sentence of this paragraph states that under Future Baseline conditions, groundwater production is anticipated to exceed the Sustainable Yield by approximately 1,200 AFY. However, the cumulative storage of the PVB shows an overall increase in net storage over the water years 2022 through 2069 simulative period as shown in the plot below. The average pumping over the 2022-2069 period is 14,557 AFY.

Based on this comment, we do not agree with the Sustainable Yield estimates in Table ES-3.

p. ES-4, footnote "b" to Table ES-3. The estimation of pumping through time is somewhat complicated and not intuitively obvious. We spent much time trying to understand the estimation process used by UWCD staff to estimate the time-varying pumping rates for the Baseline scenario. We think it is critical that stakeholders understand and have the opportunity to comment on this estimation process. We discovered in our review that there was double counting of some water supplies and that the pumping estimates would need to be revised for each scenario.

Also, it would be useful to provide maps of pumping distributions, spatially and vertically (i.e., by aquifer) so that we can compare how pumping is shifted among the scenarios. For example, maps showing the distribution of pumping by aquifer as shown in Figure 5-4, where the size and color of the symbol represents pumping volumes, would be helpful. Given pumping rates are reduced over time in some scenarios, it would be helpful to use these maps to show, 1) overall simulation period average annual extraction and, 2) average annual extraction rate for the period 2040 through 2069. These displays would be useful in understanding how pumping patterns affect groundwater flow conditions, including changes in interaquifer flows, groundwater discharge patterns, interbasin groundwater flows, and seawater intrusion.

p. ES-5, Section "Assessment of Progress Towards Sustainability." Based on our above comments, it appears that pumping simulated in UWCD's calibrated model and the Future Baseline scenario largely meets the primary sustainability goal for the PVB.

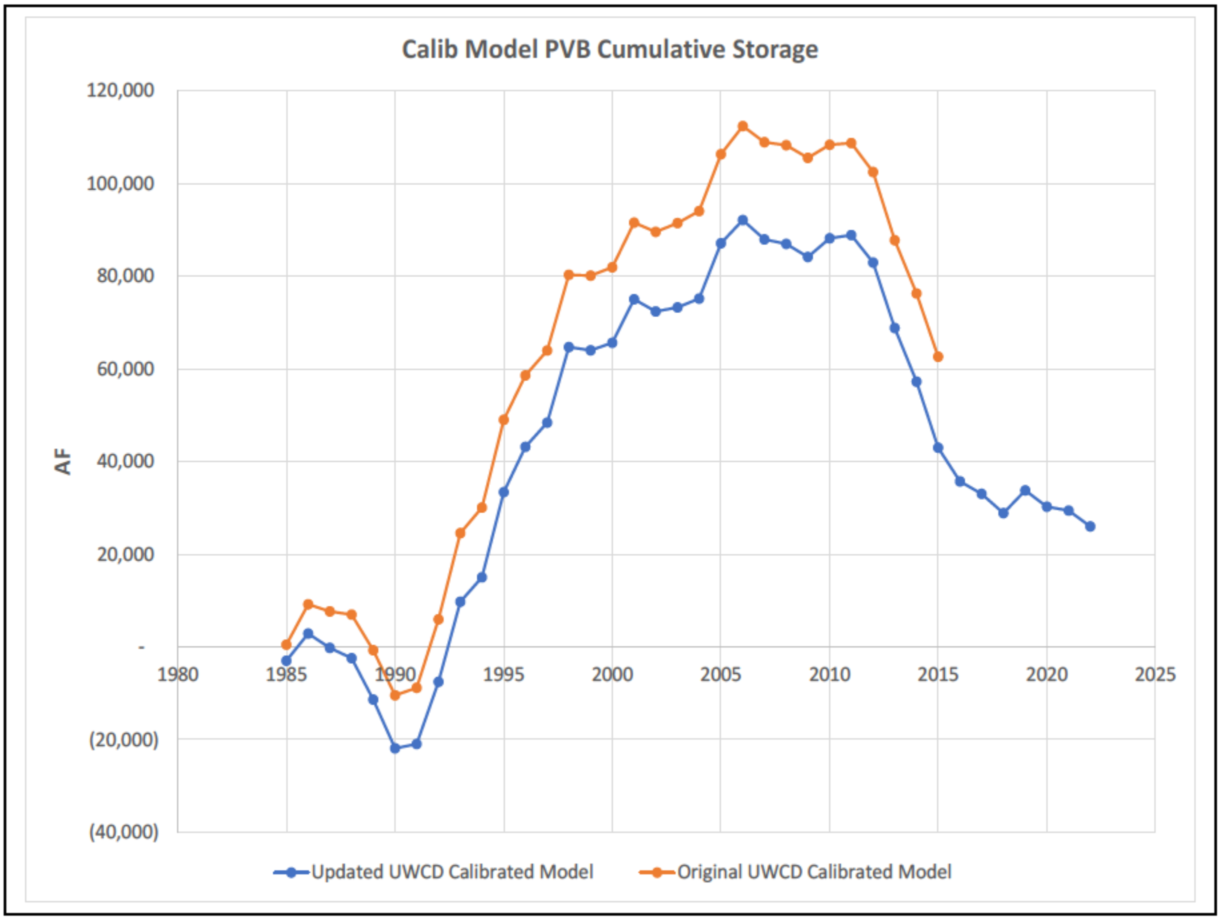
p. 6, third para., first sentence. See previous comment.

pgs. 9 & 10. It is important to note that groundwater pumping occurs in confined aquifers of the UAS and LAS near the boundary of the PVB and Oxnard Subbasin, e.g., Pleasant Valley Pumping Depression Management Area. The confined storage of these aquifers is very small, so much of the water supplied to these wells is from interaquifer flow (leakage from above) and movement from surrounding areas.

Pumping in confined aquifers results in large drawdowns near the pumping wells to create hydraulic gradients towards the wells, i.e., flow from upgradient areas of the PVB and flow from upgradient areas of the Oxnard Subbasin. Once pumping is reduced substantially, groundwater levels immediately rebound significantly, in a relatively short period of time. So, it is not the case so much that recharge in the Oxnard Subbasin is recharging the PVB, it is more the case that groundwater flow from the PVB to the Oxnard Subbasin is reduced because of increasing groundwater levels in the Oxnard Subbasin, until storage builds further in the PVB and groundwater flow increases toward the Oxnard Subbasin.

p. 14, Section 2.2.1.8. We do not agree that NNP3 is representative of sustainable pumping in the PVB as discussed above in previous comments. This scenario should not be used to establish SMCs in the PVB.

p. 17, Section 2.2.2.2. This section discusses storage changes in the PVB. Estimates of storage changes over the evaluation period rely on the updated UWCD calibrated model. There needs to be a discussion of the differences between the original UWCD groundwater calibrated model and the updated model and implications to simulated model results. For example, we compared the PVB cumulative storage changes between the two models and found that the updated calibrated model shows one-thirds less storage or around 20,000 AF less (in 2015) in the PVB compared to the original model. See plot below for the comparison.



It appears that this reduction in storage is due to differences in ET and drain flows between the two models, with higher drain and ET discharge flows in the updated calibration. Given the significance of the differences in storage there needs to be an explanation of the validity of the changes.

p. 17, Section 2.2.2.1. We cannot validate the storage change value of 11,300 AF, which is reported to represent the storage change between water years 1997 and 1999. We compute a storage change of 14,695 AF for water years 1997 through 1999 inclusive (so, cumulative storage change for 1997, 1998 and 1999). We compute a value of 12,771 AF for water years 1997 to 1999 (so cumulative storage change for water years 1997 and 1998).

p.19, Section 2.2.2.2. We cannot validate the storage change value of 4,500 AF, which is reported to represent the storage change between water years 1994 through 1998. We get a storage change of 7,792 AF for water years 1994 through 1998 inclusive (so, cumulative storage change for 1994, 1995,1996, 1997, and 1998). We get a value of 4,037 AF for water years 1994 to 1998 (so cumulative storage change for water years 1994, 1995, 1996, and 1997).

p. 21, Section 2.2.2.3. The conclusion that PVB storage decline resulted in an undesirable result is taken out of context. It is understood and expected that groundwater storage will fluctuate up and down in response to wet and dry periods. As shown above, based on UWCD's updated model, groundwater storage in PVB increased by about 90,000 AF between 1985 and 2005, then decreased to about 26,000 AF (compared to 1985) by the end of water year 2022. Since then, groundwater storage has recovered somewhat above this 26,000 AF low as a result of wet conditions over the last couple of years.

p. 38, Section 3.2.1.2. It is not clear that the recycled water pipeline interconnection will reduce groundwater pumping. Couldn't this recycled water be used to meet new demands? Unless there are restrictions that require offsetting of groundwater pumping by use of additional recycled water, then a reduction in groundwater pumping may not occur.

p. 41, Section 3.2.4.2. The stated benefit of 6,000 AFY to OPV sustainable yield has not been demonstrated.

p. 56, Section 4.1.1. Camrosa has installed a new multi-depth monitoring well in Heritage Park in the northeastern part of the PVB. In addition, Camrosa retained Intera Inc., to review UWCD's model for the northeastern portion of the Pleasant Valley Basin. Intera has made many recommendations for modifying and refining the UWCD groundwater flow model. We anticipate working with UWCD to address these recommendations to improve the model in this area of the PVB. We are happy to share Intera's review and recommendations with the GMA.

p. 63, last para. UWCD's calibrated model update shows PVB average pumping for water years 2021 and 2022 of 14,380 AFY, not 14,600 AFY.

p. 65, Table 4-5. Camrosa provided comments on the values used in Table 4-5 on Sept 16, 2024, in response to a request from Trevor Jones of Dudek.

p. 69, Table 4-8. Camrosa provided corrections to this table on Sept 16, 2024, and clarified that Camrosa provides CamSan water to PVCWD as opposed to direct deliveries of CamSan recycled water from the City of Camarillo. The text should also be corrected to reflect the correct values.

p. 72, Section 5.1, last sentence. It is important for stakeholders to obtain the referenced forthcoming Technical Memorandum from UWCD in order to understand the changes to the updated groundwater model and assess the implications of those changes to sustainability estimates based on this updated model. We have developed a preliminary comparison between the original model calibration and the updated model calibration for selected water budget components. This comparison is provided in Attachment A. We are particularly curious about why there is a change in ET in the PVB and a resulting decrease in cumulative storage over the simulation period. As stated above, we have retained Intera, Inc. to review the original calibrated model and based on this review have a number of recommendations for further modifications and refinements of the model.

p. 74, Section 5.2.1.2. As stated in comments relative to p. ES-4, footnote “b” to Table ES-3, the estimation of pumping through time is somewhat complicated and not intuitively obvious. We spent much time trying to understand the estimation process used by UWCD staff to estimate the time-varying pumping rates for the Baseline scenario. We think it is critical that stakeholders understand and have the opportunity to comment on this estimation process for all scenarios. We discovered in our review that there was double counting of some water supplies and that the pumping estimates would need to be revised for each scenario.

Also, it would be useful to provide maps of pumping distributions, spatially and vertically (i.e., by aquifer) so that we can compare how pumping is shifted among the scenarios. For example, maps showing the distribution of pumping by aquifer as shown in Figure 5-4, where the size and color of the symbol represents pumping volumes, would be helpful. Given pumping rates are reduced over time in some scenarios, it would be helpful to use these maps to show, 1) overall simulation period average annual extraction and, 2) average annual extraction rate for the period 2040 through 2069. These displays would be useful in understanding how pumping patterns affect groundwater flow conditions, including changes in interaquifer flows, groundwater discharge patterns, interbasin groundwater flows, and seawater intrusion.

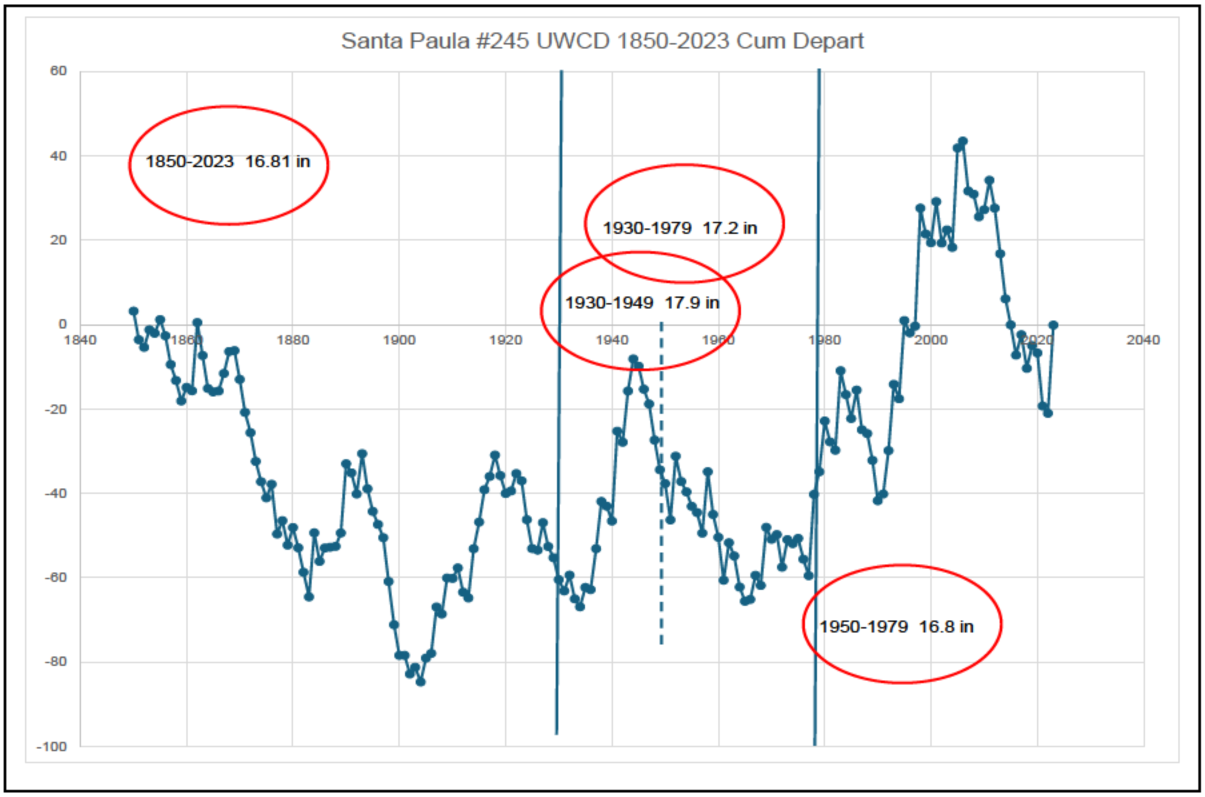
p. 76, Table 5-1. The recycled values for CamSan and Camrosa need to be revised based on information provided to Trevor Jones on Sept 16, 2024. It is not clear if Camrosa’s University Well (supply to the Round Mountain Water Treatment Plant, RMWTP) pumping should be included in this table as pumping came online in 2015. Camrosa provided in March 2024 the future expected annual pumping rate for the University well, which is 1,131 AFY. We understand that this pumping is included in all the model scenario simulations.

p. 79, Section 5.2.2, first para. after the bullet list. We do not agree with the approach used in the GSP that uses water years 2023 through 2039 as the implementation period and water years 2040 through 2069 as the sustaining period. We think that as a minimum, the entire 2023 through 2069 should be used to identify the sustainable yield, and ideally, the simulations should be extended to include current hydrologic conditions (so a projection of an additional 45 years, to 2113) to consider more recent hydrology and actual water management plans and operations. The long-term simulations would be performed using the best estimates of sustainable pumping to assess the success of selected pumping rates against the SMCs. Following is our rationale for using the whole 2023 through 2069 period to estimate sustainable yield.

1. The TAG chose 1930 through 1979 as a 50-year period where the hydrology, specifically mean precipitation over this period was the same to very close to the long-term mean precipitation, and the period included a number of wet and dry periods. So, the whole period was (is) considered a representative period of long-term conditions, not a portion of it.

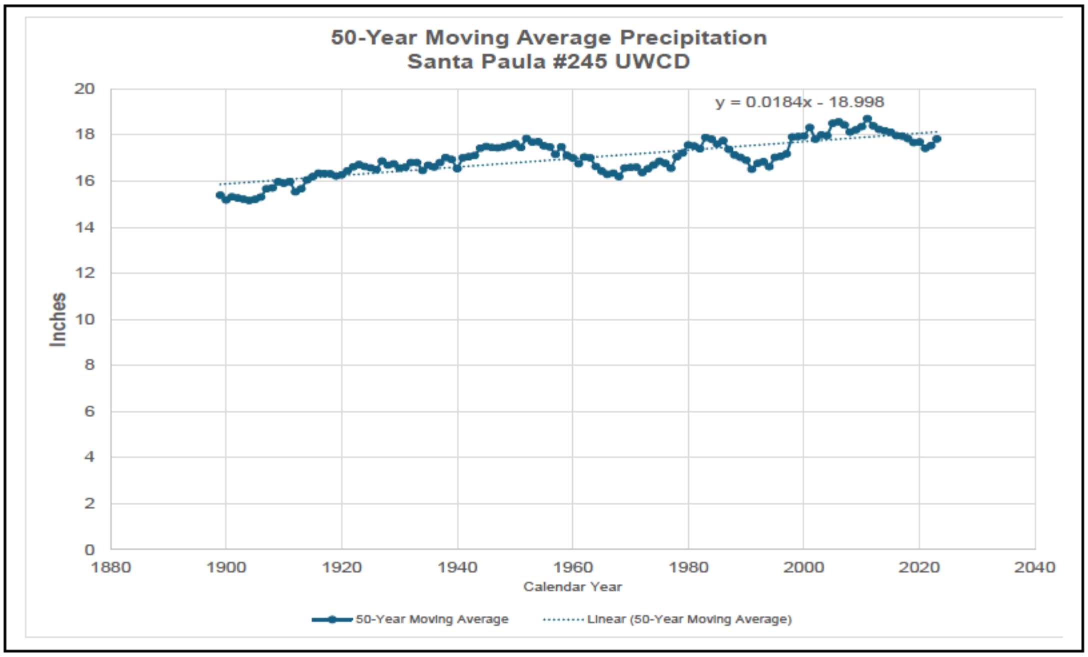
2. UWCD staff has indicated that their preferred precipitation gauge for assessing long-term trends is the Santa Paula #245 station and they provided this data to us. UWCD staff, at the May 29, 2024, Technical Workshop, suggested that the period of water years 2040 through 2069 is representative of the long-term mean for this station. The plot below shows the cumulative departure from the mean precipitation for this station over the entire record of 1850 through 2023.

As shown in this plot, the long-term mean precipitation from 1850 through 2023 is 16.81 inches. The mean precipitation over 1930 to 1979 is 17.2 inches, which is higher than the long-term mean of 16.81. The period 1950 through 1979 precipitation mean is 16.8 which is equal to the long-term mean. The period 1950 through 1979 is used to project the hydrology for 2040 through 2069 in the groundwater model simulations (i.e., 90-year offset).



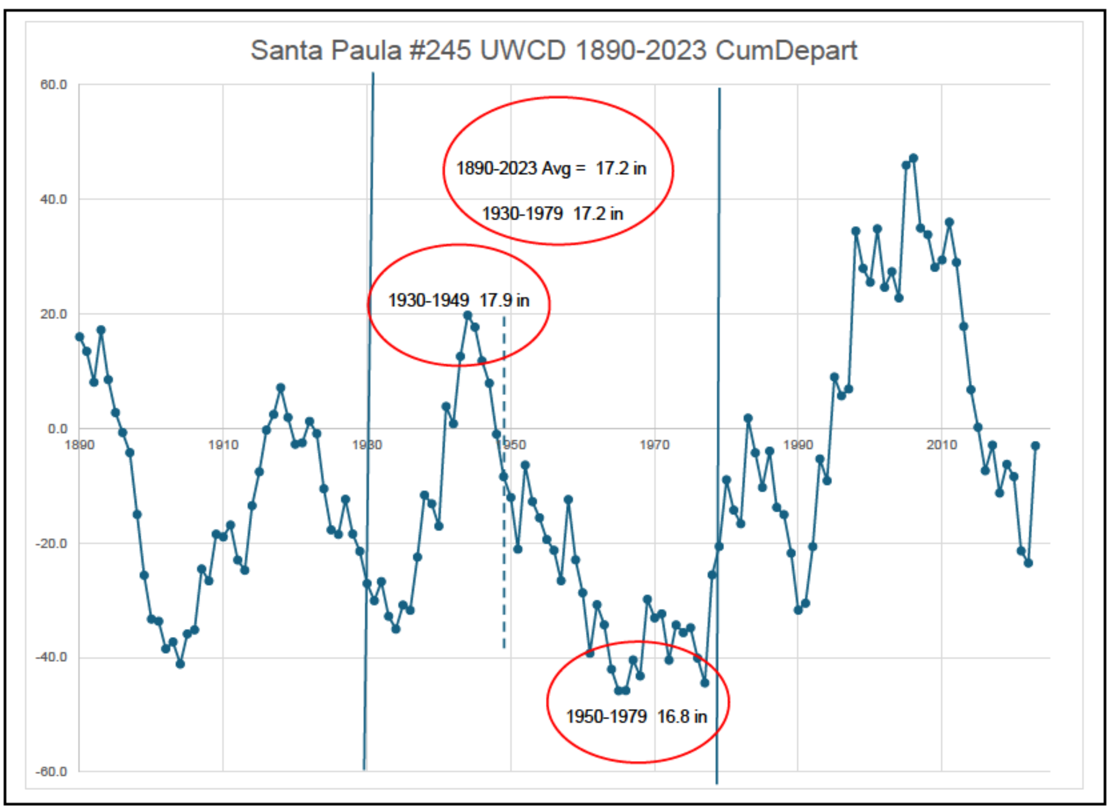
However, data provided by UWCD staff show that prior to 1890, only annual values are provided and monthly values are provided for all years 1890 and onward. We plotted the 50-year moving annual average value of precipitation for this station as shown in the plot below. This analysis shows that mean precipitation has been trending upward by nearly 2.5 inches since 1900, indicating increasingly wetter hydrology, which is consistent with a slightly warming climate. Therefore, we suggest that using the full 1850 to 2023 average is not representative of the more recent average, and that the long-term average should be limited to 1890 to 2023. The long-term mean precipitation for this period is 17.2 inches.

The plot below shows the cumulative departure from mean precipitation for the period 1890 through 2023.

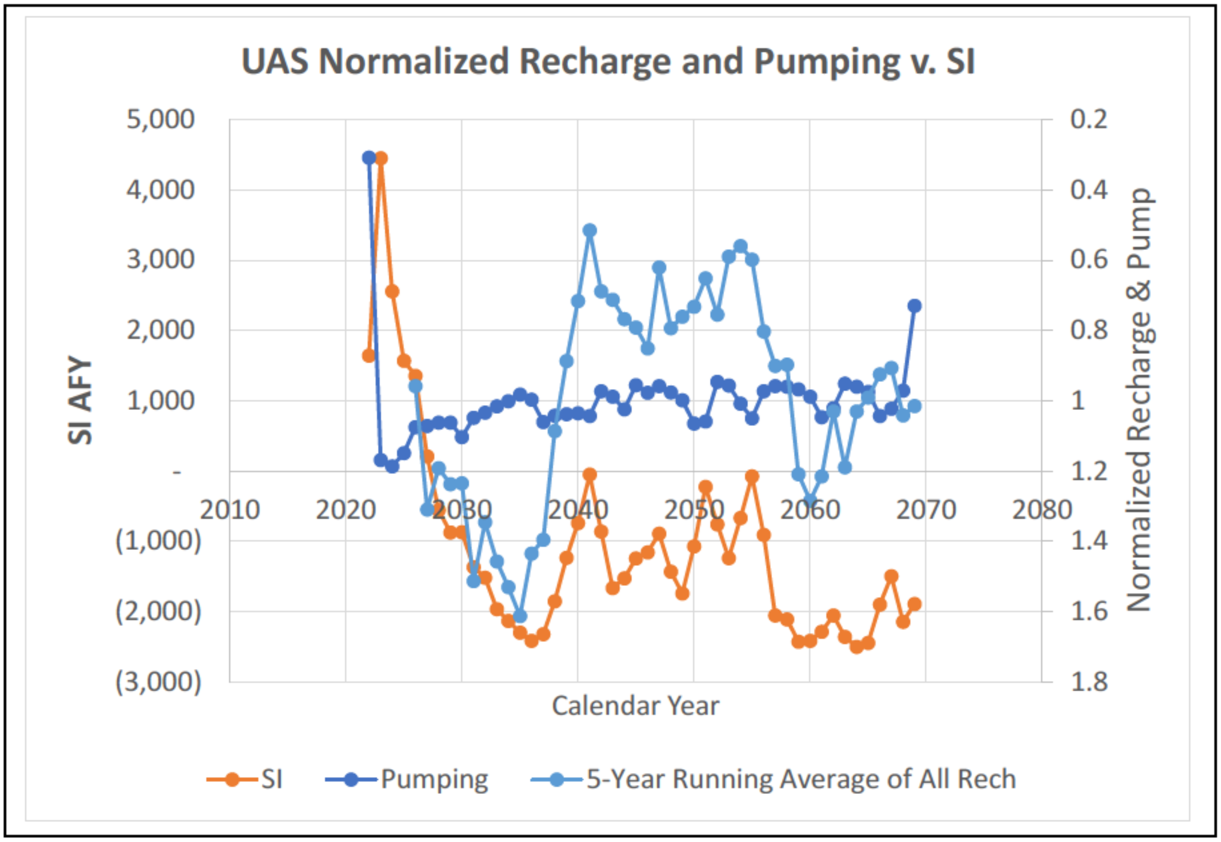


As shown in this plot, the 1930 through 1979 mean precipitation is 17.2 inches, the same as the 1890 through 2023 average. The first 20 years of this period is wetter than the last 30 years, 17.9 inches versus 16.8 inches. These differences may appear small, but they are significant, especially as runoff to streams is higher for higher precipitation events. For example, UWCD estimates recharge diverted to spreading basins in the Oxnard Forebay is greater than 2,200 AFY more for the period 2022 through 2039 compared to the period 2040 through 2069.

So, use of the period 2040 through 2069 is not representative of the long-term hydrological conditions.



3. Use of the period 2022 through 2039 for the "implementation period" to ramp down pumping is completely arbitrary. It is unknown as to what the actual hydrology is going to be in the future. It just so happens that 1933 through 1950 (projected to 2023 through 2040) is a wet period as described above. This wet period helps dampen the impacts of pumping on seawater intrusion during the ramp down of pumping. The significance of this wet period recharge is shown by plotting normalized values of recharge and pumping against sweater intrusion (SI, i.e., coastal inflow of groundwater) in the Oxnard Basin in Scenario NNP2 below.



This plot shows a rapid decline in seawater intrusion in the UAS in response to the much higher-than-average recharge in the implementation period. Average values of recharge are values that equal the average recharge over the full 47 years. A 5-year moving average recharge value is plotted to smooth the spikes in individual years. So, a value of normalized recharge equal to the average is 1, whereas values greater than 1 indicate higher than average recharge, and values lower than 1 indicate lower than average recharge. A plot of normalized pumping is also shown using the same process used to compute normalized recharge. It is clear from this plot, recharge is significantly above average in the 10 to 12 years of the implementation period, which results in a substantial decline in seawater intrusion rates in the implementation period. However, as stated above, the future is unknown, so it is not knowable as to what the actual trend will be in the future.

This last plot shows the importance of high recharge events on seawater intrusion, in terms of decreasing or even reversing seawater intrusion. The sustaining period does not account for a return of higher recharge rates, which occurs periodically, as shown by the period 1930 through 1950 and more recently during the 1990s and again over the last couple of years. It is for this reason we recommend simulating longer-term periods to assess sustainable pumping rates because in the short-term, seawater intrusion may occur during dry periods, but be completely reversed during wet periods, with the average seawater intrusion positions maintained at an acceptable equilibrium location.

We would estimate if that the average pumping over the entire 47-year simulation period was used, this would result in a similar position of the seawater intrusion front as estimated from the various simulations conducted for this study, with ramp down in the implementation period and reduced pumping over the sustaining period. Therefore, for those scenarios identified as creating sustainable conditions, the sustainable pumping rates are likely those rates closer to the average pumping over the entire simulation period as opposed to the average pumping over the last 30 years of the simulations.

p. 80, Section 5.2.2.2. The sustaining period pumping for the PVB is stated to be 13,900 AFY but Table 5-2 shows a value of 14,600 AFY.

As stated in comments relative to p. ES-4, footnote "b" to Table ES-3, the estimation of pumping through time is somewhat complicated and not intuitively obvious. We spent much time trying to understand the estimation process used by UWCD staff to estimate the time-varying pumping rates for the Baseline scenario. We think it is critical that stakeholders understand and have the opportunity to comment on this estimation of water supplies and their uses and actual pumping rates over time for all scenarios.

Listing of the pumping rates over the sustaining period (2040-2069) is not particularly informative as to how the basins are actually operated. There are significant variations in pumping as a result of the conjunctive use operations of the PTP and PVP wellfields with Santa Clara River surface water deliveries. In addition, the Camarillo Desalter goes offline by 2048, which is during the sustaining period.

p. 81, last para. The statement that, "groundwater extractions near the boundary between the two basins contributed to the regional pumping depression that influences seawater intrusion and saline migration in the Oxnard Subbasin." has not been substantiated. The large quantity of overdraft in the Oxnard Subbasin and the lack of groundwater level controls near the coast are the principal contributors to seawater intrusion in the Oxnard Subbasin. See comment on page ES-2.

p. 82, Table 5-2. This table appears to have a number of errors as many of the pumping and seawater intrusion values are not consistent with the values computed from UWCD's groundwater model water budget tables for each scenario simulation. The following table shows values that we compute from UWCD's water budget tables. We have included values for the Oxnard Subbasin as well. Highlighted values indicate significant differences. The text will need to be revised to reflect these corrected values.

Scenario	Report Baseline	UWCD Baseline	Report NNP1	UWCD NNP1	Report NNP2	UWCD NNP2	Report NNP3	UWCD NNP3
GW Extraction (2040-2069)								
PVB								
UAS	4,500	(4,650)	3,100	(2,827)	3,200	(3,034)	3,300	(3,147)
LAS	10,100	(9,214)	10,100	(9,257)	10,800	(10,095)	10,100	(9,271)
Total	**14,600**	**(13,865)**	**13,200**	**(12,084)**	**14,000**	**(13,129)**	**13,400**	**(12,418)**
OxB								
UAS	40,000	(40,048)	32,300	(30,749)	35,200	(34,257)	34,100	(32,920)
LAS	28,300	(28,285)	6,800	(6,757)	2,600	(2,600)	10,600	(10,597)
Total	**68,300**	**(68,332)**	**39,100**	**(37,506)**	**37,800**	**(36,857)**	**44,700**	**(43,517)**
Total	**82,900**	**(82,197)**	**52,300**	**(49,590)**	**51,800**	**(49,986)**	**58,100**	**(55,935)**
	100%	**101%**	**63%**	**61%**	**62%**	**61%**	**70%**	**68%**
Seawater Flux Into OxB (2040-2069)								
UAS	2,100	2,038	(1,000)	(1,404)	(1,000)	(1,487)	(800)	(799)
LAS	3,400	3,432	500	530	200	253	1,000	1,045
Total	**5,500**	**5,470**	**(500)**	**(874)**	**(800)**	**(1,234)**	**200**	**246**
Flow from PVB to OxB (2040-2069)								
UAS	900	914	700	862	600	812	700	869
LAS	300	265	(1,200)	(1,201)	(2,000)	(1,983)	(1,000)	(963)
Net All (2040-2069)		**4,222**		**3,908**		**3,021**		**3,985**
Net UAS+LAS (2040-2069	1,200	1,179	(500)	(339)	(1,400)	(1,171)	(300)	(93)

Scenario	Report Basin Optimization	UWCD Basin Optimization	Report Projects	UCWD Projects	Report EBB Baseline	UWCD EBB Baseline	Report EBB Projects	UWCD EBB Projects
GW Extraction (2040-2069)								
PVB								
UAS	3,600	(3,512)	4,100	(4,132)	4,700	-	4,200	(4,165)
LAS	10,200	(9,400)	8,900	(8,893)	9,100	-	8,800	(8,786)
Total	**13,800**	**(12,912)**	**13,000**	**(13,026)**	**13,800**	-	**13,000**	**(12,951)**
OxB								
UAS	35,200	(35,211)	39,500	(39,451)	50,000	-	49,400	(49,434)
LAS	17,100	(17,079)	26,600	(26,604)	28,200	-	26,400	(26,446)
Total	**52,300**	**(52,290)**	**66,100**	**(66,055)**	**78,200**	-	**75,800**	**(75,880)**
Total	**66,100**	**(65,202)**	**79,100**	**(79,081)**	**92,000**	-	**88,800**	**(88,831)**
	80%	**80%**	**95%**	**97%**	**111%**	**0%**	**107%**	**109%**
Seawater Flux Into OxB (2040-2069)								
UAS	(400)	(495)	1,300	1,292	6,900	6,901	6,200	6162
LAS	1,100	1,075	2,900	2,887	4,000	3,994	3,400	3453
Total	**700**	**580**	**4,200**	**4,179**	**10,900**	**10,895**	**9,600**	**9615**
Flow from PVB to OxB (2040-2069)								
UAS	900	917	1,600	1,558	1,100	-	1,800	1,775
LAS	(1,000)	(993)	600	624	500	-	900	859
Net All (2040-2069)		**3,789**		**5,993**	-	-		**6,299**
Net UAS+LAS (2040-2069	(100)	(76)	2,200	2,183	1,600	-	2,700	2,633

Also, it is often not clear as to which period is being referenced when reporting values in the text; the implementation period, the sustaining period, or the whole simulation period. Also, when reporting percentages, it needs to be clear how the percentage is being calculated. For example, if Sustainable average pumping percentage values are being reported for a scenario compared to Future Baseline conditions, then it needs to be clear if that percentage average value is being compared over the sustainable period (30 years) for the Baseline scenario or if it is being compared to the whole simulation period (47 years). It would seem that using the Baseline scenario average pumping over the whole simulation period (47 years) would be an appropriate denominator for comparing reductions in pumping, even if you are only using the sustainable period average pumping as the numerator. Regardless, it needs to be clear as to how the reported values are computed. we think it is also important to note when the Camarillo Desalter is online and offline when reporting average values.

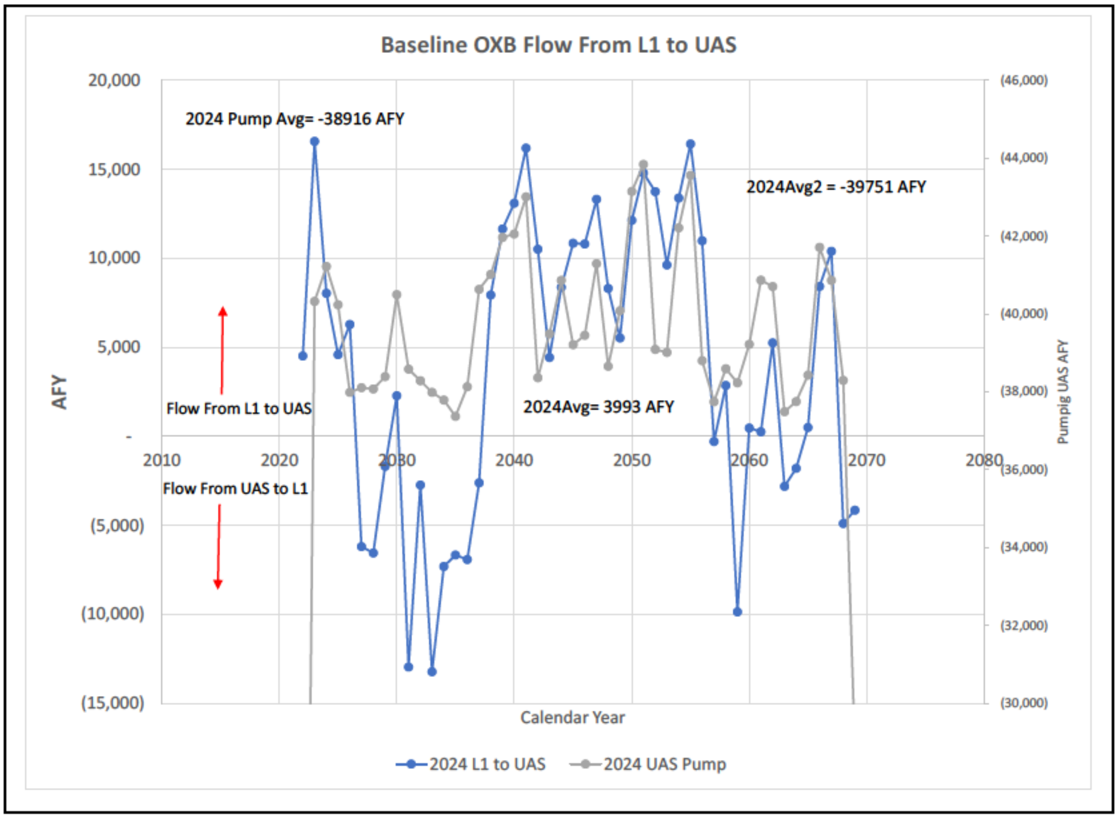
p. 83, Section 5.2.2.3.1, No New Projects 1. The values of pumping listed for Oxnard Subbasin and PVB do not appear to be consistent with UWCD water budget tables (see above table showing Table 5-2 corrections).

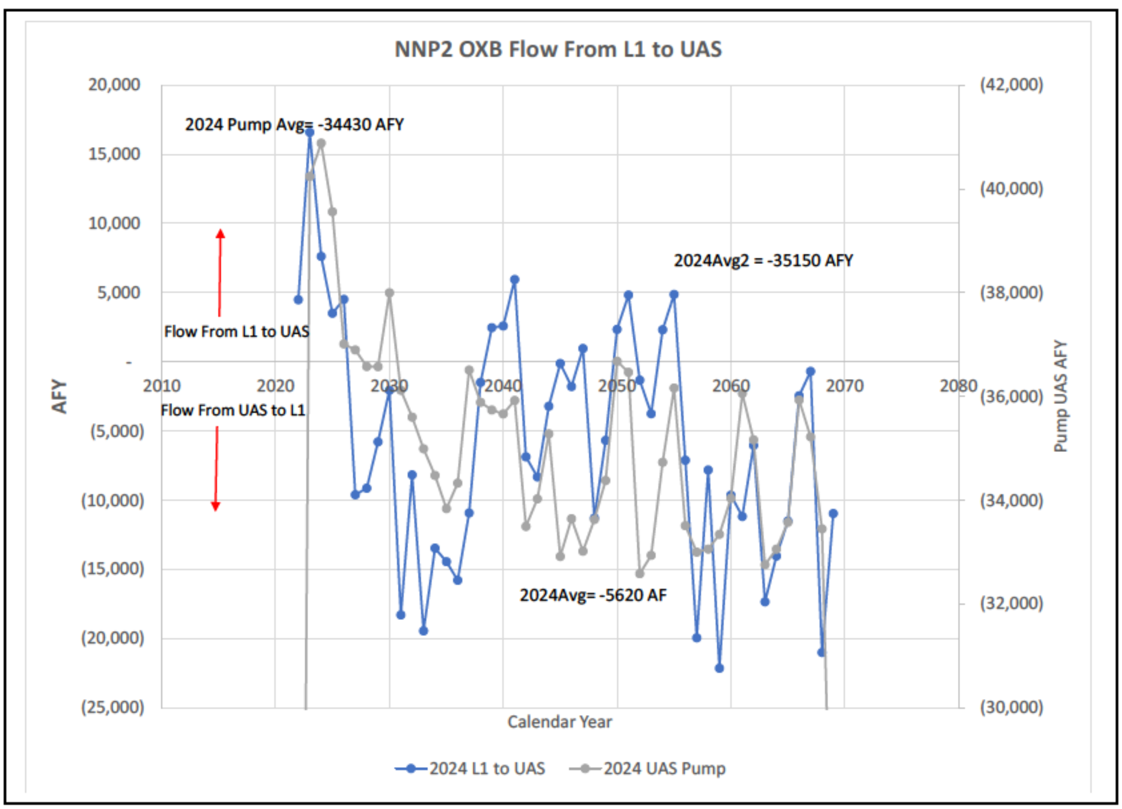
p. 83, Section 5.2.2.3.1, No New Projects 2. The values of pumping listed for Oxnard Subbasin and PVB do not appear to be consistent with UWCD water budget tables (see above table showing Table 5-2 corrections).

p. 83, Section 5.2.2.3.1, No New Projects 3. The values of pumping listed for Oxnard Subbasin and PVB do not appear to be consistent with UWCD water budget tables (see above table showing Table 5-2 corrections). Also, the “revised estimate was developed using a multiparameter system of linear regressions developed using results from the Future Baseline NNP1, and NNP2 model runs.” should be documented and discussed further in the text or in an Appendix for stakeholders to review.

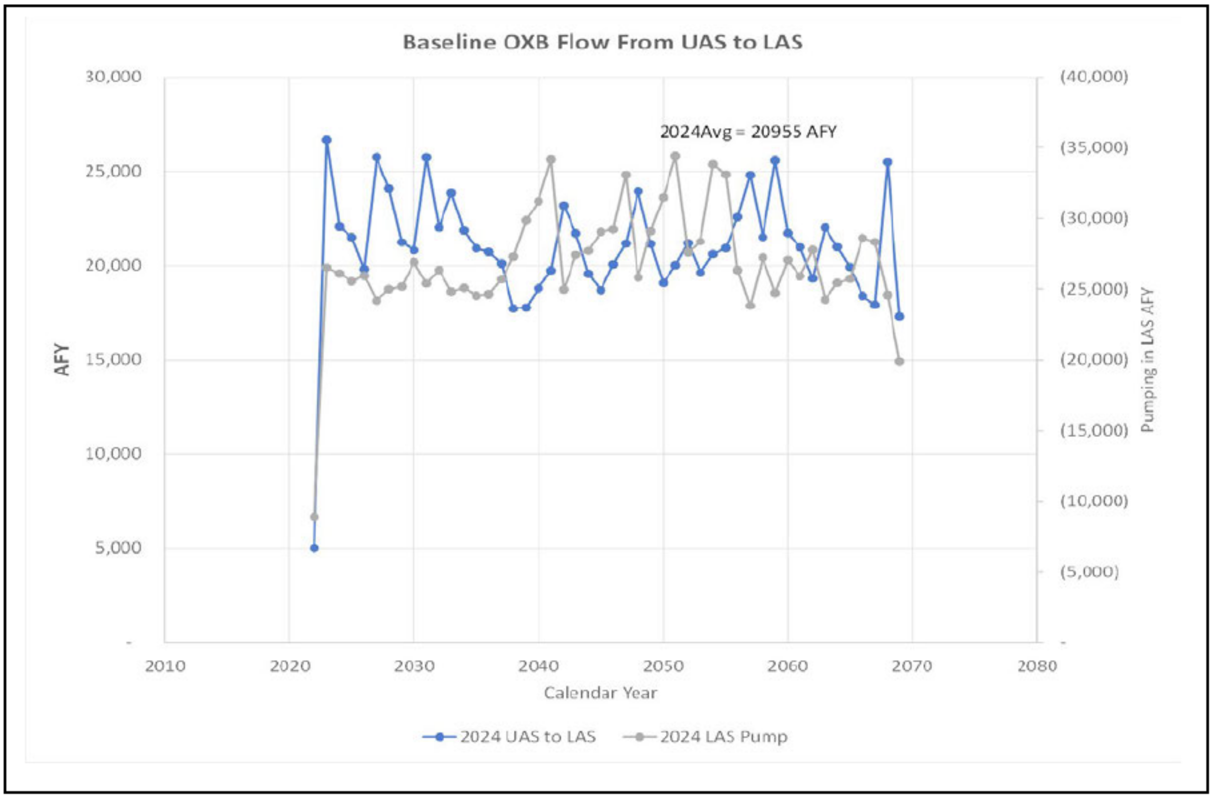
p. 84, Section 5.2.2.3.2, No New Projects Scenario Model Results. This section presents a very narrow review of the groundwater model simulation results, focusing solely on changes in seawater intrusion and interbasin flows. We think the authors reach unsupportable conclusions regarding sustainable yield and misidentifying key issues by ignoring many other changes. Changing areal and vertical pumping distributions and pumping rates create completely different groundwater flow regimes. For example, there are changes in groundwater flow between aquifers, groundwater discharges to streams, groundwater discharges to drains, groundwater discharges to ET, etc. Following are just a few of the significant changes between the Future Baseline scenario and NNP2 scenario as an example of the significant changes in the groundwater flow regime as ascertained from the UWCD water budget tables.

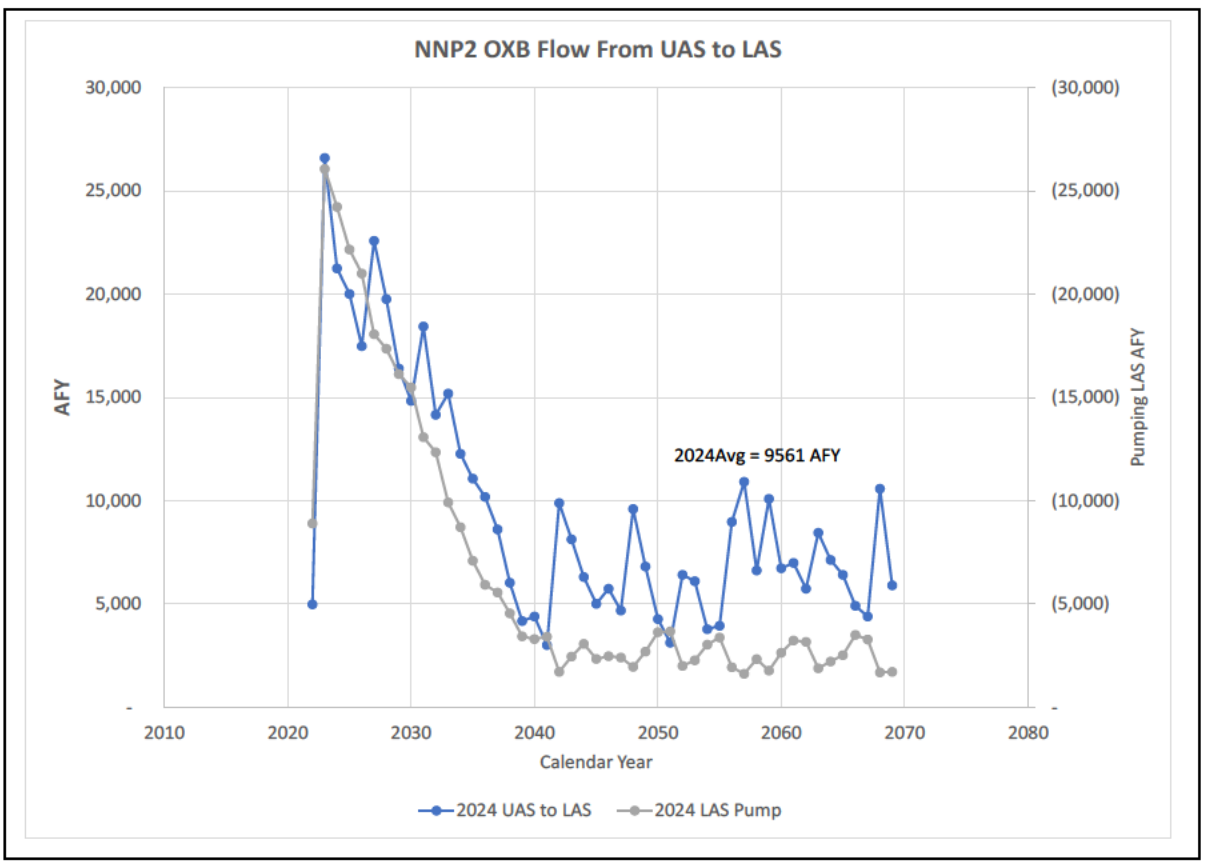
1. Groundwater flow between Layer 1 (L1) and the UAS in the Oxnard Subbasin is reversed as shown in the two plots below. In the Future Baseline scenario groundwater flow is predominantly from L1 to the UAS and averages about 3990 AFY. In the NNP2 scenario, groundwater flows predominantly from the UAS to L1, averaging about 5,620 AFY. This represents a 9,610 AFY reversal in flow between L1 and the UAS.



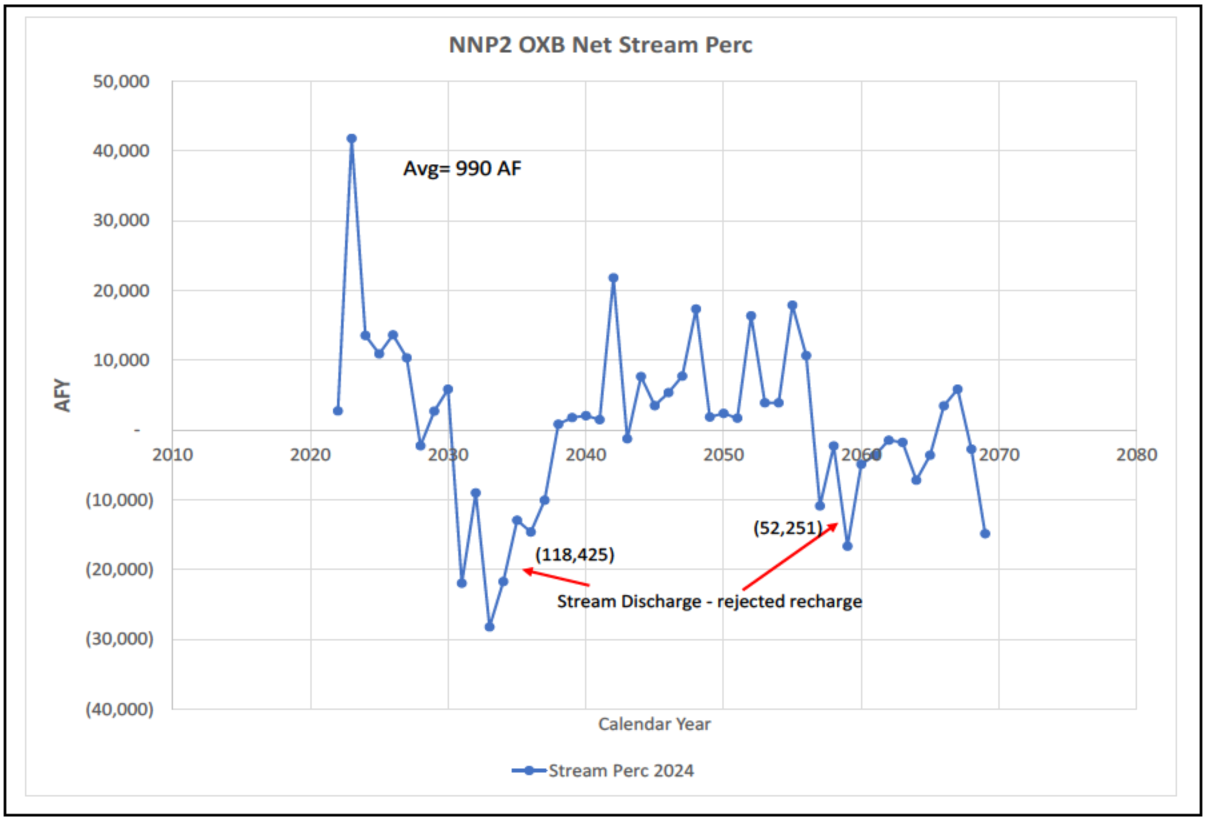


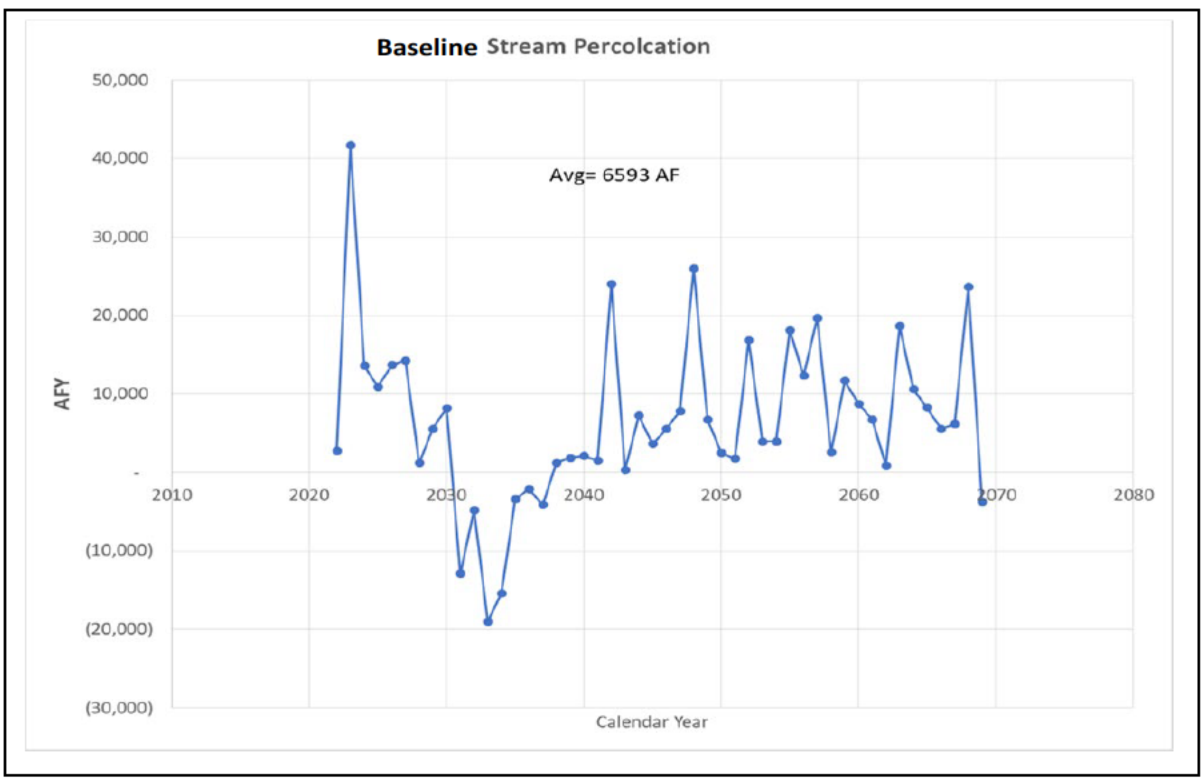
2. Interaquifer flow from the UAS to the LAS is substantially reduced in the Oxnard Subbasin as shown in the two plots below. In the Future Baseline scenario, an average of 20,960 AFY flows from the UAS to the LAS and in the NNP2 scenario, this average flow is reduced to 9,560 AFY, a reduction of about 11,400 AFY.

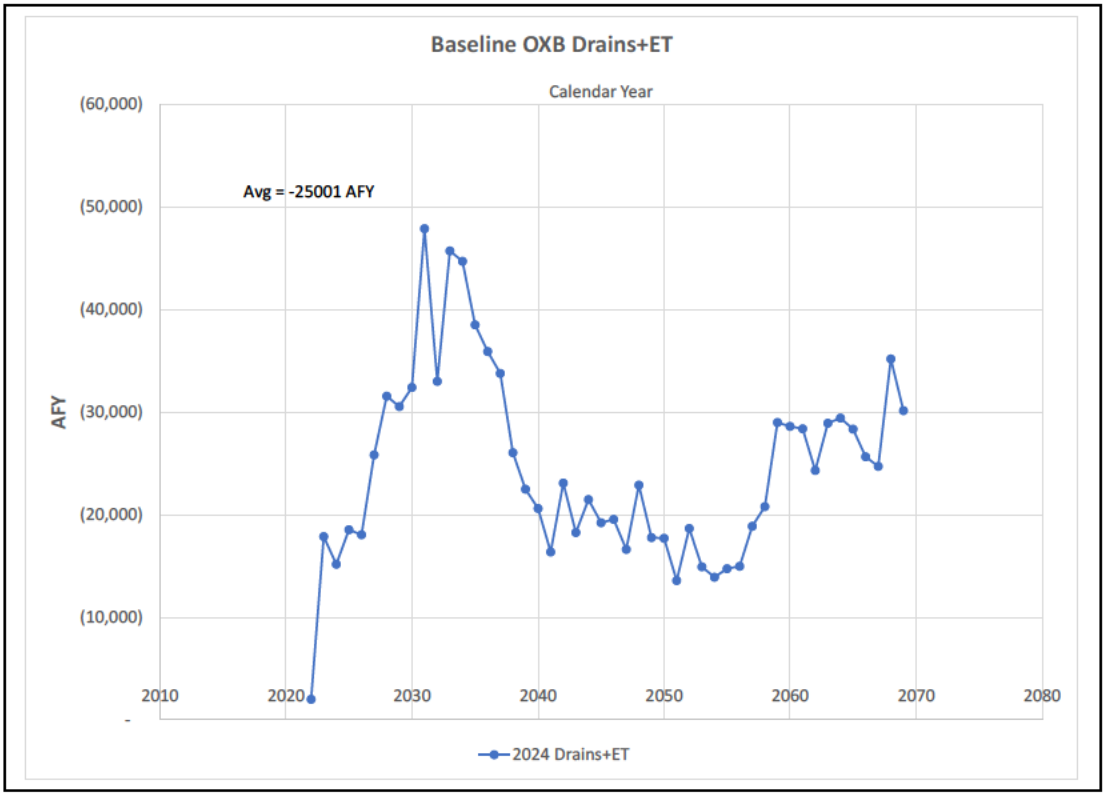


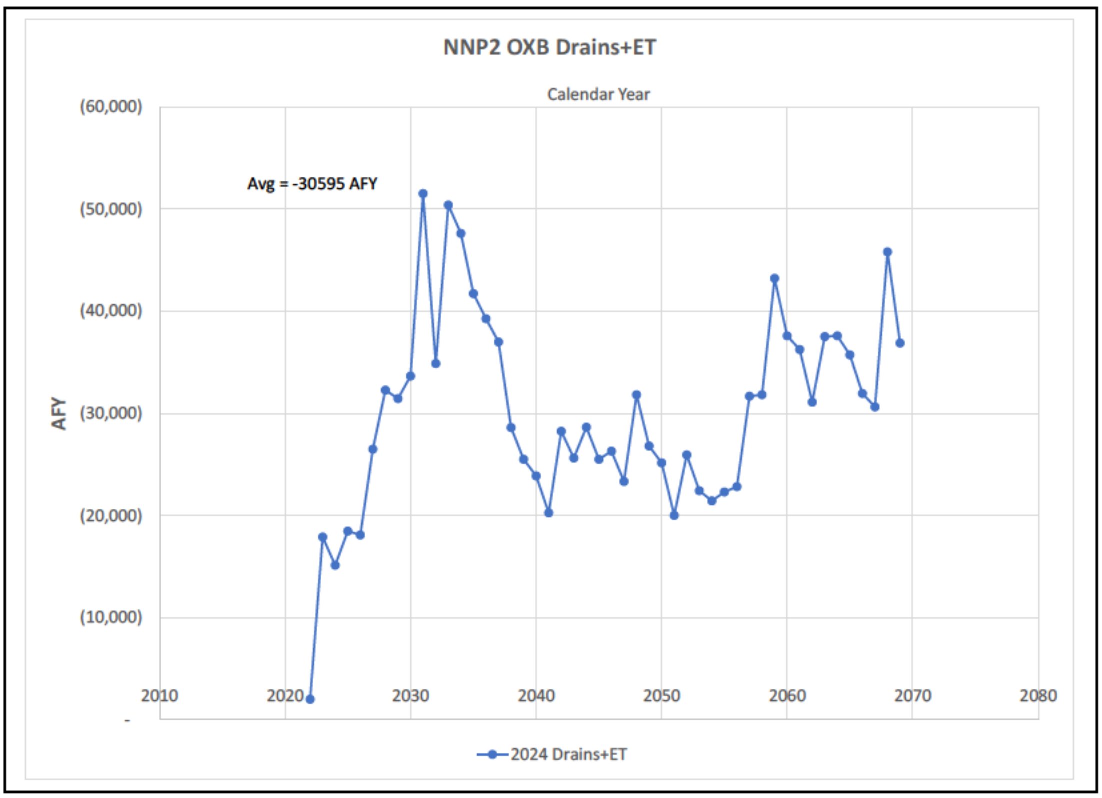


3. The groundwater flow reversal from L1 to UAS and substantial reduction in flow from UAS to LAS does not go to offset coastal inflows as desired. Instead, groundwater flow takes the path of least resistance and in response to local hydraulic gradients, is redirected to discharge into the Santa Clara River and discharge to drains and surface ET as shown in the four plots below. Net stream percolation is reduced by an average of 5,600 AFY, which instead discharges down the Santa Clara River.









As shown in the two plots above, groundwater flows to drains and ET increases by about 5,600 AFY. So, over 11,200 AFY goes to discharges to the Santa Clara River, drains and ET. This number dwarfs the 3,800 AFY of interbasin groundwater flows to the West Las Posas Basin and PVB.

Similar analyses have been completed for the other scenarios, which can be provided upon request. These analyses show similar significant effects on the groundwater flow regime.

The substantial reductions in the Oxnard Subbasin UAS and LAS pumping do eliminate seawater intrusion in the UAS, but there is still over 250 AFY of intrusion in the saline intrusion management area over the sustaining period. It seems clear that the challenge to maintain a landward to seaward hydraulic gradient in the LAS is not going to be achieved by recharge in the Oxnard Forebay only. Groundwater flow from the Oxnard Forebay recharge basins will take the path of least resistance and in response to local hydraulic gradients instead of flowing the great distance required to supply the far reaches of the Oxnard Subbasin LAS. In order to maintain controls on groundwater gradients at the coastline, especially in the LAS, a hydraulic barrier will be required; an injection barrier, which is the conventional approach used in Southern California Coastal Basins, or an extraction barrier, which is a novel approach, as proposed by UWCD.

p. 85, para. 2. This is the first time that the concept of particle tracks is introduced. There needs to be documentation of the assumptions used in this analysis, including the porosity values assumed, as the travel distance is directly related to the assumed porosity. There also needs to be a discussion about the relation between particle tracks and potential concentrations of constituents of interest. For example, under ideal conditions of one-dimensional flow, the endpoint of a particle track is theoretically at 50% of the initial concentration of the starting source concentration. The region around the endpoint will be a dispersed zone, where points upgradient of the endpoint will be between the initial starting point concentration and 50% of the initial concentration. Points downgradient of the endpoint will be between 50% of the initial concentration and trend to zero or the background concentration. The actual distribution or concentration of the constituent of concern will depend on the dispersion values of the aquifer along the flow path (and any degradation or retardation effects). For example, using chloride levels as an example, increases in chloride levels will occur downgradient beyond the particle track pathline endpoint shown in the figures.

p. 91, Section 5.2.3. The values referenced in this section need to be corrected based on the comments provided above regarding Table 5-2. We think that the sustainable yield of the PVB is around the pumping average annual levels simulated in UWCD's calibrated model and the Future Baseline scenario. This pumping rate is 14,600 to 15,400 AFY and any uncertainty should be applied using these values. This conclusion is based on the totality of our comments provided herein.

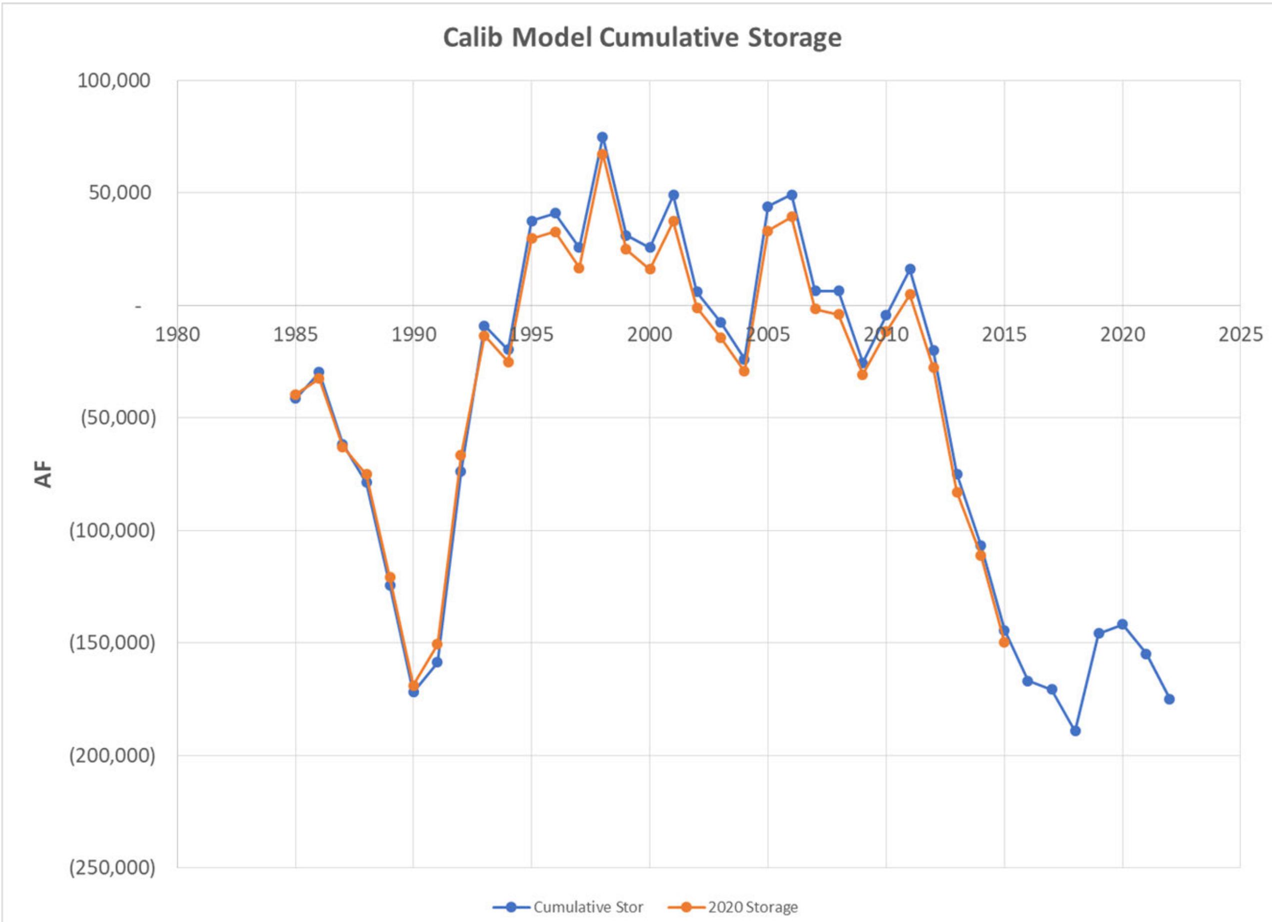
p. 92, Section "Additional Considerations." It is clear that EBB will not address seawater intrusion in the Hueneme Aquifer near Port Hueneme. Is there any consideration to using water produced from the EBB project for injection in this area as opposed to piping EBB water to the Oxnard Forebay?

Attachment A
Comparison of UWCD Calibrated Models Original Ventura Regional Groundwater Flow Model (1985-2015) and Coastal Plain Model (1985-Sep 2022)

October 2024

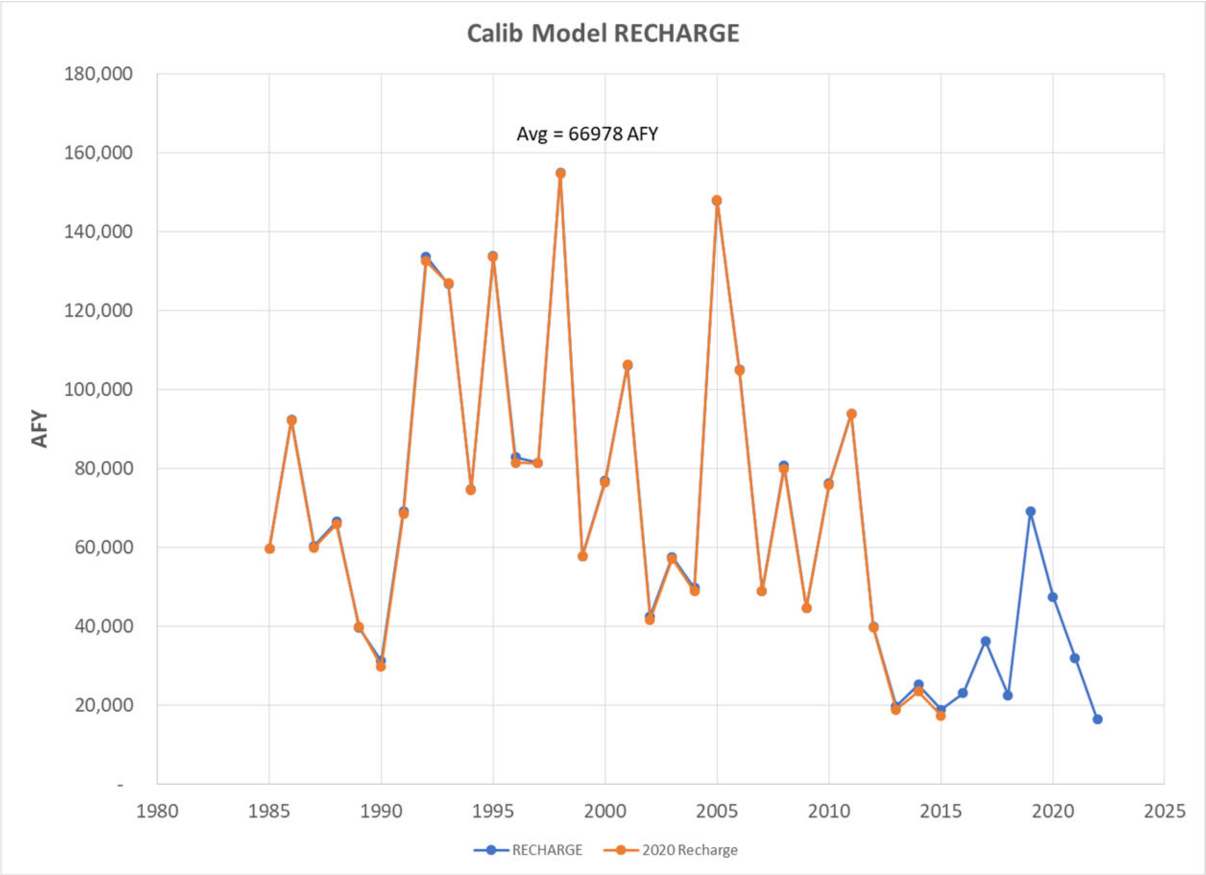
Oxnard SubBasin

Storage

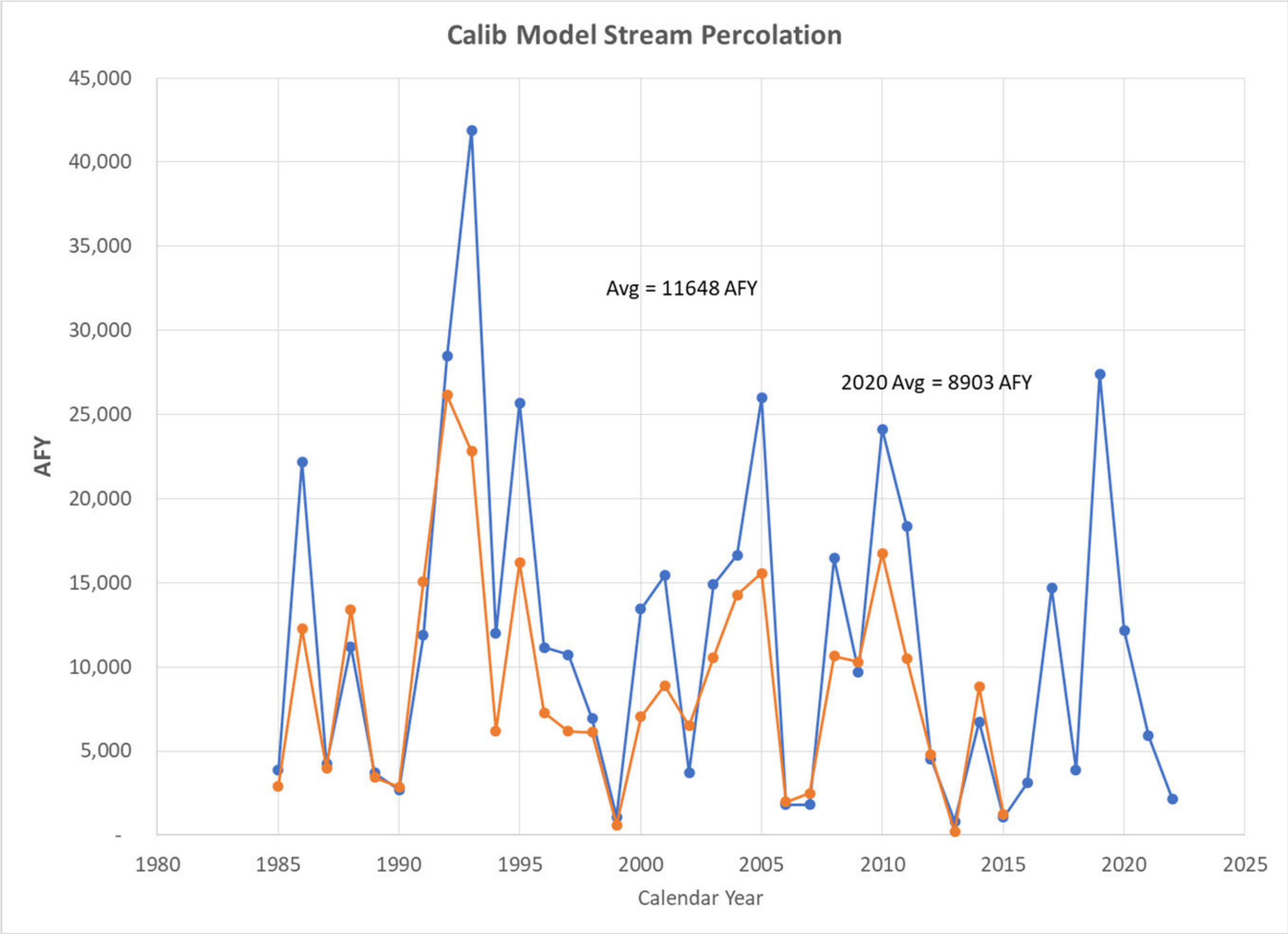


Calib Model Cumulative Storage
100,000
50,000
-
(50,000)
(100,000)
(150,000)
(200,000)
(250,000)
AF
1980
1985
1990
1995
2000
2005
2010
2015
2020
2025
Cumulative Stor
2020 Storage

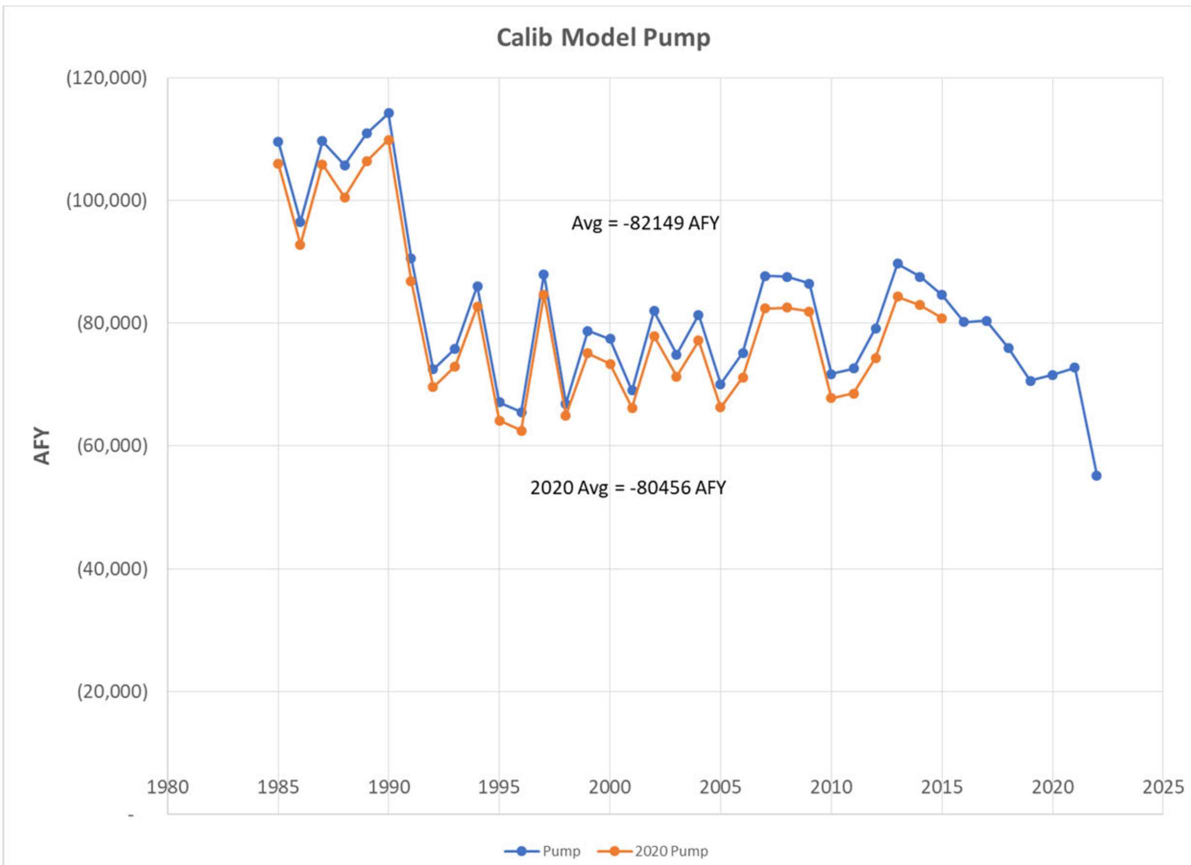
Recharge


Calib Model RECHARGE
Avg = 66978 AFY
AFY
180,000
160,000
140,000
120,000
100,000
80,000
60,000
40,000
20,000
-
1980
1985
1990
1995
2000
2005
2010
2015
2020
2025
RECHARGE
2020 Recharge

Stream Percolation

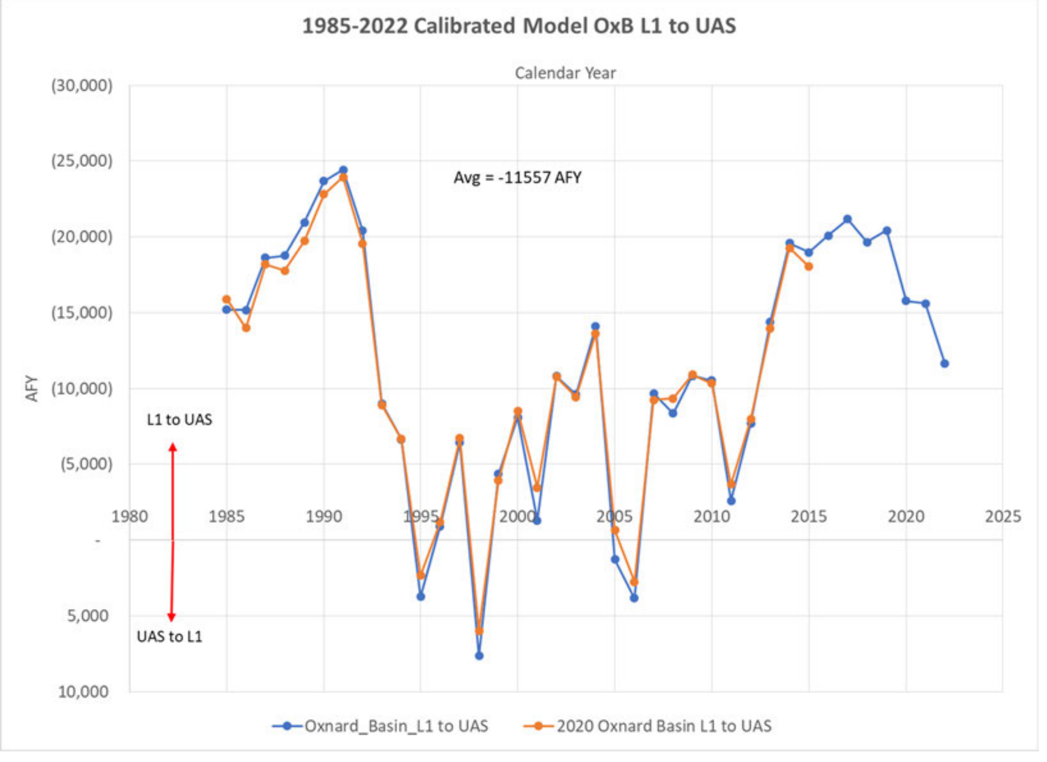


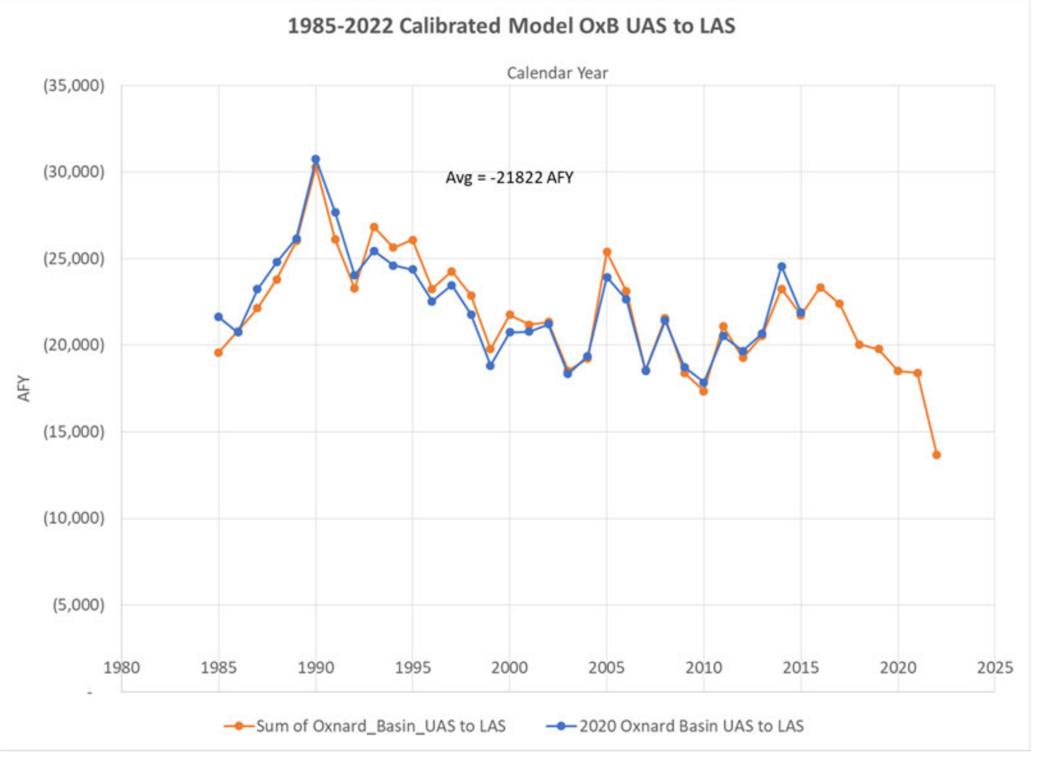
Pumping



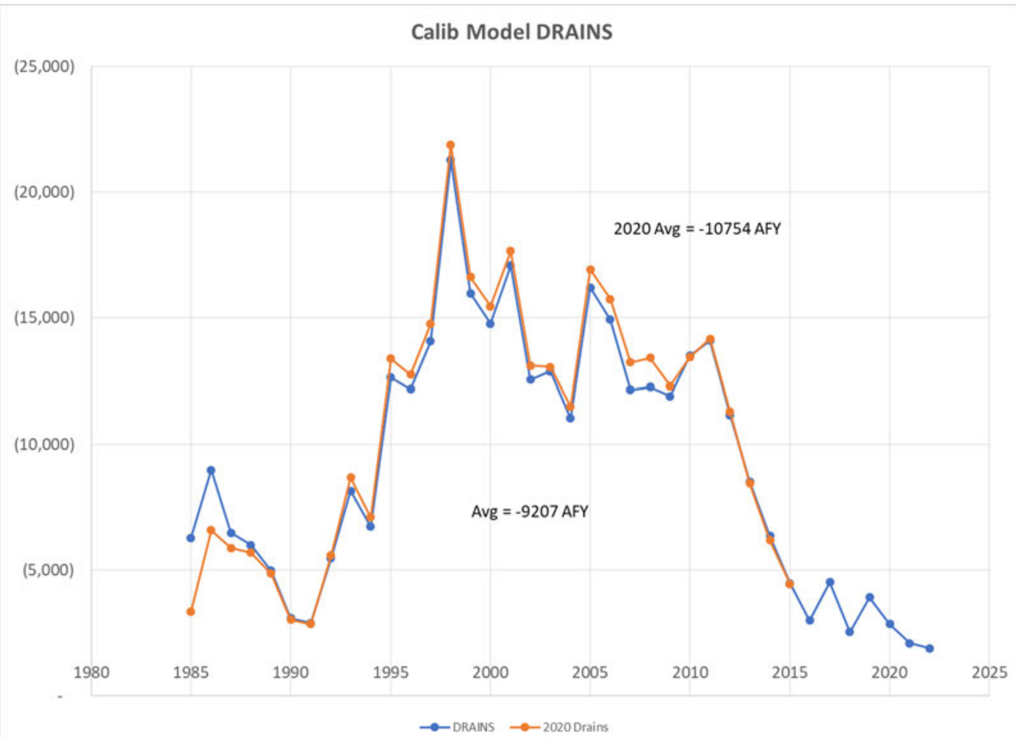
Calib Model Pump
(120,000)
(100,000)
(80,000)
(60,000)
(40,000)
(20,000)
-
AFY
1980
1985
1990
1995
2000
2005
2010
2015
2020
2025
Avg = -82149 AFY
2020 Avg = -80456 AFY
Pump
2020 Pump

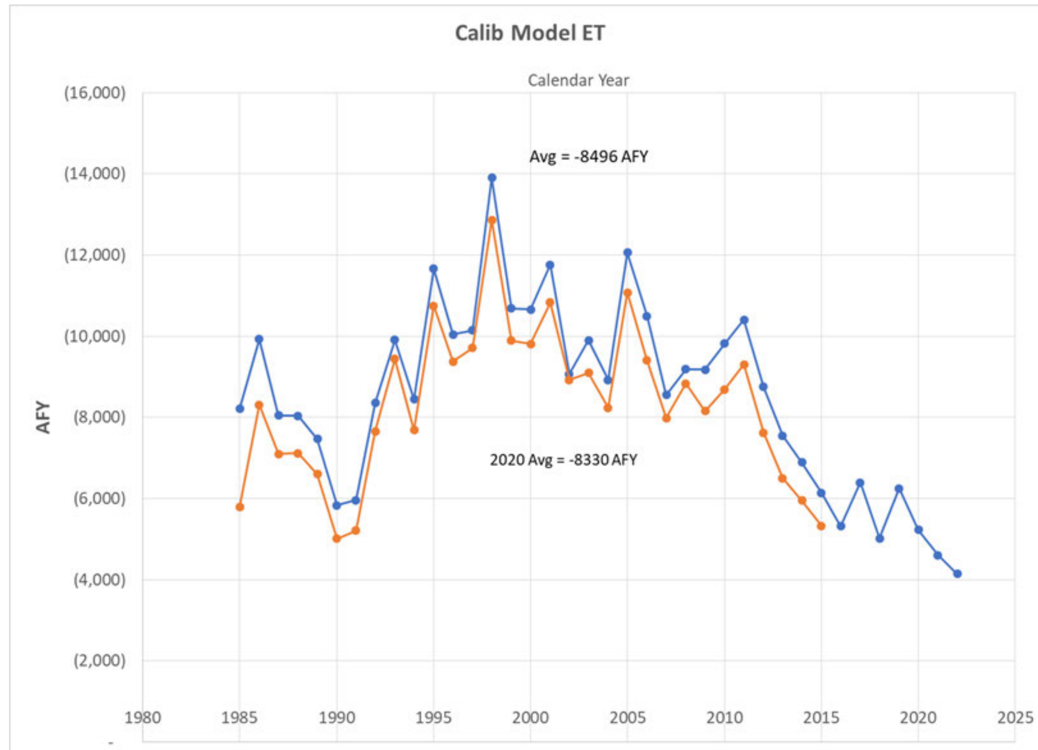
Oxnard Basin Flow Between Aquifers



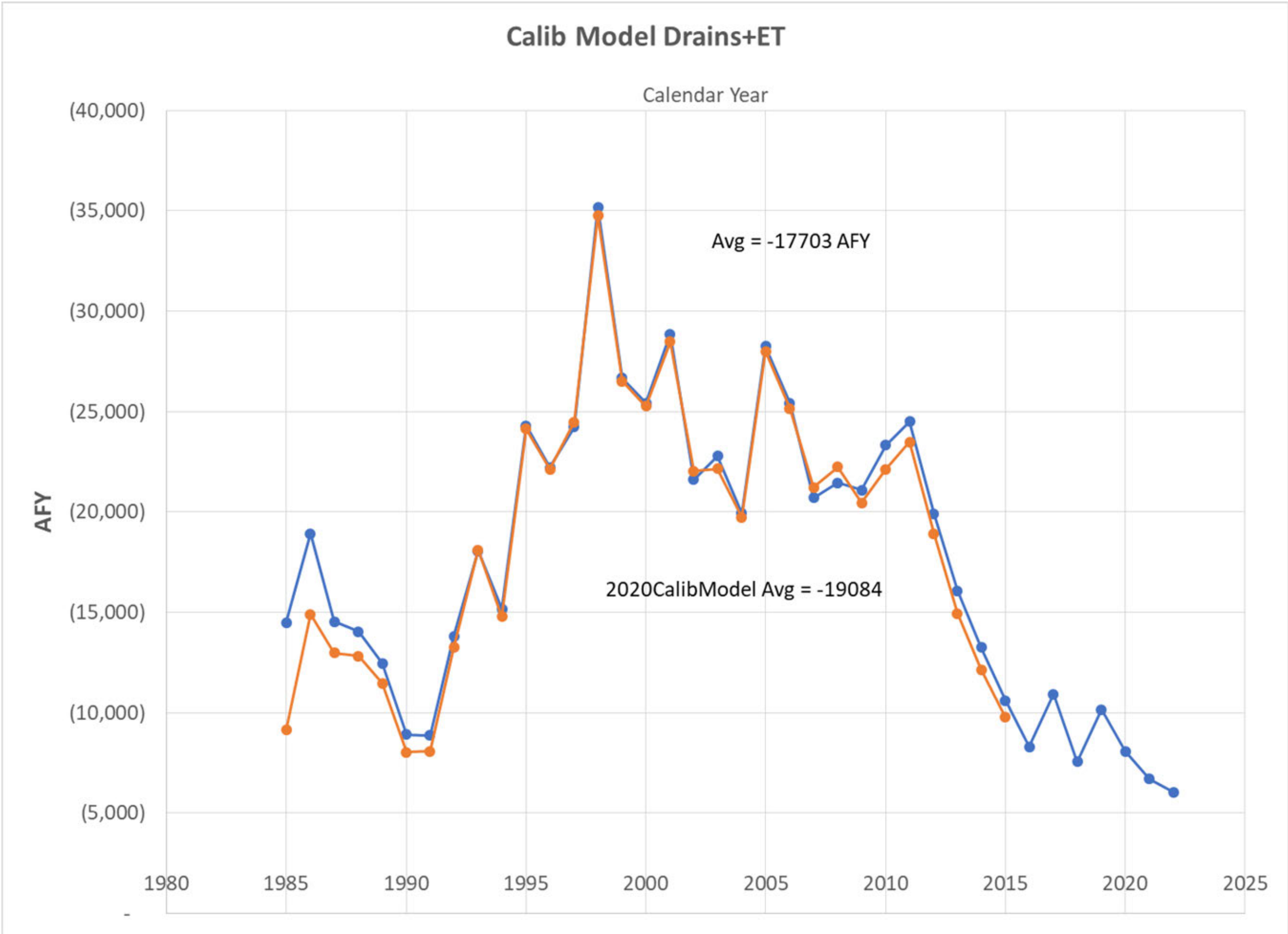


Drains and ET



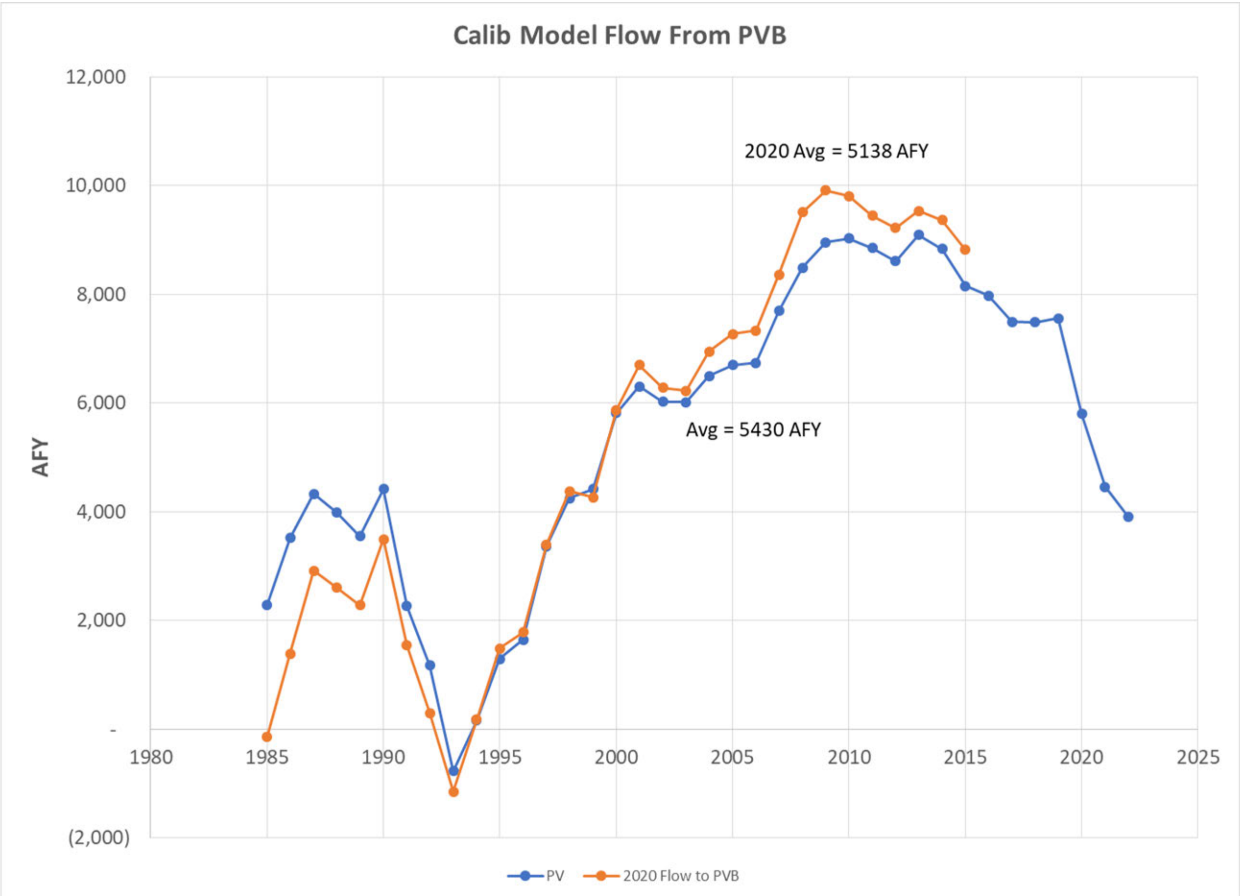


Drains+ET

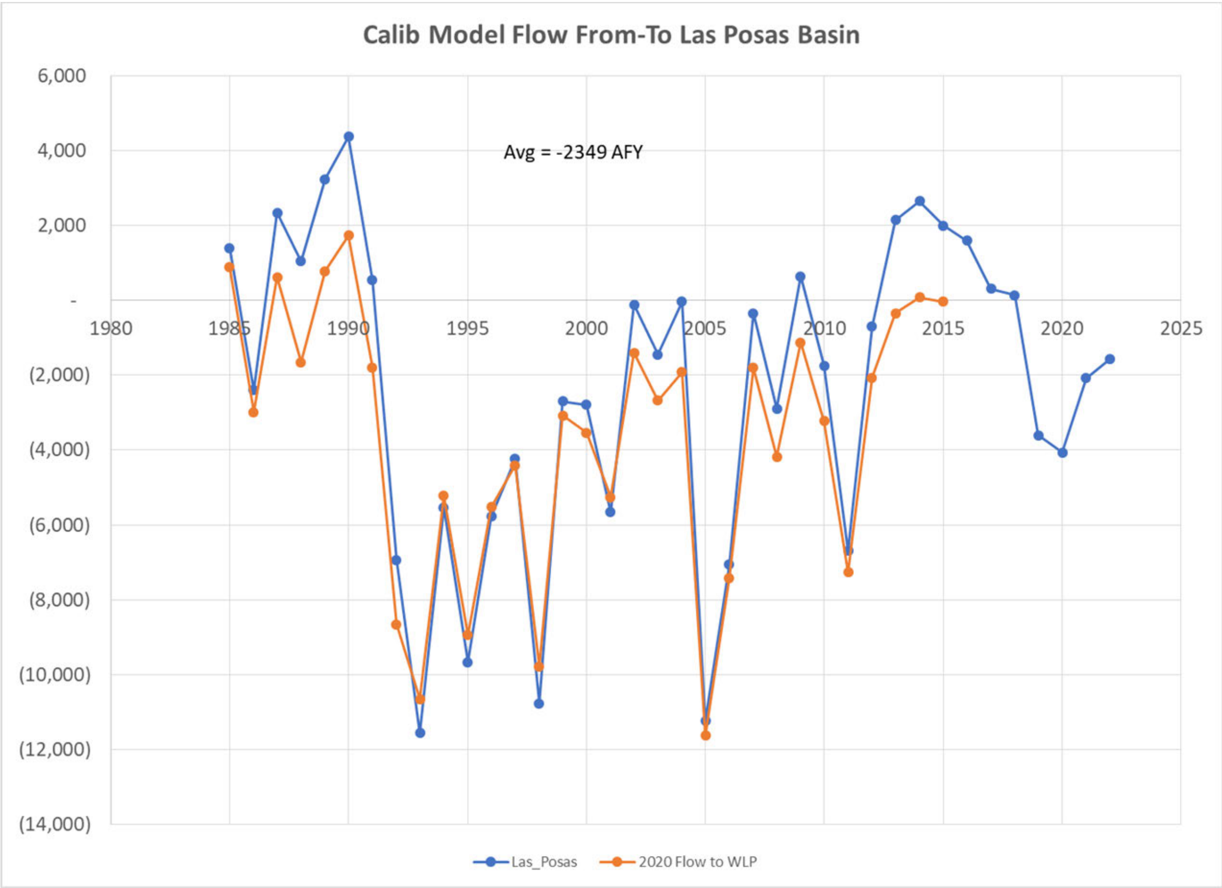


Note: New Calib Model 1985-2015 avg is 19838 AFY

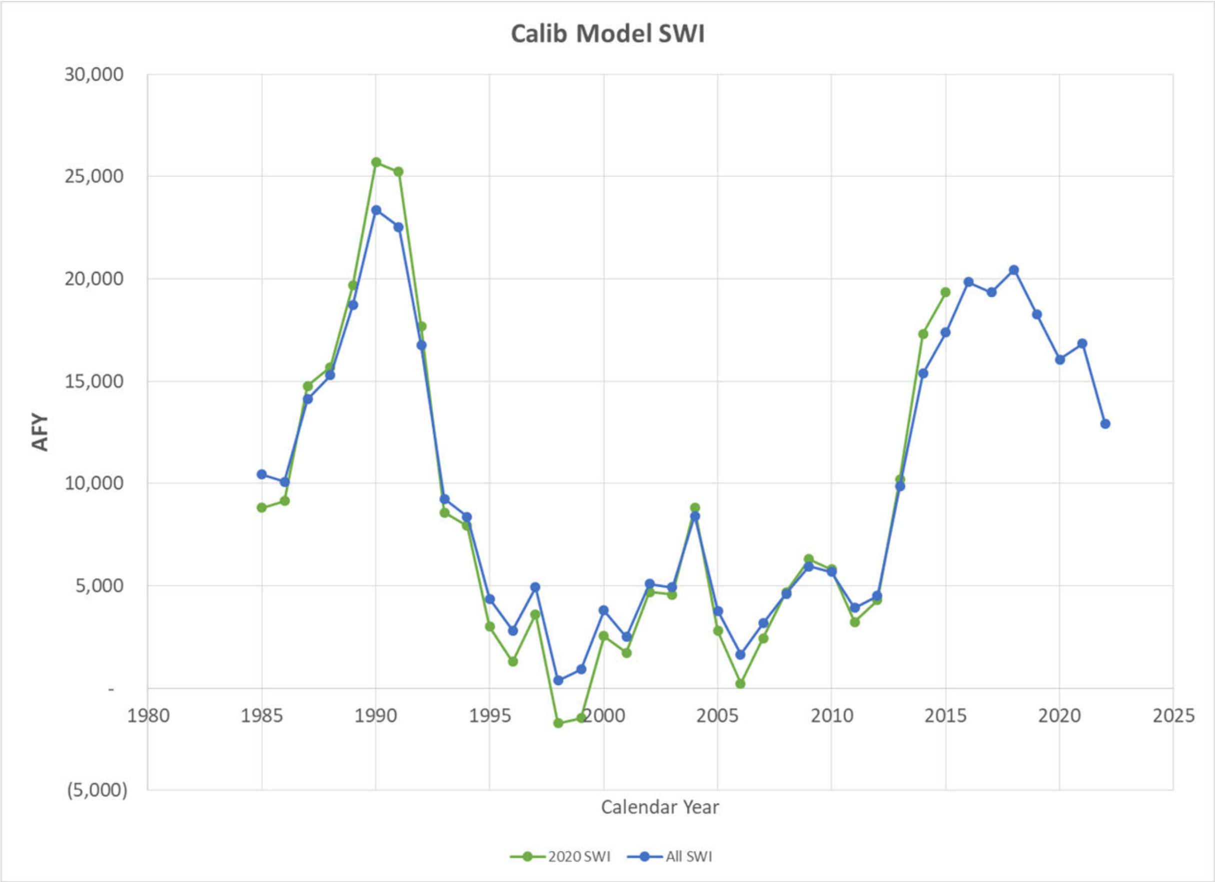
Flow From PVB



Flow Between OxB and WLP



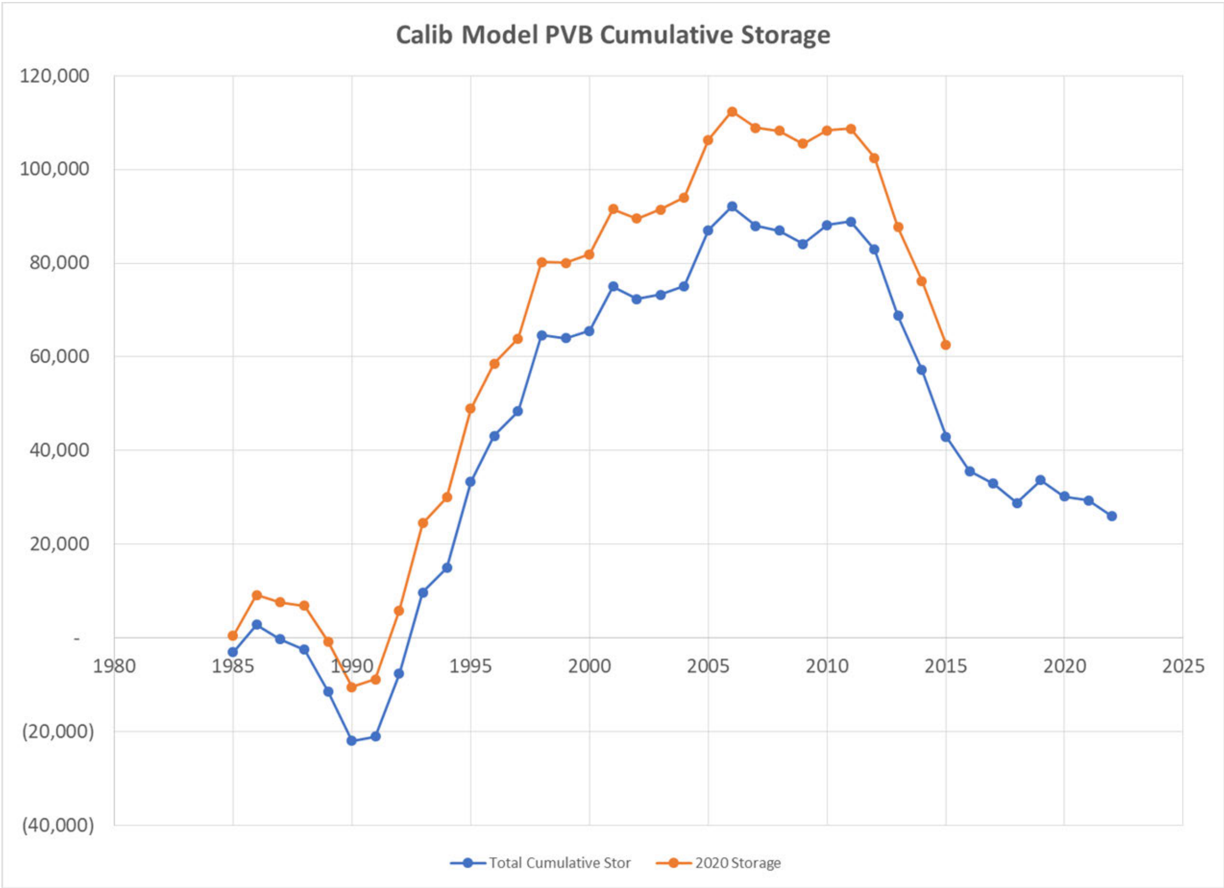
SWI



Calib Model SWI
30,000
25,000
20,000
15,000
10,000
5,000
-
(5,000)
AFY
1980
1985
1990
1995
2000
2005
2010
2015
2020
2025
Calendar Year
2020 SWI
All SWI

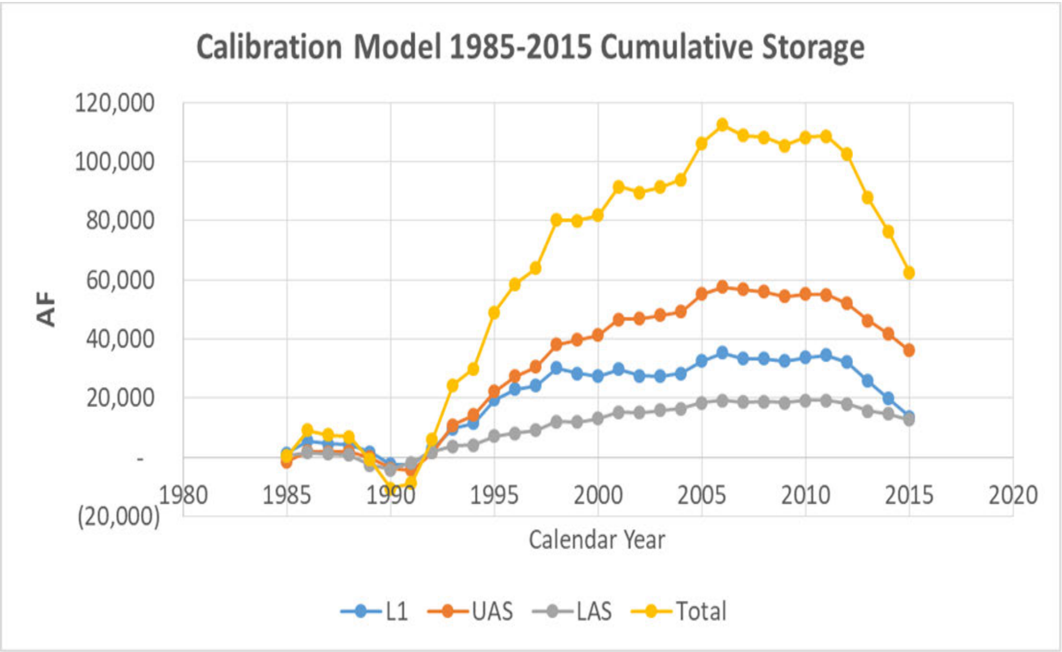
Pleasant Valley Basin

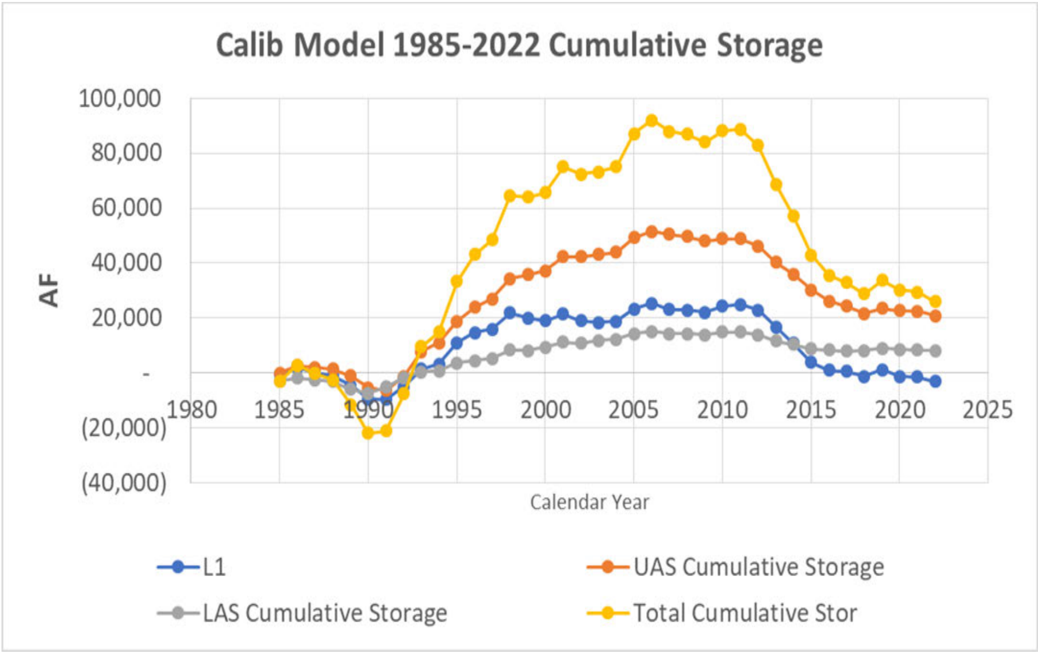
Storage



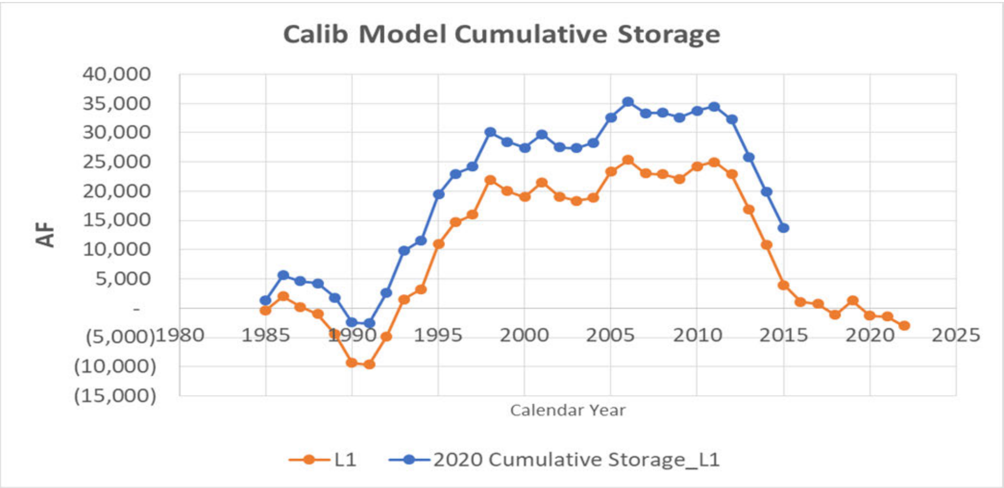
Difference is almost solely due to more ET in 2024 model

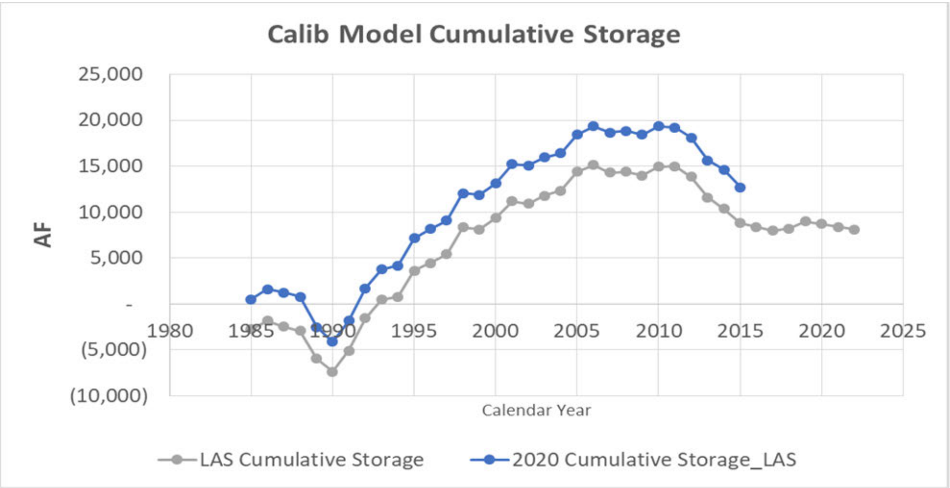
Storage By Aquifer

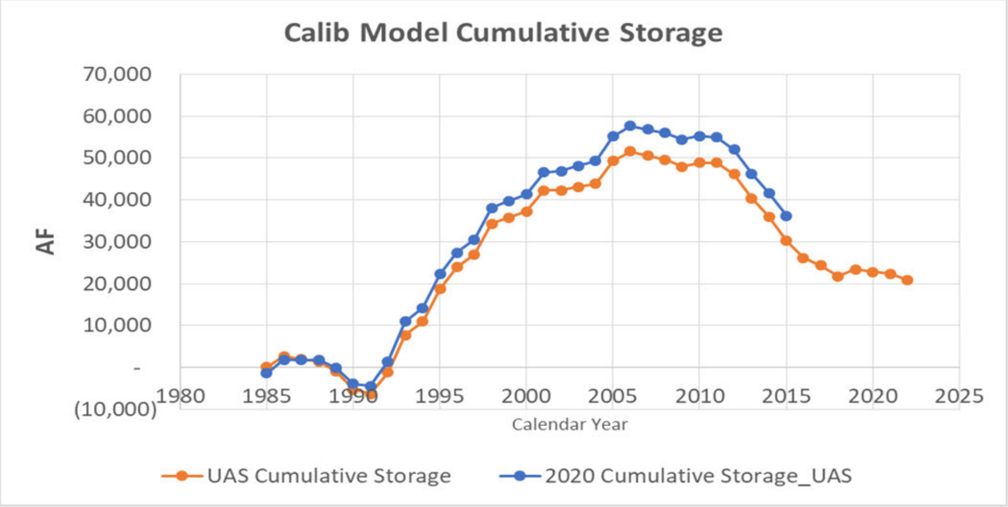




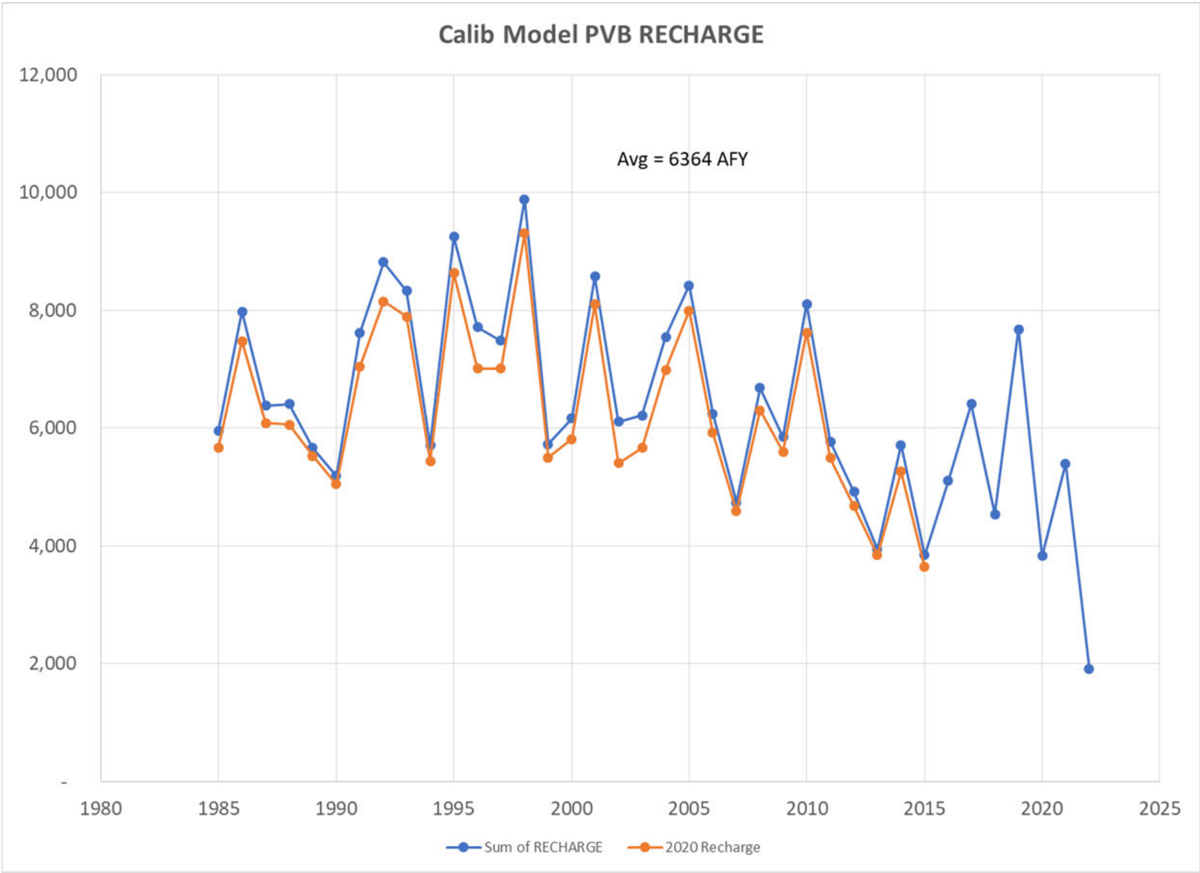
Storage Comparison By Aquifer



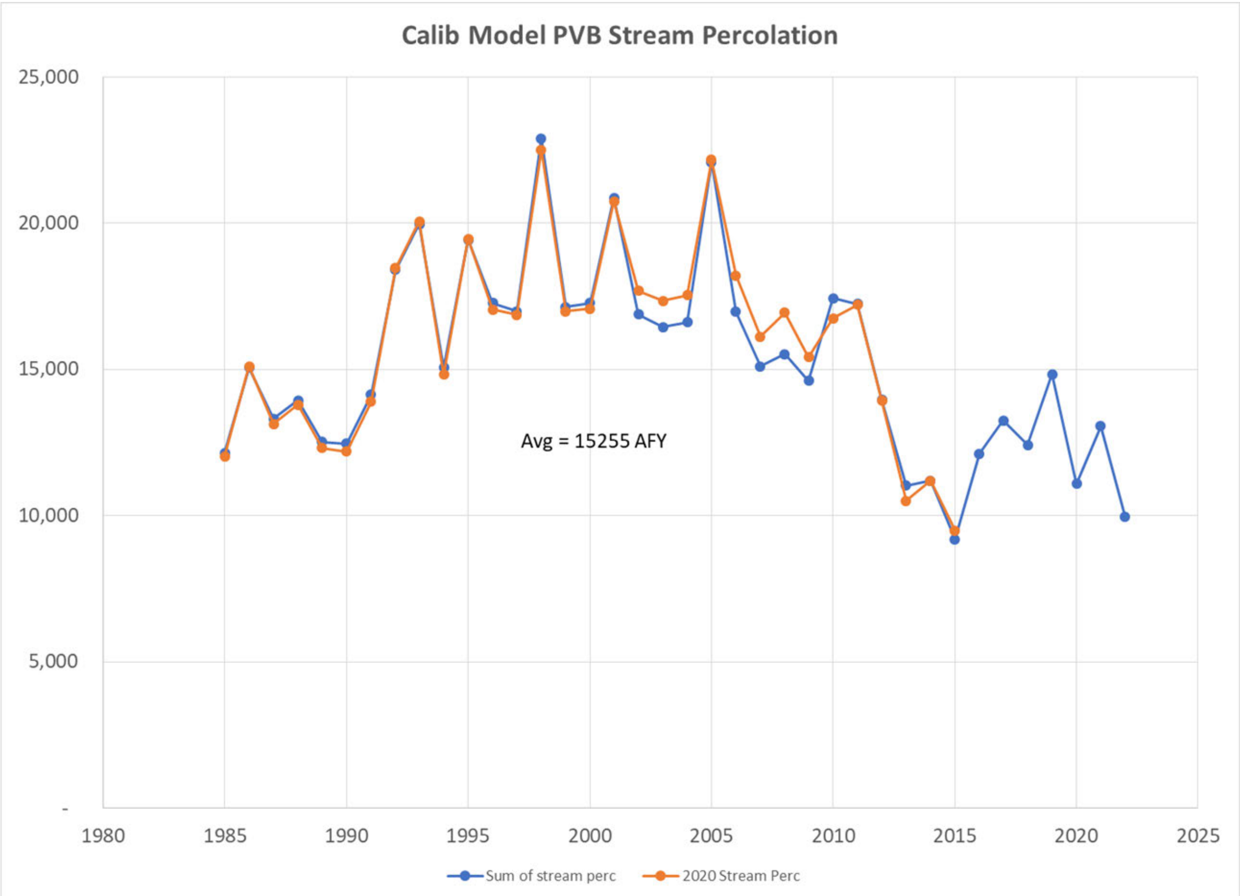




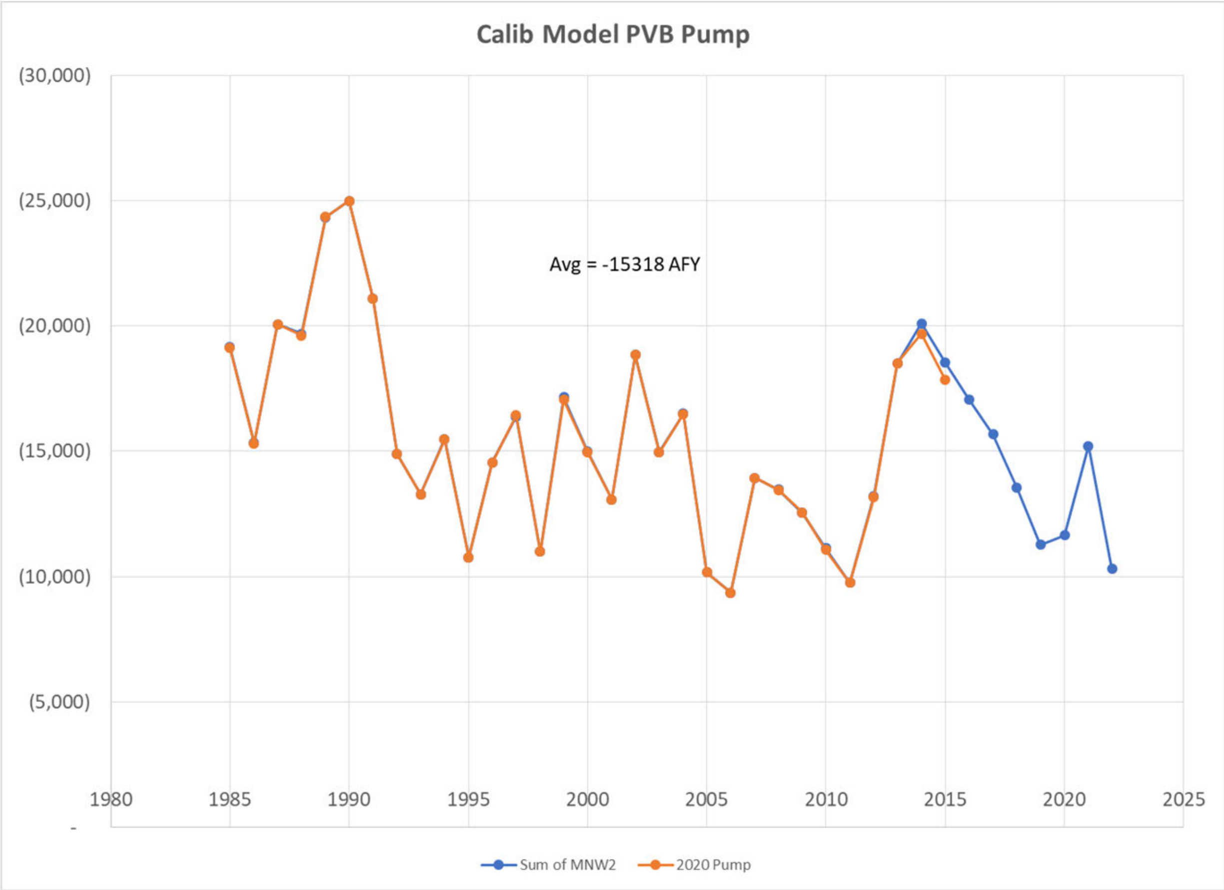
Areal Recharge



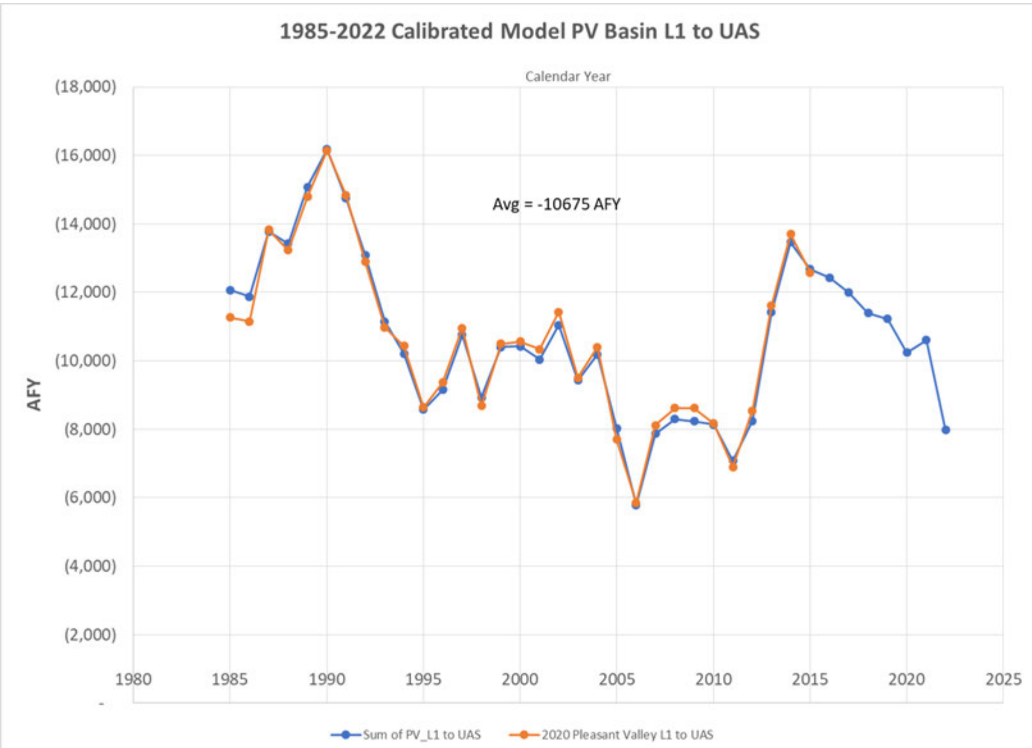
Stream Percolation Recharge

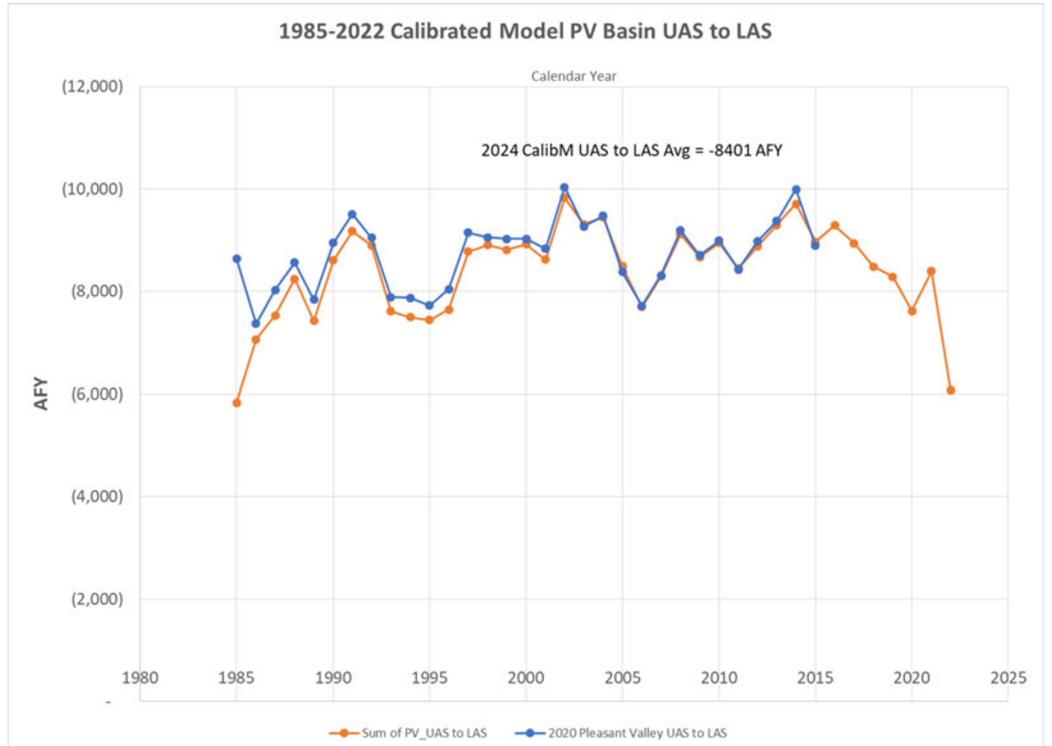


Pump

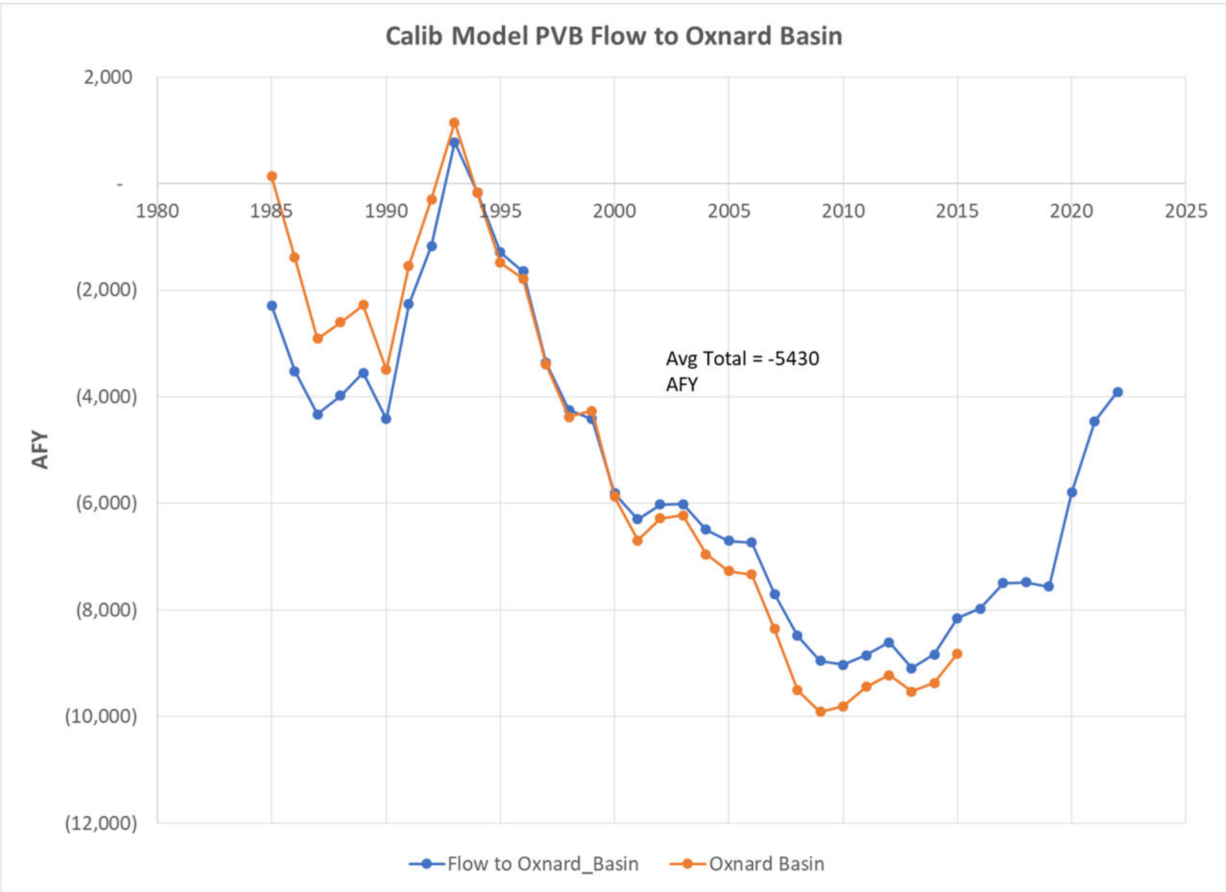

Calib Model PVB Pump
(30,000)
(25,000)
(20,000)
(15,000)
(10,000)
(5,000)
-
Avg = -15318 AFY
1980
1985
1990
1995
2000
2005
2010
2015
2020
2025
Sum of MNW2
2020 Pump

Flow From L1 to UAS and UAS to LAS

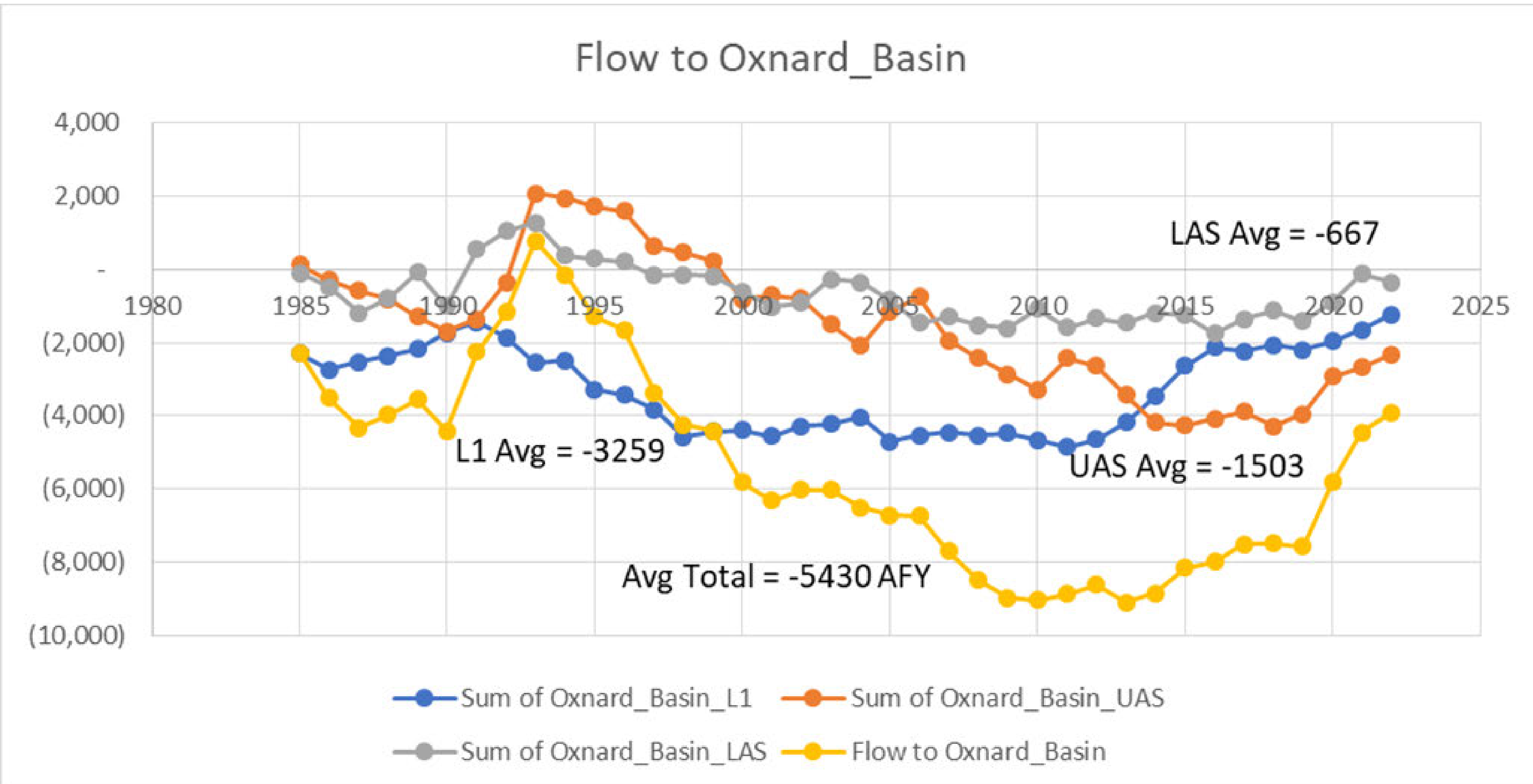




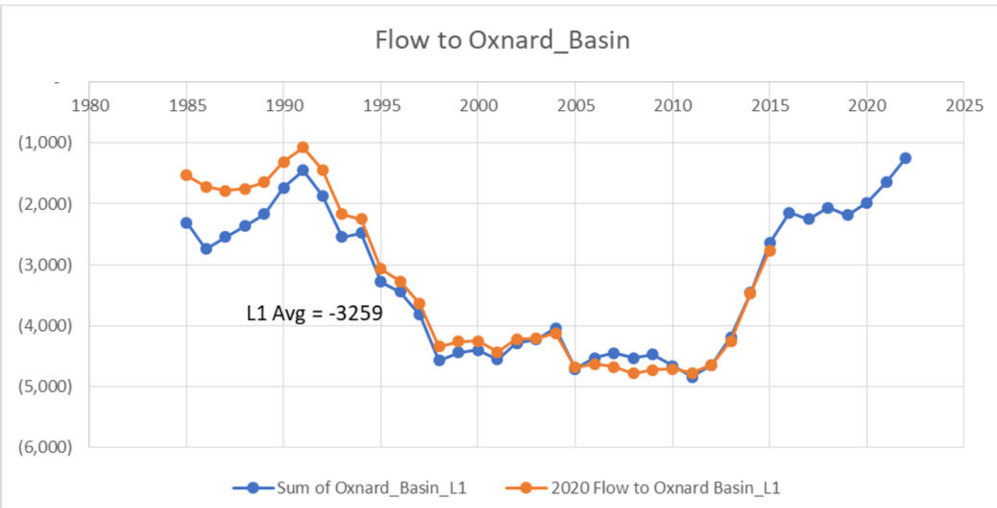
Flow to Oxnard Basin

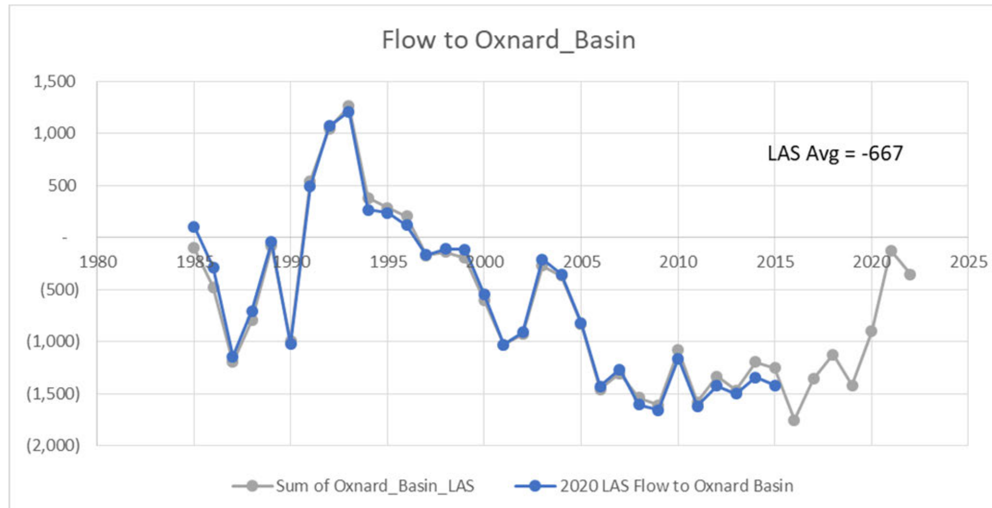


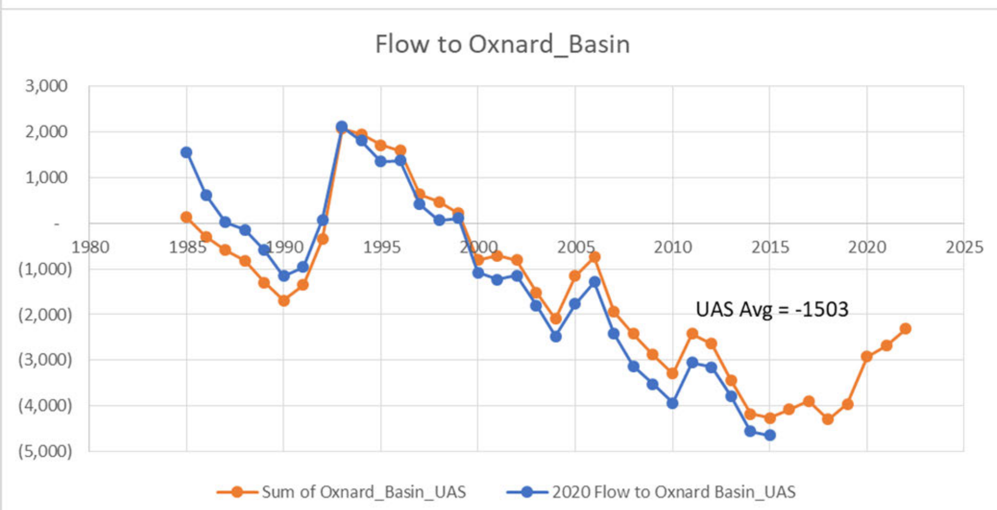
Flow to Oxnard Basin By Aquifer



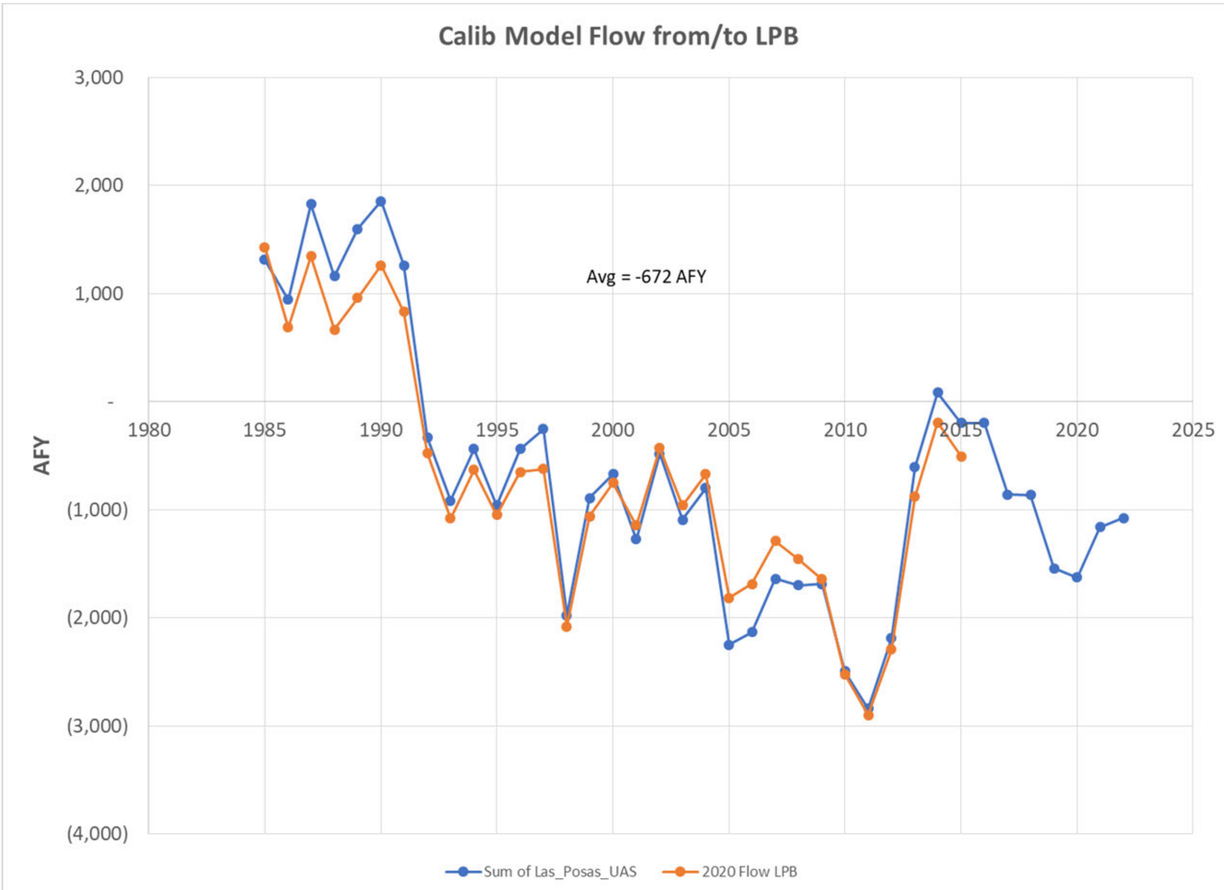
Flow to Oxnard Basin



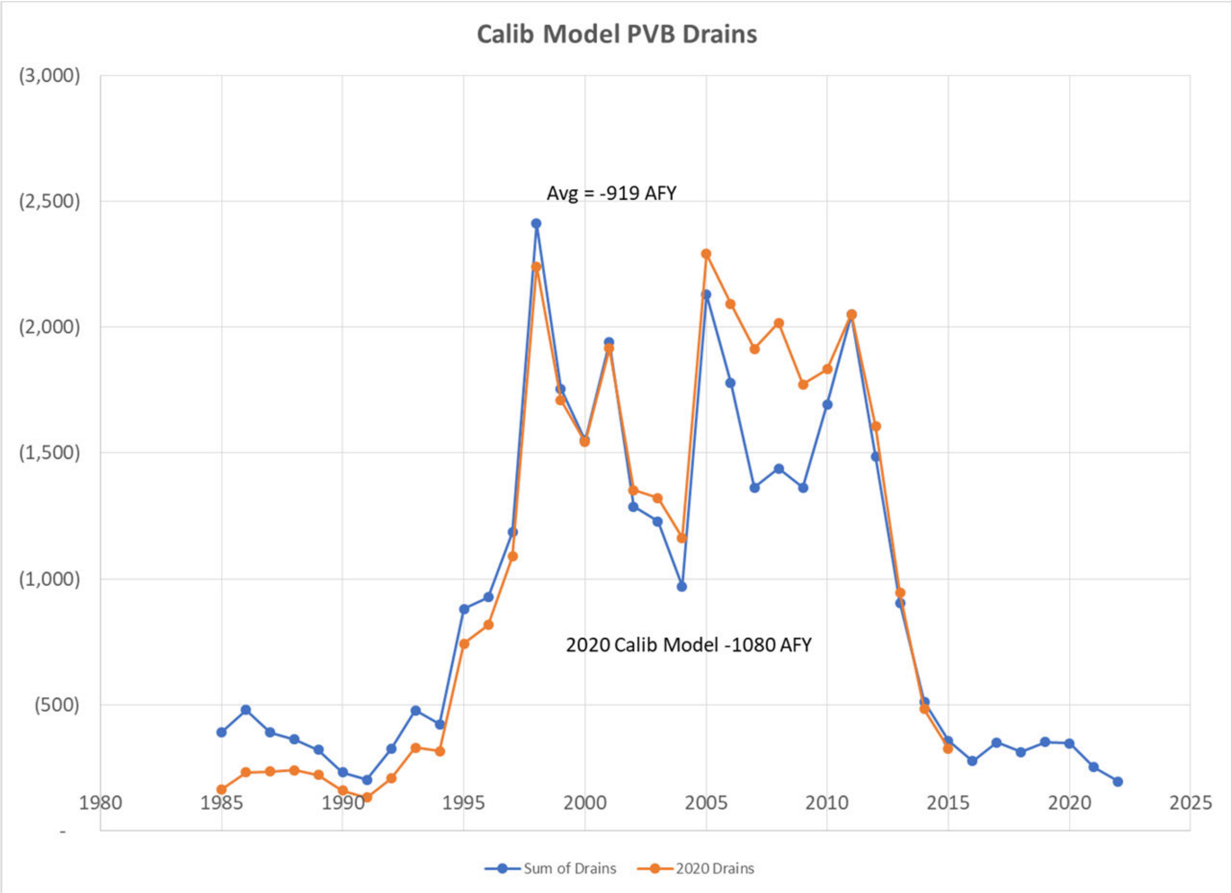




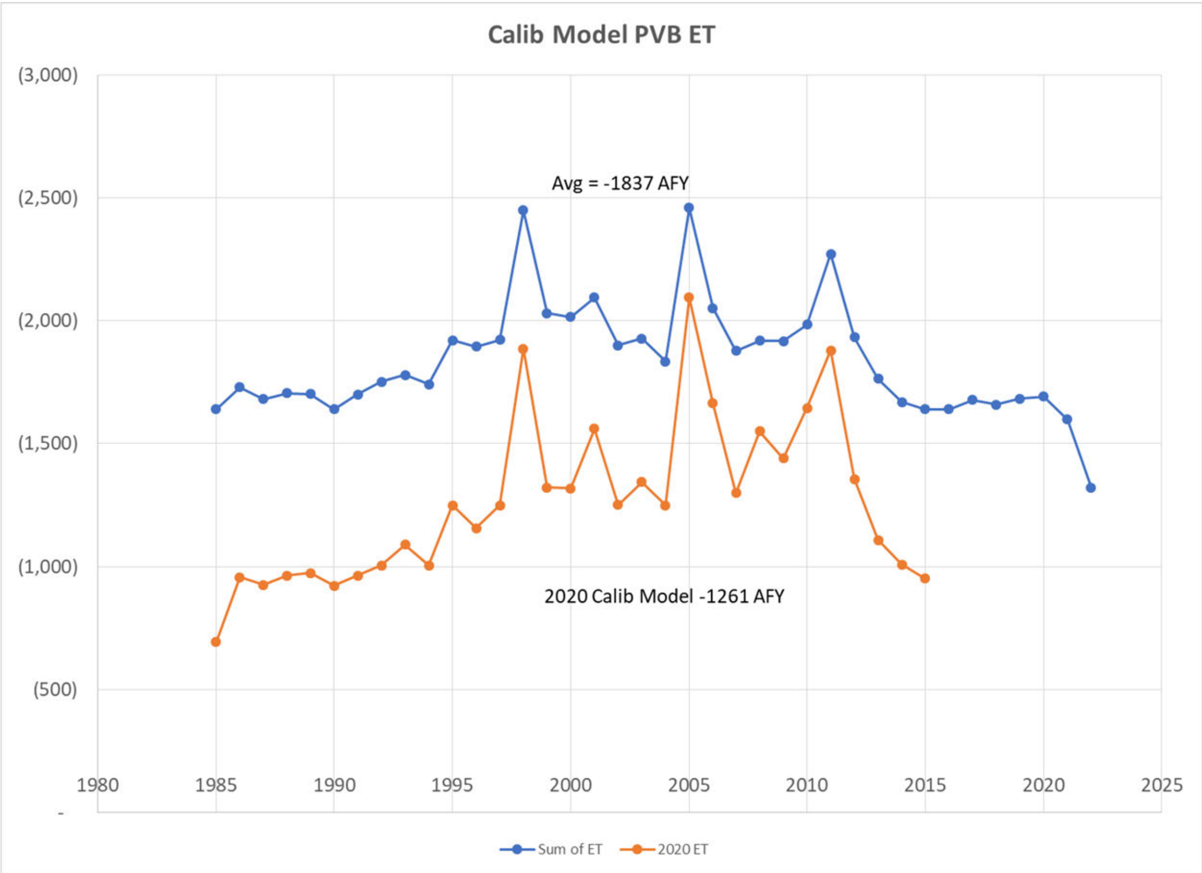
Flow to Las Posas Basin



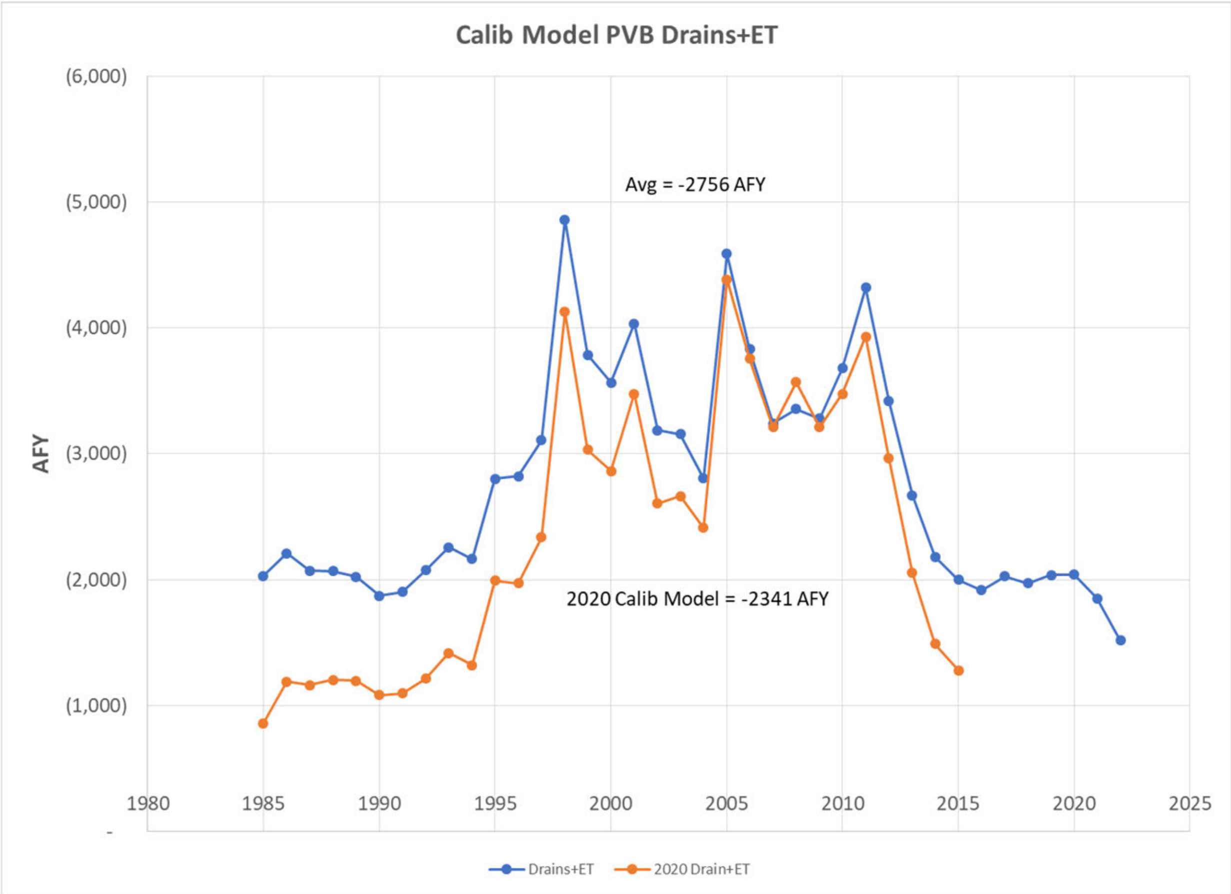
Flow to Drains



ET


Calib Model PVB ET
(3,000)
(2,500)
(2,000)
(1,500)
(1,000)
(500)
-
1980
1985
1990
1995
2000
2005
2010
2015
2020
2025
Avg = -1837 AFY
2020 Calib Model -1261 AFY
Sum of ET
2020 ET

Drains+ET


Calib Model PVB Drains+ET
Avg = -2756 AFY
2020 Calib Model = -2341 AFY
AFY
(6,000)
(5,000)
(4,000)
(3,000)
(2,000)
(1,000)
-
1980
1985
1990
1995
2000
2005
2010
2015
2020
2025
Drains+ET
2020 Drain+ET