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IN THE SUPERIOR COURT OF THE STATE OF ARIZONA
IN AND FOR THE COUNTY OF MARICOPA

IN RE THE GENERAL ADJUDICATION OF ALL RIGHTS TO USE WATER IN THE GILA RIVER SYSTEM AND SOURCE	W-1 (Salt) W-2 (Verde) W-3 (Upper Gila) W-4 (San Pedro) (Consolidated) Contested Case No. W1-103 **ARIZONA DEPARTMENT OF WATER RESOURCES' NOTICE OF FILING REPORT** (Special Master Susan Ward-Harris)

DESCRIPTIVE SUMMARY: The Arizona Department of Water Resources ("ADWR" or "the Department") hereby provides its report as requested by the Court in the Minute Entry Order dated August 5, 2019.

NUMBER OF PAGES: Two and ten-page attachment

DATE OF FILING: December 6, 2019

Pursuant to the Minute Entry Order in this matter dated August 5, 2019, ADWR hereby provides notice of filing its report on the demonstration project provided by the Salt River Project ("SRP") and its progress on the subflow depletion test. A copy of

ADWR's report is attached to the original of this Notice being filed with the Clerk (Attachment) and is being posted to ADWR's web site at:

https://new.azwater.gov/adjudications.

DATED this 6th day of December, 2019.

ARIZONA DEPARTMENT OF WATER RESOURCES

Kimberly R. Parks, Deputy Counsel

ORIGINAL of the foregoing Notice and Attachment sent by first-class mail on December 6, 2019 to:

Clerk of the Maricopa Superior Court
Attn: Water Case
601 W. Jackson Street
Phoenix, Arizona 85003

COPIES of the foregoing Notice and Attachment sent by first-class mail on December 6, 2019 to:

Special Master Susan Ward-Harris
Maricopa County Superior Court
Central Court Building
201 West Jefferson Street, Suite 3A
Phoenix, AZ 85003-2205

COPIES of the foregoing Notice sent by first-class mail on December 6, 2019 to all parties on the court-approved mailing list for Contested Case No. W1-103.

ATTACHMENT

1.0 INTRODUCTION

As requested by the Court in the Minute Entry Order filed on August 5, 2019, the Arizona Department of Water Resources (ADWR) submits its report addressing the following matters:

a. ADWR's position with respect to the Salt River Project's (SRP) Demonstration Project received by ADWR on November 1, 2019;
b. ADWR's progress on the development of the subflow zone depletion test; and
c. a proposed schedule for the continued development of the subflow depletion test for the period December 6, 2019 through March 31, 2020,including ADWR's position as to whether it would be productive to schedule a meeting of experts during the period ending March 31, 2020.

These three items are discussed in the following sections.

2.0 ADWR's REVIEW OF THE SRP DEMONSTRATION PROJECT

A technical review of the November 1, 2019 Memorandum entitled "Subflow Depletion Demonstration Modeling Project Results" (SRP Demonstration Project) and prepared by Leonard Rice Engineers, Inc. is provided as Appendix A. A more general review of the SRP Demonstration Project is provided below and references, as appropriate, SRP's pleadings, responses, and replies to the issues designated in the Special Master's August 5, 2019 Minute Entry.

The SRP Demonstration Project confirms ADWR's approach that MODFLOW and Zonebudget are the appropriate tools to use to calculate subflow zone depletion caused by pumping wells. The SRP Demonstration Project also verified that comparing the total calculated subflow zone depletion with all wells pumping to the subflow zone depletion calculated with all wells <u>except</u> the subject well pumping is the proper method to calculate a well's subflow zone depletion expressed as either a finite rate or a percentage of pumping. (Leonard Rice Engineers, Inc., 2019, p.1).

The Base Model described in the SRP Demonstration Project illustrates that even though the subflow zone is depleted by just 61% of the 45,000 cubic feet per day (cfd) pumping rate of a hypothetical well under steady state conditions, streamflow leaving the model is actually reduced by 45,000 cfd, 100% of the pumping rate. (See **Appendix A**, Figure 8). This confirms ADWR's conclusion from its December 2018 Initial Subflow Depletion Test Report:

> Further, administering only the volume of water leaving the subflow zone will not protect senior appropriable surface water rights from interference caused by pumping from COD Test Wells. For instance, based on ADWR's analysis described in Appendix 4, if only the volume of water leaving the subflow zone is subject to administration, the St. David Ditch may experience a similar amount of interference as it would if there were no wells subject to the adjudication by reason of their cone of depression. All of the time, effort, and expense to design and implement the cone of depression test in the Sierra Vista subwatershed could prove to be wasted. (page 19)

ADWR believes there are two additional issues related to the SRP Demonstration Project that warrant further discussion: 1) the "bottom" of the subflow zone, and 2) the application of the subflow depletion test results. Each of these issues is discussed below.

2.1 "Bottom" of the Subflow Zone

SRP states in its November 25, 2019 filing:

> With respect to resolving the dispute regarding the specific vertical boundary of the 'bottom" of the subflow zone for modeling purposes, SRP finds wisdom in the PDS Response. PDS states: "At this time, the record is not sufficiently developed, and PDS and City have not undertaken the technical analysis, to be able to agree or disagree with SRP's proposed location of the bottom of the sub flow zone for the depletion analysis ..... ' *See also* PDS Brief, at 5; *see also* Freeport Brief, at 6 (referring to the lack of a "developed

> technical record"). Perhaps the best approach for the Special Master at this time is to find that: (1) for purposes of developing a computer model for the depletion test, there is a "bottom" of the subflow zone (i.e., the subflow zone should not be modeled to include the basin fill and extend to bedrock); and (2) as development of the model proceeds, ADWR and the parties should attempt to determine whether such vertical boundary will be at the bottom of the floodplain alluvium or the bottom of the Holocene floodplain alluvium. (p. 7-8)

ADWR reviewed hundreds of well logs during its efforts to delineate the <u>lateral</u> extent of the floodplain Holocene alluvium. Based on those efforts, ADWR does not believe that it (or any other expert) can reliably differentiate the <u>vertical</u> boundary between the floodplain Holocene alluvium and any earlier alluvium using existing well logs. There may be a few professionally completed geologist logs where this differentiation is possible, but the vast majority of driller prepared logs, covering the majority of the lateral extent of the subflow zone, lack the detail necessary to make this decision.

In addition, differentiating the vertical boundary between alluvium and basin fill may prove challenging in those locations where only a small number of driller well logs are available, and the basin fill penetrated by the wells consists only of coarse-grained alluvial materials. ADWR can reliably differentiate Holocene and earlier alluvium from the basin fill in those areas where the basin fill consists of fine-grained sediments.

ADWR also foresees a potential issue in circumstances where the "bottom" of the subflow zone is relatively close to the land surface (i.e. a "thin" subflow zone) and is underlain by saturated, transmissive units such as coarse-grained basin fill. In such a circumstance, the subflow zone could potentially be pumped dry and depletion, defined as the removal of water from the subflow zone, would therefore become zero. However, continued pumping would create space within the underlying transmissive materials which would have to be filled by the next streamflow event before the subflow zone could be saturated again. This filling of the space beneath the subflow zone would certainly deplete streamflow and downstream contributions to the subflow zone.

2.2 Application of the Subflow Depletion Test Results

SRP makes the following statements in its November 13, 2019 filing with the Court:

> 3. Issue #3: The depletion test should be performed using a transient model run, projecting the future percentage of depletion of appropriable water on an annual basis for each well. SRP proposes that such future projection period be one hundred years, but other reasonable alternative time periods and approaches might exist. The modeling period should be selected with the goal of producing (a) an accurate depiction of the depletions and (b) a decree that is administrable and enforceable over time.
>
> 4. Issue #4: For purposes of the depletion test, the amount of water assumed to be pumped by each well should be based upon ADWR's best estimate of present and future pumping rates for that well, in consideration of past pumping rates taken from historical records. (p. 11)
>
> The purpose of the test is to determine a depletion percentage for each well under actual conditions. (p.10-11)

SRP also states:

> The fact that a particular well owner holds a water right that is greater or less in quantity than the amount he or she is actually pumping (or holds no water right at all) is largely immaterial for purposes of determining the depletion percentage. The quantity of the water right is the number **against which** the Court will compare the amount of depletion; it is not part of the basis for determining the depletion percentage. Using the quantity of the water right as part of the test for determining the depletion percentage would mean that a person would be deemed to be withdrawing appropriable water (or not) merely because he or she has a legal right to it (or not). (p.10)

As ADWR understands it, SRP envisions a decree where water rights served by wells located outside of the subflow zone are assigned a quantity. The amount of subflow zone depletion resulting from the actual pumping of the wells serving that right is then compared to the quantity of the right for administration purposes.

If the court creates a decree that assigns water right quantities to the water rights established outside of the subflow zone, ADWR believes that those quantities would likely be based on the best estimates of historical pumping, and therefore, the amount of depletion will always be less than the water right quantity. This is especially true if only the withdrawal of water from the subflow zone is counted as depletion.

Though ADWR believes that the following is well understood, there is no means to determine actual subflow zone depletion resulting from a well's pumping and to compare it to the projected subflow zone depletion that SRP proposes be recorded in the decree. Unlike diversions into ditches, ADWR cannot go into the field and assess whether a pumping well located outside of the subflow zone is depleting more subflow than it should.

The only value that can be compared to the projected subflow zone depletion listed in a hypothetical decree containing water rights supplied by wells located outside of the subflow zone, is a new subflow zone depletion projection which would require another model run using updated parameters. One option would be to update only the pumping of the subject well. In this case though, the newly projected depletion would be strictly a function of the new pumping and any exceedance of the depletion projection listed in the decree would be the result of pumping at a volume higher than historic values. It would obviously be simpler and more cost effective to administer only the pumping volume.

A second option would be to update all of the pumping and recharge values in the model while leaving the model structure and aquifer parameters constant. However, this would not result in an "apples-to-apples" comparison. For instance, if there was a large recharge facility operating during the initial model run, but not in the second model run, the calculated subflow zone depletion of wells near the recharge facility could increase in the second run, even if their actual pumping decreased.

Subflow zone depletion caused by the pumping of wells located outside of the subflow zone can certainly be projected using MODFLOW and Zonebudget and the projected values can be placed in a decree. ADWR does not currently see a way to utilize those projected values during the administration of the decree. MODFLOW and Zonebudget remain powerful tools that could be utilized by a senior appropriable right holder to demonstrate that pumping by a junior water user located outside of the subflow zone is impacting the senior right.

At this time, ADWR sees two potential options for applying the subflow depletion test:

Option 1: Calculate subflow depletion at a selected point in time, recognizing that such a selected time frame is indeed arbitrary. ADWR suggests using 100 years because as SRP has noted, this time frame is consistent with the ADWR Assured Water Supply Program. Other time periods could be proposed as additional options.

This single value of subflow depletion could be placed in the decree not as a water right per se, but as an indicator of the impact that the subject water use is having on the subflow zone. ADWR would not be able to administer the value for compliance purposes for the reasons cited above, but senior appropriable rights could utilize it to identify those water users having the most impact on their rights.

Option 2: Postpone the subflow depletion calculation until post-decree enforcement occurs. The facts pertaining to water uses served by wells located outside of the subflow zone would be summarized in the decree, but no water right would be awarded.

ADWR believes that wells located outside the boundaries of the subflow zone having cones of depression that cause 0.1 foot of drawdown or more at the subflow zone boundary under steady-state conditions are subject to the jurisdiction of the adjudication court, <u>regardless</u>

of whether the well is withdrawing appropriable water according to Judge Ballinger's 2005 Order. As stated by Judge Ballinger:

> The *Gila IV* court's affirmance of the Goodfarb Order … mandates that it is the effect on a stream and its subflow, not additions to a well's output, that is to be measured when deciding which wells are subject to this Court's jurisdiction.

2005 Order at 32.

As noted by the Special Master, Judge Goodfarb stated that the "total amount of water withdrawn" from these wells is subject to the adjudication, and that the Supreme Court in *Gila II* stated that, "Even though only a part of its production is appropriable water, that well should be included in the general adjudication."[1] *Gila IV* contains similar language affirming *Gila II*.[2] ADWR believes that these statements are consistent with Judge Ballinger's 2005 Order quoted above. The adjudication court's jurisdiction is not dependent on a "well's output," but rather the "effect on a stream and its subflow," which is determined by the cone of depression test under steady-state conditions.

Wells located outside the subflow zone are presumed to be pumping percolating groundwater[3] until a subflow depletion test establishes otherwise. Under Option 2, water uses served by these wells would not receive a water right in the decree. For this Option, ADWR suggests creating a "Summary of Water Use," for these water uses which would list the estimated annual use utilized in the cone of depression test calculations and the apparent first use date listed in the 1991 San Pedro HSR that could be used to identify

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[1] *In re Gen. Adjudication of All Rights to Use Water in Gila River Sys. & Source ("Gila II")*, 175 Ariz. 382, 391, 857 P.2d 1236, 1245 (1993); Judge Goodfarb Order filed June 30, 1994 at 63.

[2] *In re Gen. Adjudication of All Rights to Use Water in Gila River Sys. & Source*, 198 Ariz. 330, 334, 9 P.3d 1069, 1073 (2000).

[3] *Id.* at 335.

senior and junior water uses during enforcement proceedings. ADWR further suggests that the Court utilize a subflow depletion test during enforcement proceedings to determine what, if any, amount of the well's pumping is depleting the subflow zone at the time of enforcement and to what extent the well user must mitigate the impact to the senior right.

As described in the following sections, ADWR is proceeding with the construction of a MODFLOW groundwater model for the Benson and Sierra Vista Subwatersheds on the San Pedro River to be used for the Assured Water Supply Program and for subflow depletion calculations. Once completed, this model will be updated regularly as are all models used in the Assured Water Supply program.

Option 2 may be more cost effective than Option 1. As ADWR noted in its December 2018 Initial Subflow Depletion Test Report:

> …administration of COD Test Wells north of the Sierra Vista Subwatershed may be infrequent, except in the Aravaipa Subwatershed. (p. 8)

If subflow zone depletion calculations are deferred until enforcement, ADWR may never need to conduct depletion modeling downstream from the subwatersheds where the model is currently under construction. ADWR's modeling resources could be assigned to another watershed.

3.0 STATUS REPORT ON ADWR SAN PEDRO MODFLOW MODEL

ADWR has taken the following actions since the July 24, 2019 status conference:

- Hired additional staff to support development of the San Pedro groundwater flow model.
- Began research for the construction of preliminary model geology.
- Began research for the construction of an initial MODFLOW model.

4.0 PROPOSED MODEL DEVELOPMENT SCHEDULE THROUGH MARCH 31, 2020

December 6, 2019 – March 31, 2020 Workplan

- Train additional staff to support development of the San Pedro groundwater flow model.
- Work on developing an initial 3-layer model geology, comprising the confining clay unit, alluvium, and conglomerate, spanning the Upper San Pedro basin from Cananea, Mexico to the Narrows, located approximately 11 miles north of Benson, Arizona.
- Work on constructing a preliminary MODFLOW model, initially covering the period 1900-2015 and spanning the Upper San Pedro basin from Cananea to the Narrows.
- Prepare and distribute a data request and conduct a preliminary review of submitted documents.

Data Request

ADWR is requesting any relevant data, particularly those related to geology and historic water use in the model domain between 1900 and present, from the parties and their technical experts.[4] Any data considered critical to the development and calibration of the San Pedro model should be submitted at this time. These include, but should not be limited to the following:

- Aquifer test results, particularly raw pumping, drawdown, and recovery data (please include length of pumping phase of test)
- Logs of drill cuttings (i.e. logs written by a field geologist or percentage logs)
- Geophysical logs (i.e. self-potential and resistivity)
- Historic water use (1900-present), particularly in the Benson sub-basin
- Water levels, particularly any continuous records

[4] ADWR will also be requesting information from entities such as The Nature Conservancy, the USGS, and others, as appropriate.

- Historic surface water diversions (1900-present), particularly in the Benson sub-basin
- Evapotranspiration measurements
- Tributary streamflow measurements
- Spring discharge measurements
- Studies related to depth to bedrock or location of the St. David Formation
- Studies related to aquifer properties (storage, hydraulic conductivity)

Data should be provided in a readily usable format, with editable digital versions (e.g., Excel, GIS, model files, vs. PDFs or summary reports) preferred. If no digital version is available, submissions should be scanned to PDF.

ADWR is also requesting that the parties and their technical experts provide any opinions, suggestions, and/or recommendations on future model requirements and development strategies.

New data may continue to be incorporated into the model as it becomes available. However, for the purposes of the first technical workgroup meeting and to ensure steady progress on the model, ADWR will request that data be submitted to ADWR before February 15, 2020. Please provide data to Olga Hart at the following email address: ohart@azwater.gov .

Meeting Proposal

ADWR proposes to host the first technical workgroup meeting the week of March 23, 2020. The purpose of this meeting will be to update the parties on outcomes of the data request, model geology, and preliminary modeling efforts.

APPENDIX A

to ADWR December 6, 2019 Report

APPENDIX A

Review of SRP – Leonard Rice Subflow Depletion Demonstration Project Report (Nov. 1, 2019).

Background

The Leonard-Rice (LR) Subflow Depletion Demonstration Project Report (the LR SDDP report) presented results from several simple models developed to evaluate the theoretical impacts of pumping "test" wells at relatively close distances to a simulated subflow zone (SFZ). Two basic MODFLOW models were constructed, one model consisting of 2 layers, 10 rows and 10 columns with a 5,000 ft^2 horizontal grid spacing; the second model consisting of 2 layers, 90 rows and 90 columns with a 555 ft^2 horizontal grid spacing. Layer 1 of both models simulated a centrally located SFZ zone with a perennial stream bounded laterally by basin-fill deposits. Layer 2 of both models simulated basin-fill deposits.

Multiple steady-state and transient model simulations were run, with and without well pumpage, to evaluate the theoretical depletion of subflow. SFZ depletion was evaluated using the USGS Zonebudget program.

ADWR Review

General Comments

The LR SDDP report presents theoretical pumping wells that are located approximately 2,500 feet from an adjacent SFZ. In all transient examples presented, the pumping wells simulate substantial SFZ depletion within 100 years after the beginning of pumping (Tables 1 and 2, Figure 8; LR SDDP report).

ADWR believes the examples presented in the LR SDDP report are generally non-representative of distances between the SFZ boundary and most wells located outside the SFZ in the Sierra Vista Sub-Watershed (see **Figures 1-5**). ADWR's review of the 2006 USGS Sierra Vista Sub-watershed Groundwater Flow Model (the SVS model) indicates that the vast majority of pumping wells in the SVS model area are located substantially farther from the SFZ than 2,500 feet (see **Tables 1-4**). The consequence of most wells being located much farther away from the SFZ than the examples provided in the LR SDDP report were clearly shown in ADWR's 2018 Initial Report on Subflow Depletion Testing (ADWR, 2018). The results reported in the 2018 ADWR report showed that there was essentially no change in the volume of flow from the SFZ to the regional aquifer after 200 years of historic and projected future pumping by hundreds of wells (ADWR, 2018, Figures 5, 6, 7). ADWR believes the LR SDDP report examples are very non-representative of current and future subflow depletion conditions for the vast majority of wells located outside the SFZ in the SVS model area.

Specific Comment

The LR SDDP report model dataset files include Excel spreadsheets listing Zonebudget output for various model runs. The rates reported for Zone 1 on the line labeled "Stream Flow Out" on the IN portion of the budget listing are incorrect. The rates listed on that line are the rates reported by Zonebudget. However, the stream flow out should be 921,500 cubic feet day (CFD) for the Base SS model with no pumping, and 876,500 CFD for the Base SS model with pumping (**Figures 6 and 7**). As setup in the LR SDDP Zonebudget zone input file, the Zonebudget program calculates the "Stream Flow Out" component by summing the stream flow out for each stream reach (stream cell); for example multiplying 864,000 times the 14 stream cells in the 10x10 model equals 1.209E07 CFD and multiplying 864,000 times 126 stream cells in the 90x90 model equals 1.088E08 CFD, which are approximately equal to the "Stream Flow Out" values reported for the Base SS and Test1 SS models.

Although this budget item doesn't actually enter into the flow process used by SRP/LR to calculate SFZ depletion (**Figure 8**), it should be corrected or deleted to avoid confusion.

References:

ADWR, 2018. Initial Report on Subflow Depletion Testing.

Leonard Rice Subflow Depletion Demonstration Project Report, 2019. Memo to Mark McGinnis from Jon Ford and others, dated November 1, 2019.

USGS, 2007. Ground-water flow model of the Sierra Vista Subwatershed and Sonoran portions of the Upper San Pedro Basin, southeastern Arizona, United States, and northern Sonora, Mexico. USGS Scientific Investigations report 2006-5228.

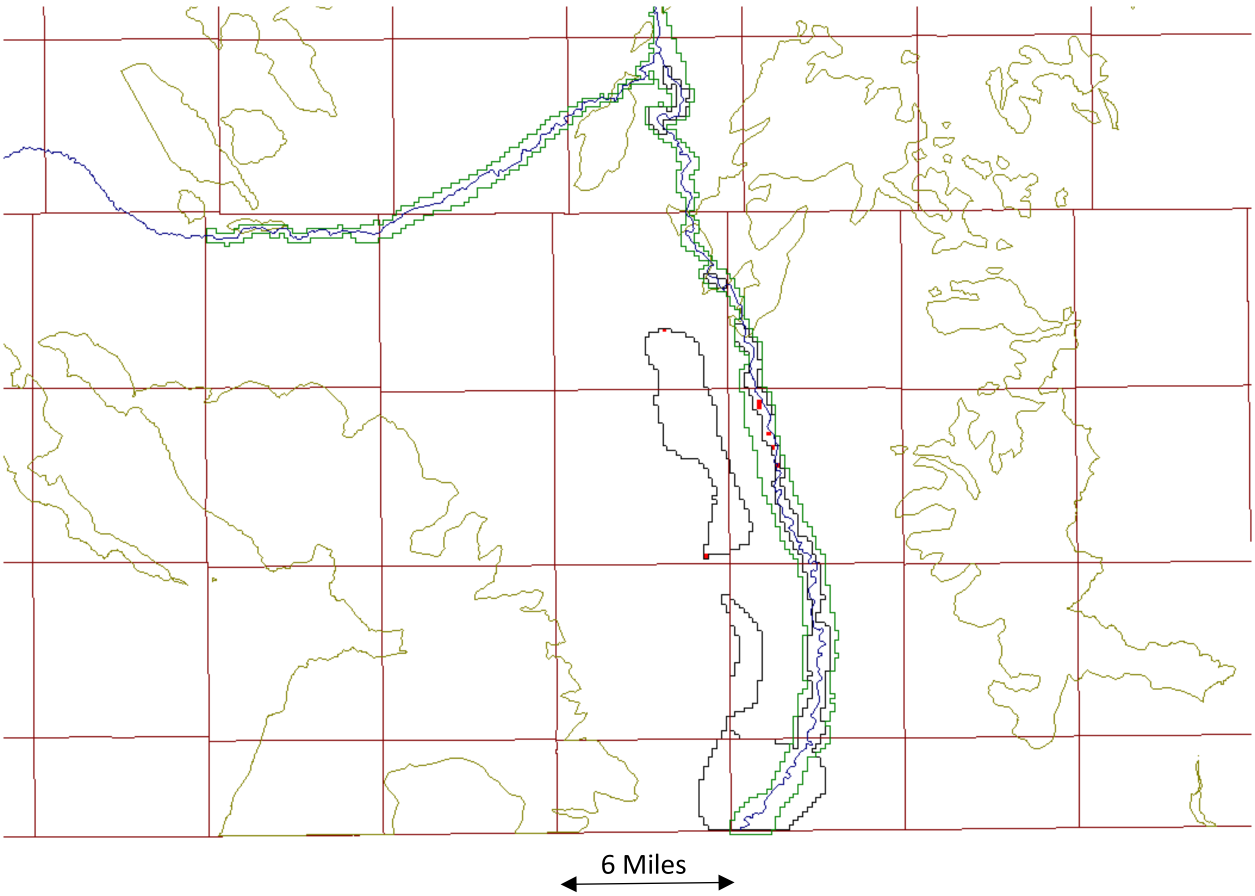
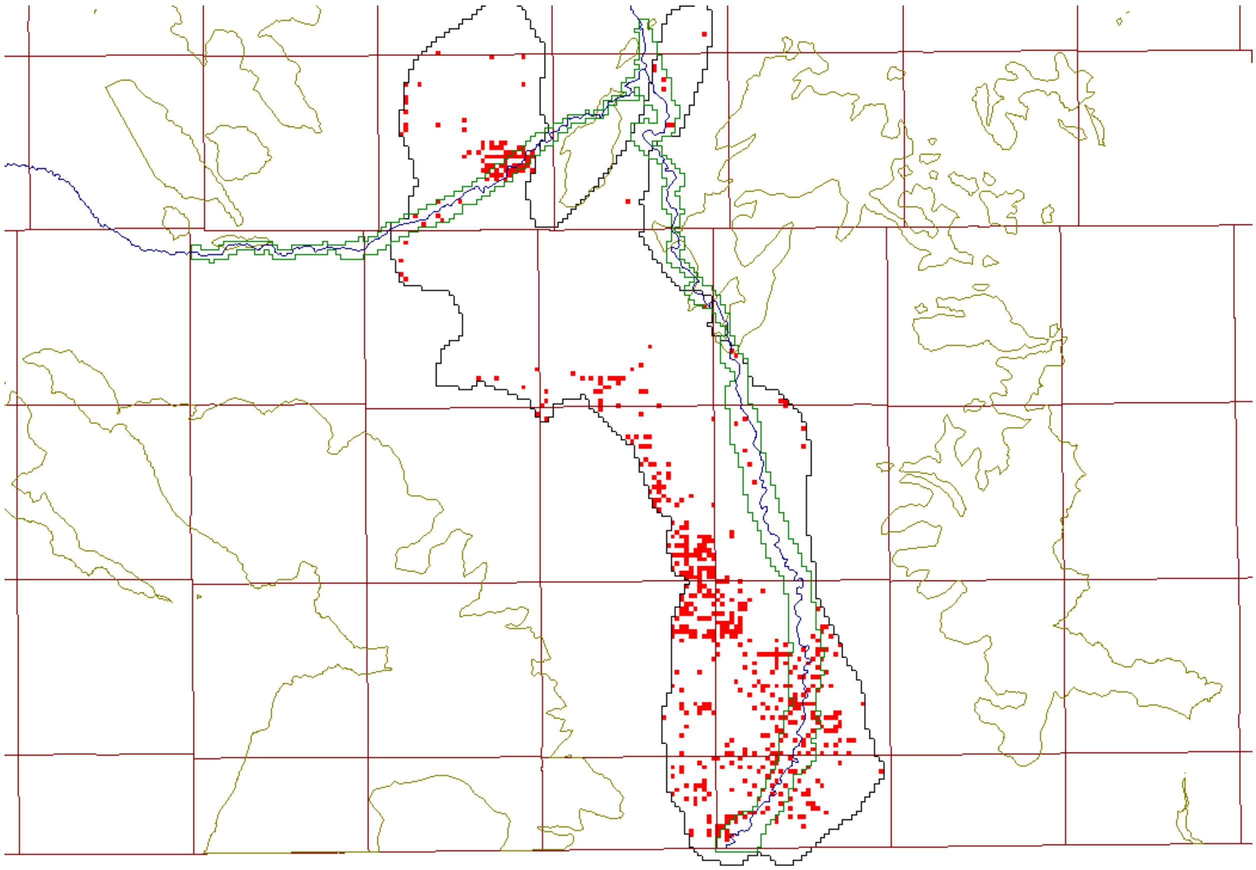


Figure 1: Locations of wells listed for Model Layer 1 in USGS SVS Groundwater Flow Model Well Package

(Note: Many wells listed in well package do not have assigned pumping volumes for any given stress period, or may have assigned recharge volumes)



6 Miles

Figure 2: Locations of wells listed for Model Layer 2 in USGS SVS Groundwater Flow Model Well Package

(Note: Many wells listed in well package do not have assigned pumping volumes for any given stress period, or may have assigned recharge volumes)

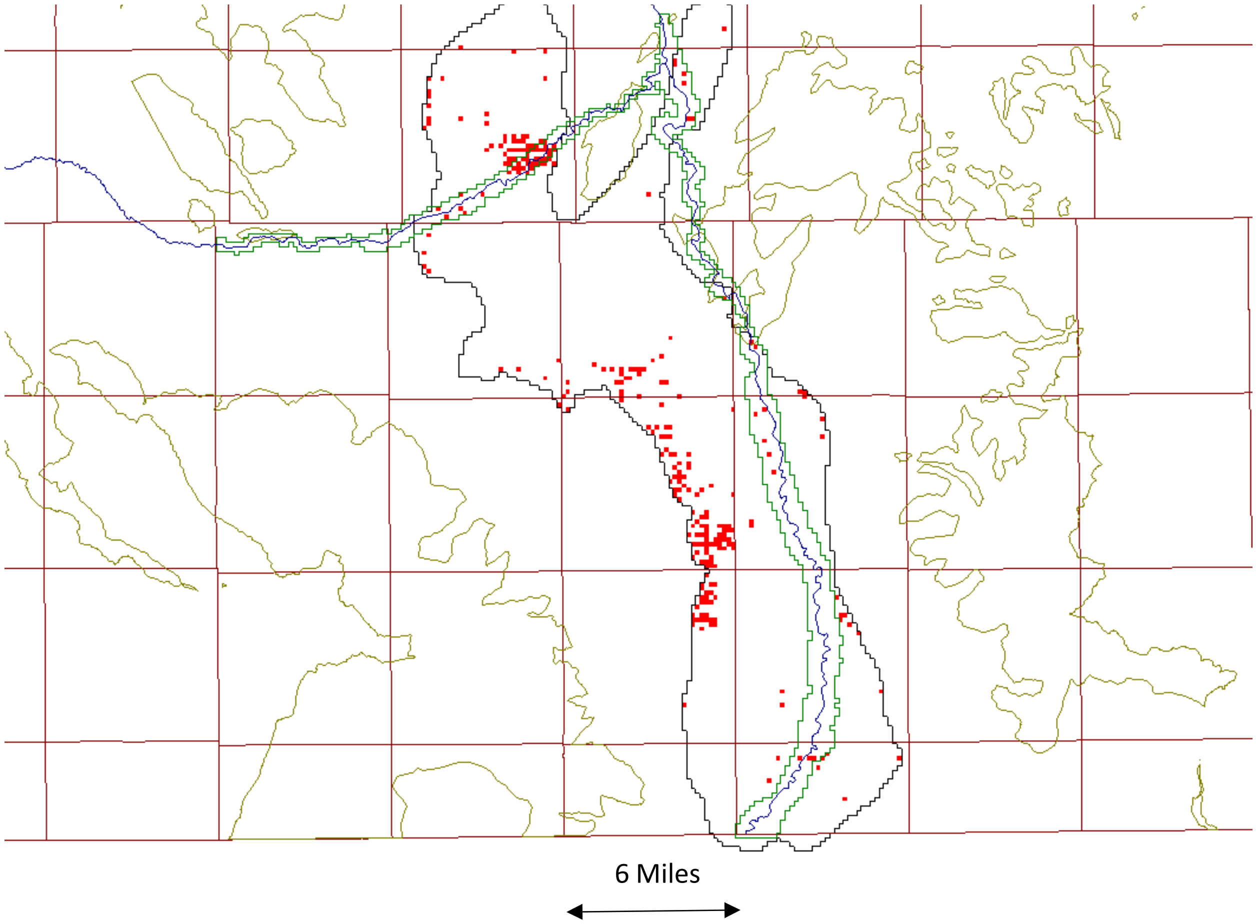


Figure 3: Locations of wells listed for Model Layer 3 in USGS SVS Groundwater Flow Model Well Package

(Note: Many wells listed in well package do not have assigned pumping volumes for any given stress period, or may have assigned recharge volumes)

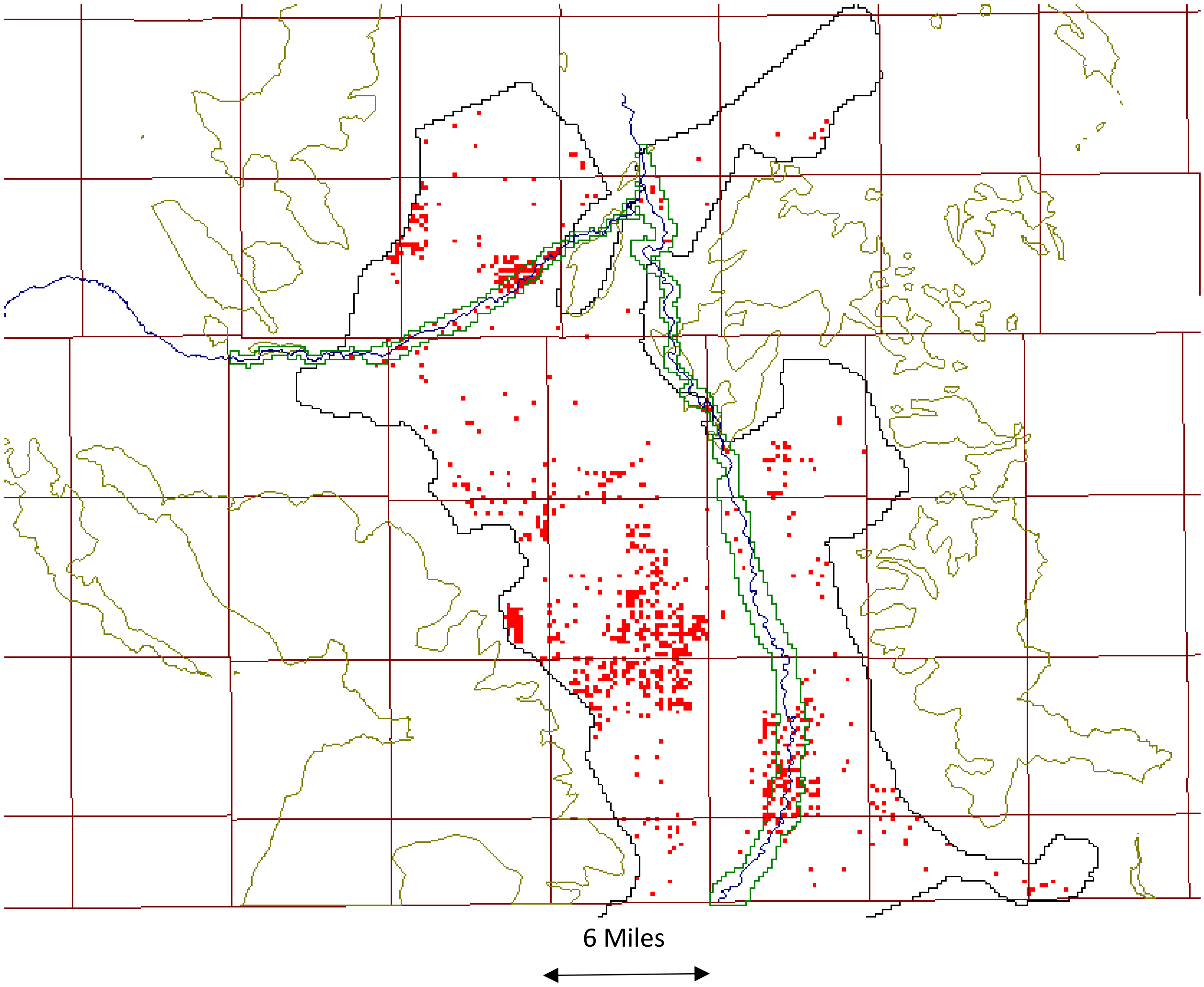


Figure 4: Locations of wells listed for Model Layer 4 in USGS SVS Groundwater Flow Model Well Package

(Note: Many wells listed in well package do not have assigned pumping volumes for any given stress period, or may have assigned recharge volumes)

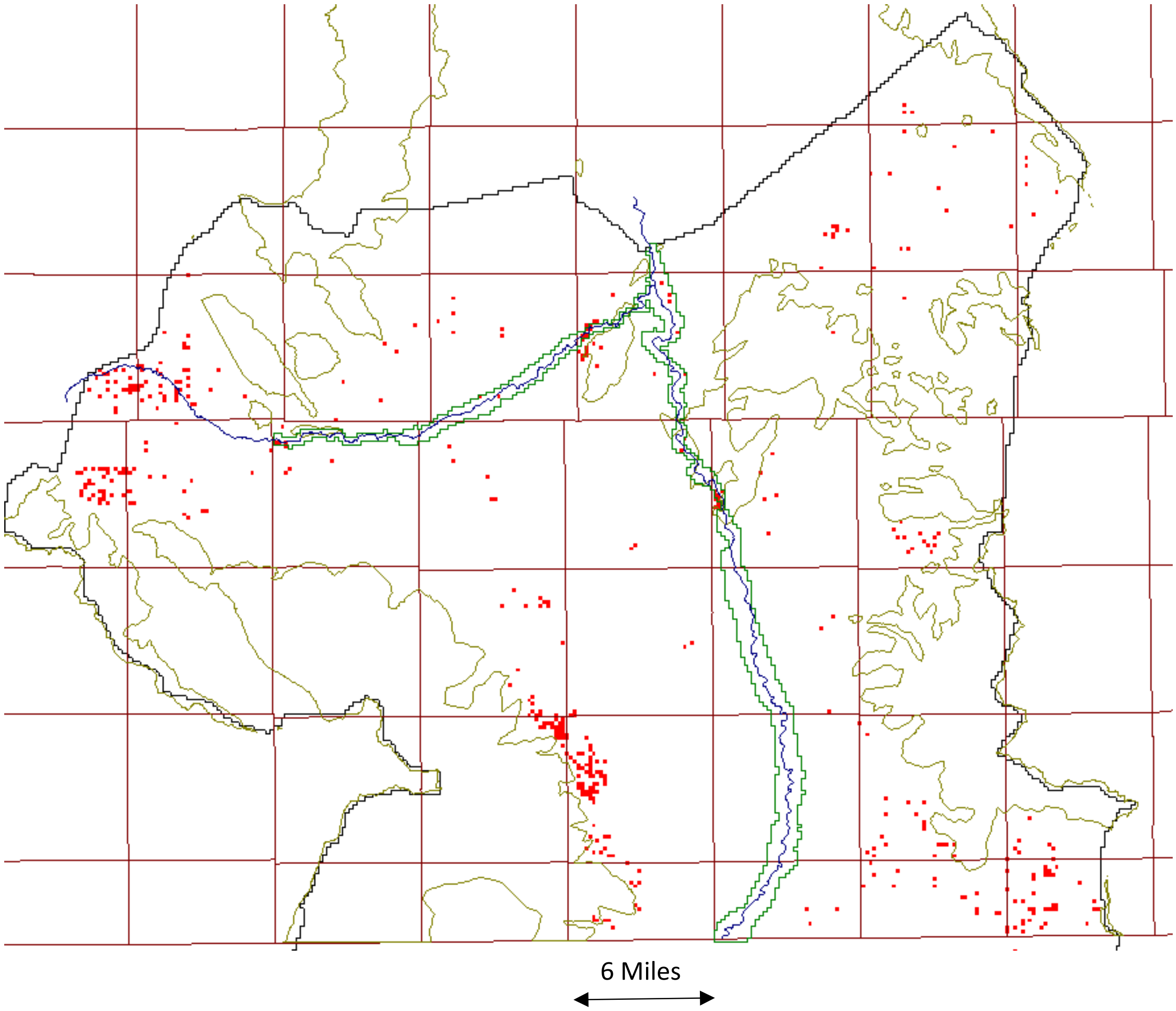


Figure 5: Locations of wells listed for Model Layer 5 in USGS SVS Groundwater Flow Model Well Package

(Note: Many wells listed in well package do not have assigned pumping volumes for any given stress period, or may have assigned recharge volumes)

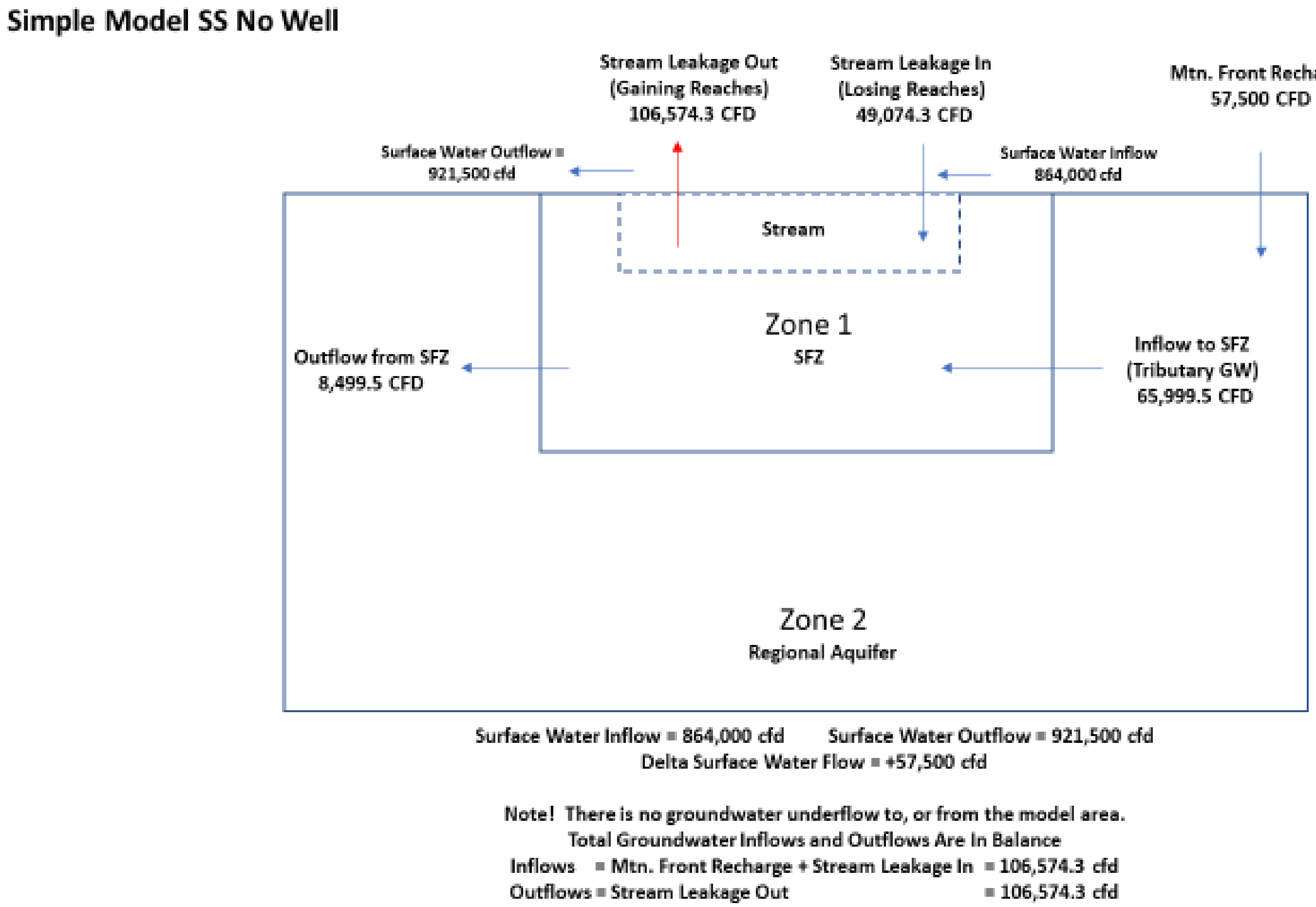


Figure 6: Diagram of Zone Budget Analysis for Base SS Model (No Pumping)

Simple Model SS With Well

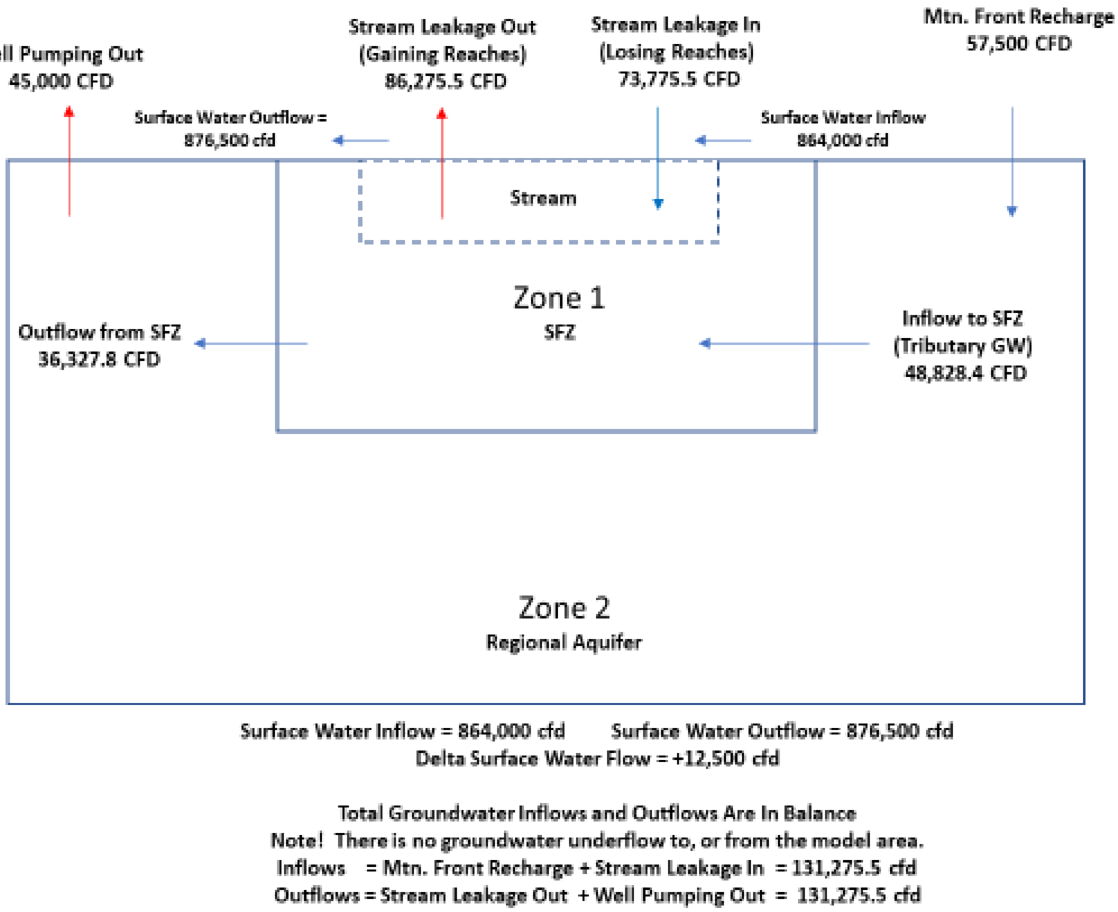


Figure 7: Diagram of Zone Budget Analysis for Base SS Model (With Pumping)

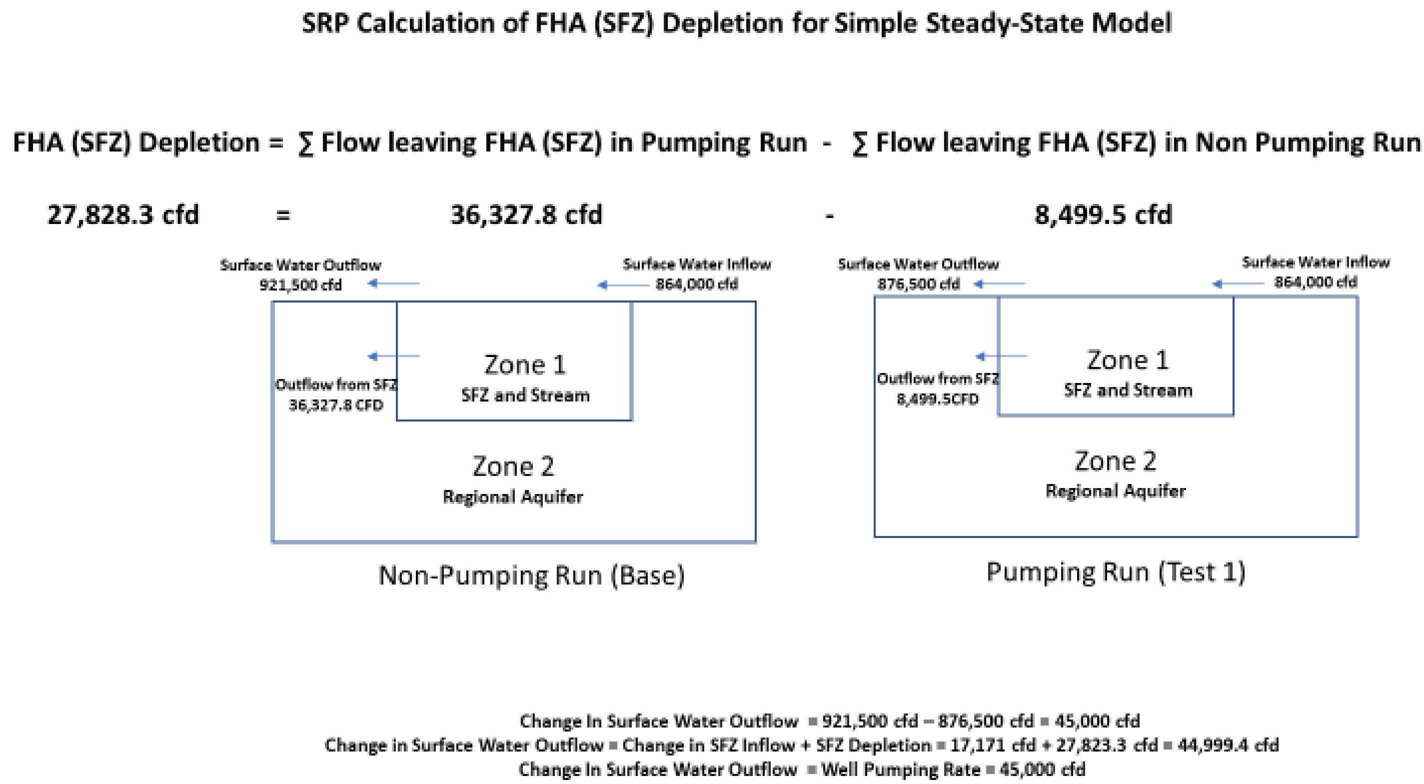


Figure 8: Diagram of Zone Budget Analysis for SFZ Depletion from Base SS Model (No Pumping) to Base SS Model (With Pumping)

Table 1: Pumping Volumes (Acre-Feet) Per Model Cell Vs. Distance (Meters) to the northern Babocomari River SFZ Boundary

Pumping Volumes Per Model Cell In (Acre-Feet) Vs Ranges of Distances From Pumping Cells To SFZ Boundary (Meters)								
Stress Period 33 (217 Days)	Babocomari North							
Distance Cell to SFZ Boundary	0-1000	1001-2500	2501-5000	5001-7500	7501-10000	10001-15000	15001-20000	>20000
Number of Cells In Range	9	80	19	76	42	4	0	0
Average Pumped Volume/Cell In SP	-3.57336	-0.26505	-2.93717	-1.30835	-0.51432	-7.73083	NA	NA
Median Pumped Volume/Cell In SP	-0.41172	-0.04646	-0.32411	-0.40821	-0.40821	-10.17170	NA	NA
Maximum Pumped Volume/Cell in SP	-10.17170	-10.17170	-12.62770	-51.20864	-8.66702	-10.17170	NA	NA
Minimum Pumped Volume/Cell in SP	-0.00665	-0.00025	-0.00007	0.00000	-0.00190	-0.40821	NA	NA
Stress Period 34 (148 Days)	Babocomari North							
Distance Cell to SFZ Boundary	0-1000	1001-2500	2501-5000	5001-7500	7501-10000	10001-15000	15001-20000	>20000
Number of Cells In Range	9	80	19	76	42	4	0	0
Average Pumped Volume/Cell In SP	-2.43713	-0.18077	-2.00323	-0.89233	-0.35078	-5.27264	NA	NA
Median Pumped Volume/Cell In SP	-0.28081	-0.03169	-0.22105	-0.27841	-0.27841	-6.93738	NA	NA
Maximum Pumped Volume/Cell in SP	-6.93738	-6.93738	-8.61244	-34.92571	-5.91115	-6.93738	NA	NA
Minimum Pumped Volume/Cell in SP	-0.00453	-0.00017	-0.00005	0.00000	-0.00130	-0.27841	NA	NA

Table 2: Pumping Volumes (Acre-Feet) Per Model Cell Vs. Distance (Meters) to the southern Babocomari River SFZ Boundary

Pumping Volumes Per Model Cell In (Acre-Feet) Vs Ranges of Distances From Pumping Cells To SFZ Boundary (Meters)								
Stress Period 33 (217 Days)	Babocomari South							
Distance Cell to SFZ Boundary	0-1000	1001-2500	2501-5000	5001-7500	7501-10000	10001-15000	15001-20000	>20000
Number of Cells In Range	41	8	2	0	9	37	58	151
Average Pumped Volume/Cell In SP	-0.42782	-4.96730	-3.01801	NA	-93.02992	-35.89392	-13.91890	-4.04687
Median Pumped Volume/Cell In SP	-0.05324	-0.41172	-3.01801	NA	-9.14943	-9.32538	-0.40821	-0.40821
Maximum Pumped Volume/Cell in SP	-10.17170	-18.16337	-5.77175	NA	-384.19035	-266.81489	-259.86132	-248.79743
Minimum Pumped Volume/Cell in SP	-0.00009	-0.03778	-0.26428	NA	-0.31840	-0.03617	-0.00005	-0.25878
Stress Period 34 (148 Days)	Babocomari South							
Distance Cell to SFZ Boundary	0-1000	1001-2500	2501-5000	5001-7500	7501-10000	10001-15000	15001-20000	>20000
Number of Cells In Range	41	8	2	0	9	36	58	150
Average Pumped Volume/Cell In SP	-0.29178	-3.38784	-0.46287	NA	-43.07819	-24.85764	-9.49307	-2.74829
Median Pumped Volume/Cell In SP	-0.03631	-0.28081	-0.46287	NA	-26.51425	-6.51778	-0.27841	-0.27841
Maximum Pumped Volume/Cell in SP	-6.93738	-12.38792	-0.88521	NA	-148.89638	-181.97513	-177.23261	-169.68672
Minimum Pumped Volume/Cell in SP	-0.00006	-0.02576	-0.04053	NA	-0.21716	-0.02467	-0.00003	-0.17649

Note: 1 meter = 3.2808 feet
1 mile = 1,609.36 meters

Table 3: Pumping Volumes (Acre-Feet) Per Model Cell Vs. Distance (Meters) to the western San Pedro River SFZ Boundary

Pumping Volumes Per Model Cell In (Acre-Feet) Vs Ranges of Distances From Pumping Cells To SFZ Boundary (Meters)								
Stress Period 33 (217 Days)	San Pedro West							
Distance Cell to SFZ Boundary	0-1000	1001-2500	2501-5000	5001-7500	7501-10000	10001-15000	15001-20000	>20000
Number of Cells In Range	49	47	408	485	236	447	37	134
Average Pumped Volume/Cell In SP	-0.57432	-52.12347	-0.84263	-1.17168	-2.46251	-6.77603	-32.36431	-4.46354
Median Pumped Volume/Cell In SP	-0.40821	-0.40821	-0.25853	-0.25065	-0.38526	-0.40821	-0.40821	-0.40821
Maximum Pumped Volume/Cell in SP	-10.14189	-725.56591	-77.11735	-206.75509	-146.14802	-266.81489	-384.19035	-84.42458
Minimum Pumped Volume/Cell in SP	-0.01084	-0.00215	0.00000	-0.00010	-0.00007	0.00000	-0.03778	-0.40821
Stress Period 34 (148 Days)	San Pedro West							
Distance Cell to SFZ Boundary	0-1000	1001-2500	2501-5000	5001-7500	7501-10000	10001-15000	15001-20000	>20000
Number of Cells In Range	48	38	408	485	236	445	37	134
Average Pumped Volume/Cell In SP	-0.25576	-0.74557	-0.57470	-0.79912	-1.67950	-4.61988	-16.88339	-3.04426
Median Pumped Volume/Cell In SP	-0.27841	-0.27841	-0.17632	-0.17095	-0.26276	-0.27841	-0.27841	-0.27841
Maximum Pumped Volume/Cell in SP	-0.28081	-6.93738	-52.59617	-141.01269	-99.67699	-181.97513	-148.89638	-57.57990
Minimum Pumped Volume/Cell in SP	-0.00739	-0.00146	0.00000	-0.00007	-0.00005	0.00000	-0.02576	-0.27841

Table 4: Pumping Volumes (Acre-Feet) Per Model Cell Vs. Distance (Meters) to the eastern San Pedro River SFZ Boundary

Pumping Volumes Per Model Cell In (Acre-Feet) Vs Ranges of Distances From Pumping Cells To SFZ Boundary (Meters)								
Stress Period 33 (217 Days)	San Pedro East							
Distance Cell to SFZ Boundary	0-1000	1001-2500	2501-5000	5001-7500	7501-10000	10001-15000	15001-20000	>20000
Number of Cells In Range	14	50	53	25	16	32	46	2
Average Pumped Volume/Cell In SP	-0.35014	-0.57770	-2.41796	-2.94077	-2.21357	-1.69896	-20.55782	-1.16207
Median Pumped Volume/Cell In SP	-0.40821	-0.40821	-0.41172	-0.40820	-0.40821	-0.41172	-0.40821	-1.16207
Maximum Pumped Volume/Cell in SP	-0.41172	-10.17082	-36.53761	-18.16336	-10.17170	-10.17216	-266.81489	-1.91594
Minimum Pumped Volume/Cell in SP	-0.03310	-0.00001	0.00000	0.00000	-0.00013	-0.00041	0.00000	-0.40821
Stress Period 34 (148 Days)	San Pedro East							
Distance Cell to SFZ Boundary	0-1000	1001-2500	2501-5000	5001-7500	7501-10000	10001-15000	15001-20000	>20000
Number of Cells In Range	14	50	53	25	16	32	46	2
Average Pumped Volume/Cell In SP	-0.23881	-0.39401	-1.64911	-2.00568	-1.50971	-1.13889	-13.04981	-0.63380
Median Pumped Volume/Cell In SP	-0.27841	-0.27841	-0.28081	-0.27841	-0.27841	-0.28081	-0.27841	-0.63380
Maximum Pumped Volume/Cell in SP	-0.28081	-6.93678	-24.91966	-12.38791	-6.93738	-6.93770	-181.97513	-0.98919
Minimum Pumped Volume/Cell in SP	-0.02258	-0.00001	0.00000	0.00000	-0.00009	-0.00028	0.00000	-0.27841

Note: 1 meter = 3.2808 feet
1 mile = 1,609.36 meters