

SUPERIOR COURT OF ARIZONA  
MARICOPA COUNTY

12/11/2019

CLERK OF THE COURT

SPECIAL WATER MASTER  
SUSAN WARD HARRIS

T. DeRaddo

Deputy

In Re: Subflow Technical Report, San Pedro  
River Watershed Case number W1-103

**FILED: 02/19/2020**

In Re: The General Adjudication  
of All Rights to Use Water in the  
Gila River System and Source  
W-1, W-2, W-3 and W-4 (Consolidated)

In re: Oral Argument and Status Conference

MINUTE ENTRY

Courtroom: CCB 301

1:33 p.m. This is the time set for Oral Argument and a status conference before  
Special Master Susan Ward Harris.

The following attorneys and parties appear in-person:

- John Burnside on behalf of BHP Copper and Arizona Public Service Company
- Sean Hood on behalf of Freeport Minerals Corporation,
- Mark McGinnis, R. Jeffrey Heilman and Sharon Morris on behalf of SRP
- Joe Sparks on behalf of the San Carlos Apache Tribe
- William Sullivan on behalf of Pueblo Del Sol Water Company and City of Sierra Vista
- Rhett Billingsley on behalf of ASARCO, LLC
- William Staudenmaier on behalf of APS
- Carrie Brennan and Kevin Crestin on behalf of Arizona State Land Department
- David Brown on behalf of the City of Cottonwood
- Kimberly Parks and Jeff Trembly on behalf of Arizona Department of Water Resources (ADWR)
- Yosef Negose on behalf of the United States, Bureau of Indian Affairs
- Jenny Winkler on behalf of the City of Chandler
- Megan Tracy on behalf of the City of Tempe

- Alexandra Arboleda on behalf of Cities of Tempe and Tombstone
- Elias Ancharski on behalf of the Arizona Water Company

Telephonic Appearances of counsel are as follows:

- Robyn Interpreter on behalf of the Pascua Yaqui Tribe and Yavapai-Apache Nation
- Lucas Christian on behalf of the Tonto Apache Tribe
- Thomas Murphy on behalf of the Gila River Indian Community
- Charles Cahoy on behalf of the City of Phoenix
- Clyde Halstead on behalf of the City of Prescott
- Sonja Overholder on behalf of the United States Department of the Interior Solicitor's Office
- Emmi Blades on behalf of the United States Department of Justice, Indian Resources Section

Court reporter, Lauren Kuhnhenh is present. A record of the proceedings is also made digitally.

Sean Hood addresses the Court on the four issues. Mr. Hood asserts that one cannot read *Gila II* in good faith and say that capture of tributary groundwater is part of a subflow depletion analysis. Tributary groundwater is not subflow. The bottom of the subflow zone will matter in the cone of depression test according to experts because there is movement of tributary groundwater underneath the subflow zone that will not result in depletion of subflow. Mr. Hood is in agreement with Mr. McGinnis regarding the need for the development of more of a technical record to evaluate how to determine the bottom and the ways in which to distinguish between the bottom of the floodplain Holocene alluvium and the older materials beneath. He discusses actual pumping versus maximum pumping capacity issue and says that the model must use actual use. He says that if a claimant wants to claim an amount greater than the amount actually used, then the model should use the amount claimed. Mr. Hood asserts that a decree cannot be based on projections well into the future. The Court and Mr. Hood discuss various scenarios regarding different time periods. Mr. Hood makes a distinction between projections made by ADWR for future use and the use of projections for purposes of the decree.

Mr. McGinnis states that he is largely in agreement with Mr. Hood. Mr. McGinnis asserts that this proceeding is not about whether the subflow depletion test will be conducted but it is about how it will be conducted. The whether issue is before Judge Brain. Mr. McGinnis discusses ADWR's response to SRP's subflow demonstration project. Mr. McGinnis states his position on the record regarding possibly resolving issues with the current ADWR model by using the bottom of the floodplain alluvium that does not include the basin fill as the bottom of the model. He agrees with Mr. Hood that the Supreme Court decision about the bottom of subflow zone does not apply in dealing with the modeling issue for wells outside the subflow zone because otherwise the model does not work.

Mr. McGinnis also clarified SRP's position in light of ADWR's report about enforcement going forward. It is not SRP's position that a pumper would get an appropriative water right based on the amount of depletion. It is SRP's position that the water right is based upon the law, but the depletion is determined by whether or not a party is exercising that right. Mr. McGinnis is in favor of performing depletion tests now rather than later. Enforcement of the water rights is discussed given changes in depletion over time. Mr. McGinnis says the depletion percentage will be increasing each year as the well is pumped so need projections to have an enforceable decree because need to know the percentage of the pumping that is appropriable water at any given time. He states the depletion projection and the water right are two different things. The Court and Mr. McGinnis discuss several various scenarios regarding these issues. He states that the cone of depression test does not tell a person the amount of appropriable water being withdrawn at any given time.

Yosef Negose addresses the Court regarding the position(s) that the United States has taken in its briefs on the record. The Court and Mr. Negose discuss several various hypothetical scenarios involving state law claims made for water from a well on land owned by the Forest Service. Mr. Negose states that specific facts in a contested case should be used to resolve the issues. The central point of the United States' brief is that subflow depletion does not turn on the volume of water that wells pump at a given point in time. It instead turns on whether water use tends to diminish appreciably and directly at the surface stream and more fundamentally on how parties use water, what rights they claim to do so, and upon what facts they can bring to bear on the circumstances of their water use. Mr. Negose states Mr. McGinnis had noted that the question before the Court is not whether a depletion test is necessary, but *how* to implement the depletion analysis. Mr. Negose states that in his view, it is *how* the implementation of a depletion analysis depends on *why* the analysis would be developed.

The Court states that the purpose of doing the subflow depletion analysis is because there are those that have wells outside of the subflow zone who want appropriable water rights, and there must be a way to determine whether they are pumping appropriable water.

Discussion is held regarding the best way to implement a depletion analysis and a cone of depression test. Mr. Negose argues that the best method to implement the depletion analysis is in a contested case with specific factual context. He further states that if a groundwater user wants an appropriative right then the user has to explain what entitles him to an appropriative right under *Southwest Cotton*. There was no ADWR at the time of *Southwest Cotton* to provide a depletion test and to establish the amount of appropriable water for the claimant.

Joe Sparks makes his positions known as stated on the record. He is in favor of conducting the cone of depression tests and a depletion analysis. Wells located outside the subflow zone will be handled by the cone of depression test and ADWR should be able to choose the appropriate test for the various locations. If the cone of depression test shows that the well is pumping any water flowing to or from the subflow zone, then that well and

all water that it pumps is subject to the jurisdiction of the Court. As to those wells pumping subflow, the question must be asked whether appropriative rights were acquired and, if not, then the well is included in a category of wells that have no appropriative rights. Once a decree is entered, then those wells located outside the subflow zone that are or will be pumping subflow will be subject to the depletion analysis. Proponents of those wells who wish to continue to use those wells must show that they are not depleting and destroying the whole basis of this adjudication. Mr. Sparks states that he is most concerned about the delay attributed to the testing because of the importance of the preservation of the *res*. He states that the water in the river is being exhausted. Mr. Sparks states that the cone of depression test could be used in the determination of claims made by a well owner for an appropriable water right under state law. Water is not an inexhaustible resource and the Court should not be diverted by this test from adjudicating water rights.

William Sullivan states that the test is needed for enforcement and possibly for quantification so therefore it is important for the Department to devise the test.

Carrie Brennan concurs with Mr. Hood and indicates support for the initiation of a contested case to apply the test.

Thomas Murphy states that the SRP's position on the vertical extent of the subflow zone seems to make sense for modelling purposes for wells located outside the subflow zone. He agrees with SPR on the timing issues and the Court should adopt a test that assesses wells over a period of time and not use the short time analysis implied in *Gila IV*.

Kim Parks agrees to schedule a meeting among the parties regarding the bottom of the subflow zone. The Court and Ms. Parks discuss several scenarios regarding issues as stated on the record.

Court stated that the ADWR should respond to SRP's position because the Court does not believe that there is adequate information to determine the issue.

Jeff Trembly addresses the Court regarding projecting forward depletion analysis using historical data. The test could calculate that some percentage of the water came from the subflow zone. The test can project depletion forward assuming that conditions stay the same.

2:56 p.m. Matter concludes.

LATER:

The parties have briefed and argued four issues identified as a result of meeting among the parties and experts with ADWR that pertain to ADWR's development of the subflow depletion test to analyze the cones of depression of wells located outside the subflow zone.

**Issue No. 1. Should depletion analysis include reduction in flow to the subflow zone as opposed to depletion analysis based solely on reduction in flow from the subflow zone?**

“The most important element in the modeling process is the determination of the overall form and essential components of the model. These decisions must be based on a clear idea of the scientific or engineering purpose of the model.” S. Lawrence Dingman, *Physical Hydrology* 27 (2002). Similarly, where a model or scientific test is developed to aid the Court is making a legal determination, decisions about the model design must be grounded in an understanding of the Court’s purpose for using the model and the legal posture of the case in which the model will be used. The United States stated, in part, that it cannot respond to Issue No. 1 because the “purpose (if any) of a depletion analysis, and the facts (if any) to which the Court’s question pertains are unclear.” United States’ Response to Special Master’s Questions, filed October 25, 2019 (U.S. Response) at 8. Although no other party doubted that the subflow depletion test had a purpose, the parties do not share a uniform view of its purpose.

A discussion of the purpose of the subflow depletion test must begin with the concept of subflow and the impact of the adoption of that concept on Arizona’s water laws that differentiate between surface water and groundwater. Subflow has become a legal rather than a scientific term. Subflow is not a hydrologically valid scientific term. *In re Gen. Adjudication of All Rights to Use Water in Gila River Sys. & Source (Gila IV)*, 198 Ariz. 330, 334, ¶ 1, 9 P.3d 1069, 1073 (2000). It does not describe a scientifically recognized water classification. Instead, the concept of subflow acts essentially as a legal concept because it assigns the legal rights that govern appropriable water to percolating groundwater that meets a set of criteria established by the Court. As a result, the concept of subflow creates an exception within the general construct of Arizona water law.

In Arizona, different rules apply to a person’s rights to use groundwater<sup>1</sup> and surface water and a person’s ability to protect and enforce those rights. Under the common law, a landowner is permitted to pump groundwater necessary for the reasonable use of the land. *Davis v. Agua Sierra Res., L.L.C.*, 220 Ariz. 108, 110, ¶ 11, 203 P.3d 506, 508 (2009). Common law rights to use groundwater provide the landowner with only a limited ability to protect the groundwater on which the landowner relies from the actions

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<sup>1</sup> As used here, the term refers to “percolating groundwater” which is groundwater not included within the statutory definition of “appropriable water” in A.R.S. §45-141. Under common law, “underground water is presumed percolating water, i.e., independent of surface water.” *Gila IV*, 198 Ariz. at 335, ¶ 6, 9 P.3d at 1074 (2000); *Neal v. Hunt*, 112 Ariz. 307, 312, 541 P.2d 559, 564 (1975); *United States v. Smith*, 625 F.2d 278, 280 (9th Cir. 1980).

of another that reduce the available water supply. See, e.g., *Brady v. Abbott Labs.*, 433 F.3d 679, 683 (9th Cir. 2005);<sup>2</sup> *Maricopa County Mun. Water Conserv. Dist. No. 1 v. Southwest Cotton Co. (Southwest Cotton)*, 39 Ariz. 65, 96, 4 P.2d 369, 380 (1931).

In contrast, the doctrine of prior appropriation, which Arizona has adopted by statute, protects the rights obtained by senior users of surface water against the actions of users with junior rights or no rights to appropriable water. See *Pima Farms Co. v. Proctor*, 30 Ariz. 96, 106, 245 P. 369, 372–73 (1926) (The holder of rights to water “from a running stream is entitled to have it flow down the natural channel to his point of diversion undiminished in quantity and quality or, if diverted from the natural channel by other appropriators for their convenience, to have it delivered to him at available points by other means provided by subsequent appropriators and at their expense.”) Rights accorded to the use of appropriable water, however, do not extend beyond surface water and “permit surface appropriators to protect their source of surface waters from depletion by groundwater pumping.” *In re Gen. Adjudication of All Rights to Use Water in Gila River Sys. & Source (Gila III)*, 195 Ariz. 411, 421, ¶ 34, 989 P.2d 739, 749 (1999). The notion of subflow creates an exception to the parallel operation of these two legal regimes. *Id.* It causes the rules applicable to the protection and enforcement of surface water rights to be applied to a limited amount of groundwater as that term is defined by hydrologists.<sup>3</sup>

The genesis of subflow in Arizona law is the Arizona Supreme Court’s decision in *Southwest Cotton*. In that case, the owner of a well field moved to enjoin an upstream user from damming a river to prevent the loss of a water source to the downstream well field needed to irrigate crops. The boundaries of the subflow exception created by the

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<sup>2</sup> In *Brady*, a farmer sought to recover damages from a neighboring landowner for the loss of his pecan orchard. The neighboring landowner, Abbott Laboratories, had pumped groundwater from its land until it exhausted a perched aquifer that had supported the trees on the Bradys’ pecan farm. The Court held “because we conclude that Abbott’s de-watering activity was protected by the common law doctrine of reasonable use, the Bradys’ negligence and nuisance claims must fail.” 433 F.3d at 683. The Court recently confirmed the limited protection afforded by common law groundwater rights against interference by another user. *Silver v. Pueblo del Sol Water Co.*, 244 Ariz. 553, 557, ¶¶10-11, 423 P.3d 348, 352 (2018) (“The doctrine of reasonable use ... relieves the landowner from the liability for a resulting diminution of another landowner’s water supply.”)

<sup>3</sup> “Groundwater, or subsurface water, is a term used to denote all the waters found beneath the surface of the ground. However, the groundwater hydrologist is primarily concerned with the water contained in the zone of saturation . . . , and uses the term *groundwater* to denote water in this zone.” Jacob Bear, *Hydraulics of Groundwater* 19 (2007). “Ground water is water under positive (i.e., greater than atmospheric) pressure in the saturated zone of earth materials.” S. Lawrence Dingman, *Physical Hydrology* 325 (2002). “The term *groundwater* is usually reserved for the subsurface water that occurs beneath the water table in soils and geological formations that are fully saturated.” R. Allan Freeze & John A. Cherry, *Groundwater* 2 (1979).

Court should be examined within the context of this decision. *In re Gen. Adjudication of All Rights to Use Water in Gila River Sys. & Source (Gila II)*, 175 Ariz. 382, 389, 857 P.2d 1236, 1243 (1993). In *Southwest Cotton*, the well owner claimed appropriable water rights senior to those of the upstream user. As a part of its demarcation of a well owner's rights to protect the flow of water to its wells, the Court incorporated the concept of subflow into Arizona water law. It held that if well owners pump subflow and apply the water "to a beneficial use, and have not since forfeited or abandoned such use in whole or in part, they are entitled to have any rights so acquired protected" as appropriable water. *Southwest Cotton* at 65, 4 P.2d at 382. Thus, the *Southwest Cotton* Court intended that the concept of subflow would provide well owners who pumped a very limited category of groundwater with the opportunity to acquire the same rights available to users of surface water to enable the groundwater users to protect their continued use of that groundwater classified as subflow against the actions of junior surface water users.<sup>4</sup>

In *Gila IV*, the Court approached the concept of subflow from a different angle. It described the concept of subflow as a source of protection for the holders of "appropriable surface water rights against interference caused by the pumping of groundwater." *Gila IV*, 198 Ariz. at 334, ¶5, 9 P.3d at 1073. This observation is one of the logical consequences of the reclassification of groundwater as subflow because a senior right holder could enforce its appropriable water rights against a well owner pumping the reclassified water if the well owner had junior rights or no water rights. The decisions issued by the Arizona Supreme Court in which it has adopted, developed, and refined the concept of subflow within the confines of the bifurcated water laws necessitate the development of a subflow depletion test for the purpose of identifying and quantifying the groundwater that constitutes subflow where the well is not directly located within a subflow zone but has a cone of depression that has expanded into the subflow zone.

The legal posture of this proceeding must also be considered in defining the purposes for which the model must be developed. This proceeding is part of the General Stream Adjudication authorized by the legislature to judicially determine the rights of all persons to use appropriable water under state law and all water subject to claims based on federal law and enforce those rights. A.R.S. §§ 45-242(A) and 45-251(A). Among the parties identifying a purpose for the test, there is no dispute that the enforcement of appropriable water rights is one of the purposes of the subflow depletion analysis. It is not equally clear that there is a recognition that the adjudication of water rights claimed by a well owner is also one of the purposes of the subflow depletion analysis.

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<sup>4</sup> The Arizona Department of Water Resources included the general fact pattern from *Southwest Cotton* in its Report identifying the "Potential Administrative Conflicts Between Water Rights". Report at 8.

Under the controlling statutes, the Court must adjudicate claims for water rights under state law in the San Pedro Watershed filed pursuant to A.R.S. §45-254 by owners of wells located outside the subflow zone. These claims exist. In one case, for example, a landowner filed a Statement of Claimant for a water right with a 1930 priority date, a specific quantity, a place of use, and listed a well outside the boundaries of the subflow zone as the source of water. Arizona Department of Water Resources investigated this claim and filed a watershed file report that assigned a potential water right to the claimed use with the well as the source of water. Due to the location of the well, there is a factual question about whether the well is pumping appropriable water through its cone of depression. Obviously, if the well is only pumping percolating groundwater, no appropriable water rights can be decreed.

This question, which will arise in similar cases where landowners seek appropriate water rights for wells located outside the boundaries of the subflow zone, requires technical expertise. The Court or special master must request the technical assistance from ADWR to “[i]nvestigate or examine the facts pertaining to the claim or claims asserted by each claimant.” A.R.S. §45-256(A)(4); *see also Gila II*, 175 Ariz. at 386, 857 P.2d at 1240. Consistently with the statute, the Court approved the trial Court’s determination that ADWR must develop a test that is “realistically adaptable to the field” using “whatever method is the least expensive and delay-causing” to separately evaluate whether a well is pumping water through its cone of depression with a high degree of reliability. *Gila IV*, 198 Ariz. at 358, ¶39, 9 P. 3d at 1082. To date, contested cases involving the claims for water rights made by owners of wells located outside the subflow zone in the San Pedro Watershed have either not been initiated or have been stayed in whole or in part pending the development of an approved subflow depletion test.

Thus, a review of the common law of subflow and the statutory directives of the General Stream Adjudication supports the conclusion that the subflow depletion test, which will identify and quantify groundwater that constitutes subflow, is being developed for the following purposes:

- i. To adjudicate claims for appropriable water filed by owners of wells located outside the subflow zone and investigated by ADWR; and,
- ii. To enforce decreed appropriable water rights among parties using appropriable water.

The San Carlos Apache Tribe and the Gila River Indian Community argue that the purpose of the model is to protect senior appropriable surface water rights and therefore the test should include the depletion of streamflow caused by a well’s pumping of water flowing from or to the well because “pumping groundwater in a watershed depletes

streamflow.” Gila River Indian Community’s Brief on Issues Raised in August 5, Minute Entry, filed October 25, 2019 at 11. The analysis proposed by these parties is essentially a test to determine “capture”. Capture is a well-established hydrological term that describes pumping-induced changes in discharge from the aquifer and increases in recharge to the aquifer caused by a well whose cone of depression reaches a river or lake and causes water from the lake or river to flow into the aquifer. More specifically, capture occurs as the extraction of water from a well propagates to surface waters hydrologically connected to groundwater and changes gradients and groundwater flows to and from the surface water areas.

While it is undisputed that a well can impact surface waters hydrologically connected to groundwater pumped by that well, the purpose of the model is not to conduct a scientific study to ascertain the impact of a well on the surrounding aquifer and surface streams. Similarly, the purpose of the model is not to reclassify percolating groundwater as subflow beyond the limitations imposed by the Arizona Supreme Court. The development of the subflow depletion cannot be used as vehicle to change Arizona’s bifurcated water law into a unified system. This proceeding is bound by the decisions set down by the Court and the development of the subflow depletion test must be consistent with those decisions.

Having defined the purposes of the model, the next step is to determine the components of the model to accomplish the purposes that are consistent with the Court’s decisions. The Court has consistently emphasized that the concept of subflow must be narrowly construed; the exception created for subflow is not a broad exception. *Gila II*, 175 Ariz. at 389, 857 P.2d at 1243; *see also Gila IV*, 198 Ariz. at 341, ¶32, 9 P.3d at 1080. The Court limited the groundwater that could be classified as subflow by describing it as “those waters which slowly find their way through the sand and gravel constituting the bed of the stream, or the land under or immediately adjacent to the stream, and are themselves a part of the surface stream.” *Southwest Cotton*, 39 Ariz. at 96, 4 P. 2d at 380. In its subsequent decisions, the Court continues to tightly restrict the category of groundwater that qualifies as subflow by describing the characteristics of subflow and excluding categories of groundwater to insure that subflow only includes groundwater “that is more closely associated with the stream than with the surrounding alluvium.” *Gila II*, 175 Ariz. at 392, 857 P.2d at 1246; *see also Gila IV*, 198 Ariz. at 356, ¶30, 9 P.3d at 1080. Subflow is not groundwater flowing to or from the stream; it must be generally flowing in the same direction as the stream. *Gila II*, 175 Ariz. at 392, 857 P.2d at 1246. Subflow is not water pumped from underground tributary aquifers. *Gila IV*, 198 Ariz. at 336, ¶ 10, 9 P.3d at 1075. A tributary aquifer is “an aquifer having a direct hydraulic connection with a stream or with another aquifer that has such a connection.” *Gila II*, 175 Ariz. at 389 n. 7, 857 P.2d at 1243 n. 7.

The Court's intent to narrowly construe the concept of subflow can also be seen in its consideration of tests used to identify those wells that pump subflow, in whole or in part. The *Southwest Cotton* Court formulated the first test as whether wells pumping "from them will appreciably deplete the water of the surface stream." 39 Ariz. at 101, 4 P.2d at 382. Based on this language a test, known as the 50%/90 test, was formulated to measure the impact of a well's pumping on the streamflow. The test compared the reduction in streamflow with well production assuming continuous pumping over 90 days. When the test showed that a well depleted a stream by an amount equal to or more than 50% or more of the volume of the water pumped from the well over 90 continuous days<sup>5</sup>, the trial Court concluded that the well pumped subflow. Among the reasons that the *Gila II* Court rejected this test was because it exclusively measured the impact of the pumping and did not evaluate the nature of the water pumped. *Gila II*, 175 Ariz. at 392, 857 P. 2d at 1246. In *Gila II*, the Court provided a host of characteristics to be considered such as elevation, gradient, flow direction, and chemical composition. *Id.* When the *Gila IV* Court ultimately approved the subflow test developed by ADWR it noted with approval that the test did not "include tributary aquifers in its definition of subflow." 198 Ariz. at 341, ¶32, 9 P. 2d at 1080.

In this proceeding, the required analysis must move beyond the physical location of the well used by the approved subflow test to the cone of depression created by the well. As articulated in *Gila IV*, an acceptable test must reliably answer two questions to determine whether the pumped groundwater should be reclassified as appropriable water:

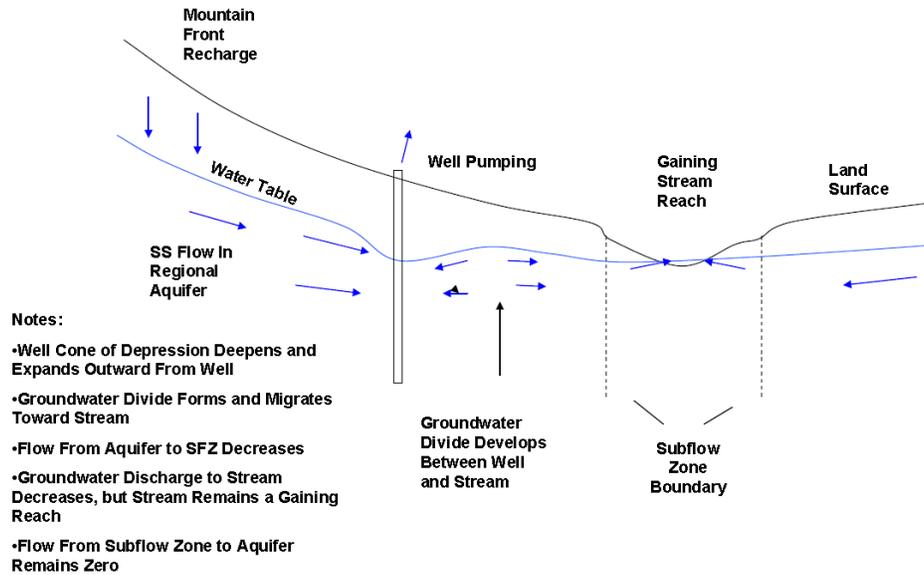
- i. Has the cone of depression of a well located outside the limits of the saturated floodplain alluvium expanded into the subflow zone?
- ii. If yes, will continual pumping of the subflow by virtue of that cone of depression affect the quantity of the stream?

*Gila IV*, 198 Ariz. at 343, ¶40, 9 P.3d at 1082.

The Report prepared by ADWR contains both a discussion and an illustration of the development of a cone of depression in a regional aquifer that directly addresses the first question. As shown in *figure IB* prepared by ADWR, and replicated below, a well's cone of depression can impact the flow of water from the aquifer to the stream without causing any flow to occur from the subflow zone to the regional aquifer. In the situation illustrated by ADWR, using the terms of the Court, the well is pumping tributary

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<sup>5</sup> For example, when a well owner extracted 100 acre feet of groundwater and depleted stream flow by 51 acre feet in a 90-day time period the subflow classification would attach. *Gila II*, 175 Ariz. at 392, 857 P.2d at 1246.



**Figure 1B** Conceptual Model of Early Stage Groundwater Development and Transient Flow to a “Gaining” Stream Reach

groundwater “which is not part of the surface stream and may not be considered subflow.” *Gila IV*, 198 Ariz. at 336, ¶10, 9 P. 3d at 1075. The well’s cone of depression has not expanded into the subflow zone and no appropriable water is being pumped from the well illustrated in Figure 1B. A subflow depletion test that includes the depletion of flow to the stream and causes the model to generate the result that the well is pumping subflow and is therefore pumping appropriable water would support a reclassification of percolating groundwater contrary to the Court’s decision that tributary groundwater is not subflow. Accordingly, the depletion analysis should not include reduction in flow to the subflow zone. The depletion analysis should be based solely on reduction in flow from the subflow zone.

**Issue No. 2. What is the legal definition of the vertical extent of the subflow zone?**

The question, phrased as a legal issue, presumably arises from Critical Finding #1 included in ADWR’s Initial Subflow Depletion Test Report dated December 2018 (“Report”). Based on its preliminary analysis, ADWR stated that its model showed that despite transient pumping by a test well located outside the lateral boundaries of the subflow zone during the period 1986 to 2102, overall the water flow from the subflow zone into the aquifer remained relatively constant. Report at 14. In other words, under its current configuration ADWR’s subflow depletion model of transient pumping demonstrated that test wells did not deplete flow from the subflow zone during the chosen

transient period. The Department offered two explanations for this result. One explanation was that water in the “deepest portion of the model (Layer 5) flowed from west to east under the river then turned north and entered the river further downstream. The water leaving the subflow zone was balanced by the water returning to the subflow zone further downstream and remained relatively constant over time.” *Id.*

The United States questions the need for a determination of Issue No. 2, stating that it “cannot hypostasize, what, if anything, such a definition should be.” U.S. Response at 9. The need to define the vertical extent of the subflow zone for purposes of a subflow depletion test arises because the decisions made about modelling water flows at the bottom of the aquifer provide one explanation for the results of the model. Thus, Issue No. 2 is important because it concerns a decision made by the modelers that could have a material impact on the results of a subflow depletion test and, therefore, on the determination about whether a particular well is pumping appropriable water.

Salt River Project suggests that for purposes of subflow depletion test, ADWR should be instructed that the bottom of the subflow zone exists where the floodplain alluvium meets the basin fill. The State Law Parties agree that a bottom other than bedrock should be used in the model but disputes the geological choice made by Salt River Project. Pueblo del Sol and Sierra Vista also agrees with SRP that a bottom should be set but argues that a bottom to the subflow zone should be set at the bottom of the saturated portion of the floodplain Holocene alluvium.

Given the importance of ADWR’s using appropriate criteria to determine whether a well located outside the subflow zone is pumping appropriable water and the technical nature of the question, the better approach is not to decide this issue as a matter of law but to set this issue for an evidentiary hearing. Arizona Department of Water Resources has scheduled a meeting among the parties and experts for March 23, 2020. It shall include in its Meeting Report a proposed schedule for discovery and hearing on the appropriate location that should be used in the Modflow model to designate the bottom of the subflow zone to be applied solely in the Subflow Depletion Model.

**Issue No. 3. What is the time component to be used in subflow depletion analysis? If the proposed time component will not determine the subflow depletion that has occurred or is occurring at the time of the test, what is the projection period and what is the purpose of determine future depletion that is not otherwise accomplished by the application of the cone of depression test?**

The appropriate time component of the test used to adjudicate a claim for an appropriable right is the past and current pumping to ascertain that groundwater, if any, that will be classified as appropriable water. To the extent that appropriable water rights

can be established for the subflow pumped by the well, those rights will be included in the decree.

The question posed also raises the possibility of calculating future depletions and raises two issues. The first issue concerns the perceived redundancy of the cone of depression test and the subflow depletion test. The cone of depression test is a procedural test to establish the court's jurisdiction over a well for the substantive purpose of determining whether the well is producing appropriable water. The cone of depression broadly defines the jurisdiction of this court to include a well if its hypothetical maximum cone of depression will expand into the subflow zone and deplete the subflow regardless of whether the well is actually withdrawing appropriative water or will withdraw appropriative water before its cone of depression attains its maximum size. In contrast, the subflow depletion test is a substantive test that will determine whether a well is or is not pumping subflow and is or is not eligible for appropriative water rights. A jurisdictional test is not synonymous with a substantive test.

The second issue concerns the use of the future projections. Salt River Project proposes that the model generate subflow depletion projections for a reasonable time period between twenty and one hundred years to provide an accurate depiction of the expected depletions and to produce a decree that can be administered and enforced. The San Carlos Apache Tribe opposes the imposition of any time limit on future projections presumably because it seeks to use the model to ascertain the full potential of the depletion that could occur as a result of the pumping. Pueblo del Sol Water Company and the City of Sierra Vista generally oppose any future projections although it does state that a 5- to 10-year future projection may be useful in the administration of the General Stream Adjudication. The State Law Parties also generally oppose any future projections, but observe that there may be circumstances where ADWR would benefit from the use of a projection period for purposes of scheduling subflow depletion tests.

While planning for future developments is crucial to the efficient and continued progress of this adjudication, there is simply not sufficient information to determine how the future projections would be used in the decree or post-decree for the administration of the decree. As stated by Pueblo del Sol and the City of Sierra Vista, it is normally improper to attach appropriable water rights to future quantities of water that may be put to beneficial use. If ADWR were to determine that a projection period would benefit its administration of the decree, it should not be difficult for ADWR to add a time step component into the model. Thus, based on the record at this time, the appropriate time component to be used in subflow depletion analysis is past and present pumping.

As this proceeding moves forward and the parties meet and have the opportunity to evaluate SRP's Demonstration Project, this issue may be subject to re-evaluation by the filing of a motion. Similarly, if ADWR determines that it would benefit from the

inclusion of forward projections in the administration of the decree and it also determines that the model must be constructed so that it has a current capability to make those forward projections, ADWR is expected to bring this matter to the attention of the court at a status conference so that the issue can be discussed and sufficiently defined for the parties to respond.

**Issue No. 4. For purposes of modeling subflow depletion to determine whether a well is depleting the subflow zone, should the amount of water pumped equal the amount actually pumped or should it equal the amount reported, if any, in a watershed file report or well report prepared by ADWR?**

The subflow depletion test will be used to separately evaluate each well located outside the subflow zone for which an owner has filed a Statement of Claimant to determine whether the well is pumping subflow for the purpose of adjudicating any claimed rights to appropriable water and eventually to enforce appropriative rights. *See Gila IV*, 198 Ariz. at 343, ¶39, 9 P.3d at 1082. Thus, the amount of water pumped must be factually accurate given that the test must depict a well's cone of depression with sufficient accuracy and reliability to demonstrate that a well is currently pumping subflow and not the presumed percolating groundwater. *Gila II*, 175 Ariz. at 392, 857 P. 2d at 1246.

Arizona Department of Resources should use its technical expertise to calculate the past and present pumping volume from the well. The information from the San Pedro Hydrographic Survey Report, dated November 21, 1991 (San Pedro HSR) may be one source of information, but it should not be the only source of information. It appears from the descriptions of the methodology used in the San Pedro HSR that quantities listed for potential water rights may in some cases be based on factors other than a determination of actual use. For example, ADWR based the apparent annual volumes for irrigation use in its Zone 2 Reports on a regional quantification methodology based on farming practices in the area. Vol. 7 San Pedro HSR at 19-20. Amounts attributed to stock ponds and reservoirs were based on the maximum volume of the structures. *Id.* The maximum annual quantity from historical water use records served as the proxy for municipal, commercial, industrial and mining uses. *Id.*

The Gila River Indian Community argued for the inclusion of an important caveat when a well owner makes a claim for an appropriable water right that is greater than the amount determined by ADWR. Thus, for purposes of modeling subflow depletion to determine whether a well is depleting the subflow zone, the amount of water pumped should equal the amount that ADWR determines, using its technical expertise, is the actual past and present pumping volume from the well. As part of its evaluation of the actual

amount pumped, ADWR may consider information included in a watershed file report or well report prepared by ADWR. If, however, the owner of a well seeks appropriable water rights for a quantity greater than the amount determined by ADWR, then the model should be run using the amount for which the Claimant intends to establish an appropriable right.

A status conference shall be scheduled in this matter upon receipt of the Meeting Report from ADWR following the March 23, 2020 meeting.