SUPERIOR COURT OF ARIZONA
MARICOPA COUNTY

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FORM V000

HONORABLE EDDWARD BALLINGER, JR. M. Wetherell
Deputy

W-1, W-2, W-3, W-4(Consolidated)
Contested Case No. W1-103

FILED: **September 28, 2005**

In Re the General Adjudication
of All Rights to Use Water in
The Gila River System and Source

In Re Subflow Technical Report,
San Pedro River Watershed

Order Re: Report of the Special Master on the Arizona Department of Water Resources' Subflow Technical Report, San Pedro River Watershed and Motion for Approval of Report

Procedural Background

In 2001, this Court requested that the Arizona Department of Water Resources ("ADWR" or the "Department") file a report describing how it proposed to determine the extent of stream subflow for purposes of setting the jurisdictional limits of this adjudication. On January 8, 2002, a hearing was held to consider ADWR's "Report Concerning Implementation of the Arizona Supreme Court's Decision on Subflow." On January 22, 2002, the Court directed the Department to prepare more specific and detailed recommendations addressing the following issues arising in the San Pedro River Watershed:

1. A proposal for determining the subflow zone including more than just consideration of the saturated lateral extent of the Holocene alluvium.

2. A test for determining if a well's cone of depression is withdrawing appropriable subflow.

3. A set of rational guidelines for determining whether a given well, though pumping subflow, has a *de minimis* effect on the river system.

4. A method for including both perennial and intermittent streams as part of the subflow analysis, including streams that were historically perennial or intermittent, but are now ephemeral due to development and other human actions.

5. A timeline for completing the tasks outlined in its report.[1]

ADWR's second subflow report was filed on March 29, 2002 (the "Subflow Report"). It specifically addressed each of the requests identified in the January 22, 2002, order. Various parties filed comments and objections to the report, some of which were supported by expert declarations. The Court referred consideration of Subflow Report issues to the Special Master with direction to consider the comments and objections, hold any necessary hearings, and make recommendations as to whether the report should be adopted or modified.[2]

After supervising discovery among the parties, considering expert declarations, and resolving a number of pre-hearing issues, the Special Master held a two-day evidentiary hearing at which the parties and their experts presented their positions on

[1] Minute Entry ("M. E.") (Jan. 22, 2002).
[2] Order (Feb. 21, 2003).

the procedures proposed in the Subflow Report. Following post-hearing briefing and supplemental oral argument, the Special Master filed his "Report of the Special Master on the Arizona Department of Water Resources' Subflow Technical Report, San Pedro River Watershed; Motion for Approval of Report; and Notice of Subsequent Proceedings" (the "Special Master's Report"), which thoroughly evaluated the Subflow Report, summarized the parties' positions, and set forth the Special Master's recommendations. The Court received additional comments and objections to the report and held a hearing on July 13, 2005, to consider whether it should adopt the Special Master's recommendations and approve or modify the Subflow Report.

The Subflow Zone

This adjudication is charged with determining the rights of all persons to use the waters of the Gila River system and its sources pursuant to A.R.S. § 45-251 *et seq*. This task is complicated by Arizona's bifurcated system of water rights management. While all surface water is subject to this Court's jurisdiction, for decades Arizona courts have protected the rights of groundwater users by holding that surface water appropriation cannot extend to percolating subterranean water. *Maricopa County Mun. Water Conservation Dist. No. 1 v. Southwest*

Cotton Co., 39 Ariz. 65, 4 P.2d 369 (1931), *modified and reh'g. denied*, 39 Ariz. 367, 7 P.2d 254 (1932) ("*Southwest Cotton*").[3]

If setting jurisdictional limits were as simple as declaring that surface water is appropriable while water found underground is not, the adjudication would be much nearer to completing it initial tasks of identifying and prioritizing appropriable water rights. But, although underground water is generally not part of this adjudication, it becomes appropriable if it can be characterized as subflow of a stream. Our Supreme Court has declared that subflow consists of "those waters which slowly find their way through the sand and gravel constituting the bed of the stream, or the lands under or immediately adjacent to the stream, and are themselves a part of the surface stream."[4]

As to how water is to be characterized as subflow, in *Gila II* the Arizona Supreme Court quoted with approval the test first announced in *Southwest Cotton*:

> The best test which can be applied to determine whether underground waters are as a matter of fact and

[3] In lieu of appropriative rights, groundwater users are permitted to withdraw water underlying their land subject only to the doctrine of reasonable use and federal reserved water rights. *In re the General Adjudication of All Rights to Use Water in the Gila River System and Source*, 175 Ariz. 382, 857 P.2d 1236 (1993) (*"Gila II")*; *In re the General Adjudication of All Rights to Use Water in the Gila River System and Source*, 195 Ariz. 411, 989 P.2d. 739 (1999) (*"Gila III"*).

4 *Southwest Cotton,* 39 Ariz. at 96, 4 P.2d at 380. The *Southwest Cotton* court explained that subflow "[i]n almost all cases ... is found within, or immediately adjacent to, the bed of the surface stream.... [and] physically ... constitute[s] a part of the subsurface stream itself, and [is] simply incidental thereto.... It is subject to the same rules of appropriation as the surface stream itself"." *Gila II*, 175 Ariz. at 387, 857 P.2d at 1241 (quoting *Southwest Cotton,* 39 Ariz. at 96-97, 4 P.2d at 380-81).

> law part of the surface stream is that *there cannot be any abstraction of the water of the underflow without abstracting a corresponding amount from the surface stream*, for the reason that the water from the surface stream must necessarily fill the loose, porous material of its bed to the point of complete saturation before there can be any surface flow. (Emphasis in *Gila II*.)
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> . . . .
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> Not only does [subflow] move along the course of the river, but it percolates from its banks from side to side, and the more abundant the surface water the further will it reach in its percolations on each side. But, considered as strictly a part of the stream, the test is always the same: *Does drawing off the subsurface water tend to diminish appreciably and directly the flow of the surface stream?* If it does, it is subflow, and subject to the same rules of appropriation as the surface stream itself; if it does not, then, although it may originally come from the waters of such stream, it is not, strictly speaking, a part thereof, but is subject to the rules applying to percolating waters.[5] (Emphasis in *Southwest Cotton*.)

In 1987, the judge then assigned to this adjudication, the Honorable Stanley Z. Goodfarb (Retired), issued his first ruling as to which underground waters were to be considered appropriable subflow. The trial judge attempted to craft a practical subflow definition. He held extensive evidentiary hearings that included testimony from hydrologists and

[5] *Gila II*, 175 Ariz. at 388, 857 P.2d at 1242 (quoting *Southwest Cotton*, 39 Ariz. at 96-97, 4 P.2d. at 380-81).

hydrological engineers. He solicited memoranda of law from interested parties and utilized the services of the Department to arrive at a definition he believed would permit the adjudication to move forward. Because a number of parties objected to Judge Goodfarb's subflow determination, the Supreme Court accepted an interlocutory appeal of his order due to "the need to resolve the [subflow] question early in the proceeding."[6]

The Arizona Supreme Court rejected Judge Goodfarb's initial subflow definition and remanded consideration of the issue. It also provided guidance as to how the trial court should undertake to revise its subflow definition by setting forth specific criteria to be used in making this determination:

> Whether a well is pumping subflow does not turn on whether it depletes a stream by some particular amount in a given period of time…. [I]t turns on whether the well is pumping water that is more closely associated with the stream than with the surrounding alluvium…. [C]omparison of such characteristics as elevation, gradient, and perhaps chemical makeup can be made. Flow direction can be an indicator. If the water flows in the same general direction as the stream, it is more likely related to the stream. On the other hand, if it flows toward or away from the stream, it likely is related to the surrounding alluvium.[7]

[6] *Id*. at 386, 1244.

[7] *Id.* at 392, 1246. The specific factors listed in *Gila II* to determine whether water flows constitute subflow are referred hereinafter as the "*Gila II* Criteria".

Upon remand, Judge Goodfarb proceeded to hold additional hearings. He, along with party representatives and experts, traveled within the San Pedro River Watershed to learn about the area's hydrology and geology. After considering additional evidence relating to the relationship of groundwater to surface water, he issued a comprehensive order redefining "subflow."[8] Objections followed, causing the Arizona Supreme Court to expedite consideration of "whether, after remand in ***Gila River II***, the trial court properly determined what underground water constitutes 'subflow' of a surface stream, thus making it appropriable under A.R.S. § 45-141(A)."[9]

In ***Gila IV***, the Supreme Court approved Judge Goodfarb's second iteration of a subflow description. Twelve years after the Supreme Court's attempt "to resolve the question early," the adjudication court finds itself conducting hearings and considering arguments directed to the question of what is a fair and practical definition of subflow that will permit the Court to define its jurisdictional limits and fairly protect the rights of both surface and groundwater users.

The Subflow Report recommends adopting a number of procedures and assumptions in connection with mapping the subflow zone. Three questions related to these proposals have sparked the most controversy:

[8] June 30, 1994, Order (the "Goodfarb Order").
[9] *Gila IV,* 198 Ariz. at 333, 9 P.3d at 1072.

- Whether the Court should declare the entire saturated floodplain Holocene alluvium as comprising the limits of the subflow zone without further reference to the criteria announced in ***Gila II***.[10]
- Should the Court assume, for jurisdictional purposes, that the entire floodplain Holocene alluvium is saturated?[11]
- Should the Court adopt the Special Master's recommendation that ADWR's subflow analysis be based upon predevelopment stream flow conditions?

1. Extent of the Subflow Zone

Those objecting to the first recommendation - that the Court find that the saturated floodplain Holocene alluvium is the subflow zone - argue that this proposal permits ADWR to ignore the ***Gila II*** Criteria approved by the Arizona Supreme Court.[12] They rely primarily on two related arguments to support this objection. First, they point to specific language in ***Gila IV*** that purportedly requires continued application of the ***Gila II*** Criteria when mapping subflow limits. They also claim that

[10] ADWR answered this question affirmatively:

> Upon remand from the Arizona Supreme Court, the trial court engaged in a lengthy hearing process, involving expert testimony on complex hydrogeologic principles, that culminated in a 66-page detailed order with 36 additional pages of exhibits. [citing *Gila IV*] The trial court applied the criteria described in *Gila II* and concluded that the saturated floodplain Holocene alluvium was the 'most credible' subflow zone....

Subflow Report at 2.

[11] ADWR urges adoption of this assumption. *Id*. at 17. ("The Department ... recommends that the entire lateral extent of the floodplain Holocene alluvium be assumed to be saturated for the purpose of delineating the jurisdictional subflow zone.").

[12] *See, e.g.*, Arizona Public Service Company's and Phelps Dodge Corporation's Objections to the Special Master's Report on ADWR's Subflow Technical Report, San Pedro River Watershed (Oct. 1, 2004) ("APS/PD Objection") at 7.

the ***Gila IV*** court did not intend to uphold a trial court ruling that the saturated floodplain Holocene alluvium constitutes the subflow zone. Instead, the Supreme Court simply held that this area comprised the outer limits within which the subflow zone exists. Within this announced area, ADWR is required to apply the ***Gila II*** Criteria to ascertain the subflow zone.[13] These objectors believe that the ***Gila IV*** decision requires ADWR to begin anew and undertake an extensive review of data that might prove relevant in mapping the subflow zone within the San Pedro River Watershed.[14]

As to the latter argument, the question is: In ***Gila IV***, did the Arizona Supreme Court merely direct ADWR as to how and where to commence its inquiry regarding the extent of subflow within the San Pedro River Watershed? Or did the court adopt a standard permitting ADWR to map this Court's jurisdictional limits in an expeditious manner? The Special Master found that "the criteria specified in ***Gila IV*** to delineate the subflow zone have already been taken into account in the Supreme Court's holding that the

[13] *Id*. at 8. ("The fact that the [Arizona Supreme Court] quoted and approved the [*Gila II* Subflow Criteria] does not ... support a conclusion that ADWR need not apply the criteria when it delineates the subflow zone. To the contrary, the Court's approval of the criteria makes them binding on ADWR. These criteria *define* the subflow zone, and they *must* be used by ADWR to identify its boundaries.") (Emphasis in original.)

[14] *Id*. at 10. ("ADWR should be instructed to obtain accurate and reliable data for purposes of identifying the subflow zone in *all circumstances*.") (Emphasis in original.)

saturated floodplain Holocene alluvium is the subflow zone."[15] This Court agrees with this conclusion.

The *Gila IV* opinion explicitly recognizes that the trial court considered and applied each of the *Gila II* Criteria in connection with defining how the concept of subflow should be used to set jurisdictional limits:

> [T]he record reflects that the court based its ruling on evaluation of the pertinent factors set forth in *Gila River II* for delineating the subflow zone. For example, the order states:
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> > After consideration of flow direction, water level elevation, the gradation of water levels over a stream reach, the chemical composition if available, and lack of hydraulic pressure from tributary aquifer and basin fill recharge which is perpendicular to stream and "subflow" direction, the Court finds the most accurate of all the markers is the edge of the saturated floodplain Holocene alluvium.[16]

The Supreme Court noted that, "groundwater users conceded at oral argument, and the record reflects, that sufficient evidence supports the trial court's factual findings, which adopted the saturated floodplain Holocene alluvium as the subflow zone."[17] The objectors cannot overcome the opinion's directive that

[15] Special Master's Report at 42.
[16] *Gila IV*, 198 Ariz. at 337, 9 P.3d at 1076.
[17] *Id*. at 339, 1078. The Court's footnote reference (n.5) approving the factual finding that the saturated floodplain Holocene alluvium is the subflow zone shows that the trial court's subflow zone definition incorporated the *Gila II* Criteria.

"[t]he entire saturated floodplain Holocene alluvium, as found by DWR, will define the subflow zone in any given area."[18] The opinion makes clear that ADWR is not to generally consider again the ***Gila II*** Criteria in an effort to undertake again the work that resulted in the trial court's factual findings. To the contrary, the Supreme Court anticipated that mapping the jurisdictional limits of the subflow zone would be relatively simple:

> The record reflects that the saturated floodplain Holocene alluvium is readily identifiable; that DWR can quickly, accurately, and relatively inexpensively determine the edge of that zone; and that some of the work already has been done.[19]

2. Assuming Floodplain Holocene Alluvium Saturation

In mapping the subflow zone, ADWR proposes to assume that the entire extent of the floodplain Holocene alluvium is

[18] *Id*. at 342, 1081.

[19] *Id*. The objectors claim their position is supported by the fact that in concluding that the subflow zone is comprised of the saturated floodplain Holocene alluvium, the *Gila IV* court also added that ADWR "will determine the specific parameters of that zone in a particular area by evaluating all of the applicable and measurable criteria set forth in the trial court's order and any other relevant factors." *Gila IV,* 198 Ariz. at 344, 9 P.3d at 1083. But *Gila IV* dealt with an order delineating the limits of the subflow zone in the San Pedro River Watershed. The quoted language merely demonstrates the Supreme Court's openness to ADWR considering data, in addition to that found by the trial court, when evaluating other watersheds. *Id*. at 342, 1081. (The entire saturated floodplain Holocene alluvium defines the subflow zone in the San Pedro River Watershed. As to other watersheds, "[i]n the effort to determine [the subflow zone] in other areas, the detailed criteria set forth in the trial court's order, insofar as they apply and are measurable, must be considered, but we do not preclude the consideration of other criteria that are geologically and hydrologically appropriate for the particular location."). As the Special Master's Report recognizes, even within the San Pedro watershed there may be discrete stream segments where ADWR is required to supplement its findings based upon sound and appropriate geological and hydrological principles. Special Master's Report at 42; *see Gila IV,* 198 Ariz. at 342, 9 P.3d at 1081, n.7.

saturated.[20] The Department believes this assumption is required because the two factors determining the extent of saturation - the thickness of the floodplain Holocene alluvium and the depth to the water table beneath the floodplain - are highly variable, both spatially and temporally.[21] Attempts to measure floodplain geology or the depth of the water table at any given point in time are frustrated due to the lack of reliable, contemporaneous data. The Subflow Report states:

> [A]n accurate determination of the saturated portion of the floodplain Holocene alluvium is impractical for three reasons:
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> - Difficulties in defining the thickness of the floodplain Holocene alluvium;
> - The general lack of detailed and long-term water level data from the floodplain; and
> - The dynamic nature of the floodplain aquifer system.
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> The Department, therefore, recommends that the entire lateral extent of the floodplain Holocene alluvium be assumed to be saturated for the purpose of delineating the jurisdictional subflow zone.[22]

Some opposing adoption of the Department's saturation assumption stress that:

1. The floodplain Holocene alluvium is not stable. At numerous times, it is not fully saturated; and

[20] Special Master's Report at 52; Subflow Report at 13 & 17.
[21] Subflow Report at 13.
[22] *Id*. at 16-17.

2. The lack of data regarding the extent of saturation within the floodplain Holocene alluvium does not justify adopting an inaccurate assumption.[23]

The Special Master agrees with the objectors and recommends that the Court not approve and adopt ADWR's saturation assumption recommendation. He concluded that ADWR's recommendation does not comport with the directive in ***Gila IV*** "that any test used for determining the boundaries of a subflow zone be as accurate and reliable as possible."[24] Accuracy is paramount because in ***Gila II***, the Supreme Court held that if ADWR uses an appropriate test to delineate the subflow zone, its determination would constitute clear and convincing evidence that a well within the zone is pumping appropriable water.[25] Because saturation fluctuates within the floodplain Holocene alluvium, the Special Master found ADWR's assumption inconsistent with ***Gila IV***.[26] He concluded that the question of whether a segment of the floodplain Holocene alluvium is saturated is only relevant on the date a well is tested:

> The evidence … shows saturation fluctuates even in predevelopment conditions, and a thin upper portion of the floodplain Holocene alluvium is unsaturated.

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[23] *See* ASARCO Incorporated's and Arizona Water Company's Response to Other Parties' Objections to the Report of the Special Master (Nov. 1, 2004) ("ASARCO's Response") at 5-9.
[24] Special Master's Report at 56 (quoting *Gila IV,* 198 Ariz. at 335, 9 P.3d at 1074).
[25] In *Gila IV,* the Court stated, "it is critical that any test used for determining the boundaries of a subflow zone be as accurate and reliable as possible. Otherwise, use of an inaccurate test to determine whether a well is pumping subflow would not satisfy the clear and convincing evidentiary standard…." *Gila IV,* 198 Ariz. at 335, 9 P.3d at 1074; Special Master's Report at 56, n.130.
[26] Special Master's Report at 57.

> To include a well in the adjudication, it is not enough to determine it is highly probable the entire lateral extent of the floodplain Holocene alluvium was saturated at some point. It must be shown it is highly probable the well is pumping subflow from the saturated floodplain Holocene alluvium. (Emphasis supplied.)[27]

Both at the time the trial court issued the Goodfarb Order declaring the lateral extent of the subflow zone, and later when *Gila IV* affirmed that order, the dynamic nature of river channels and alluvial basins was well known. The Goodfarb Order reflects that the trial court was fully aware of this characteristic when it was considering subflow issues. The order recites examples of flow changes (*e.g.*, stream channel migration and shifting) that caused the trial court to conclude that river channels are not stable.[28] The trial and appellate courts held that, notwithstanding these variables, the floodplain Holocene alluvium "is the only stable geologic unit which is beneath and adjacent to most rivers and streams … [and] in order to fulfill the definition of 'subflow,' the geologic unit must be saturated because of the need for a hydraulic connection between the stream and the 'subflow'."[29]

Gila IV embodies the Supreme Court's decision that the jurisdictional limits of this adjudication extend to the

[27] *Id*.
[28] Goodfarb Order at 40.

[29] Goodfarb Order at 56; *Gila IV*, 198 Ariz. at 337, 9 P.3d at 1076.

floodplain Holocene alluvium determined at a time of saturation. In upholding the trial court's subflow standard, the Supreme Court quoted with approval the finding that:

> The evidence … shows that the only true geologic unit which is beneath and adjacent to the stream is the floodplain Holocene alluvium. When it is saturated, that part of the unit qualifies as the "subflow zone"….[30]

After more than a decade of dispute, study, and argument, the Arizona Supreme Court provided this adjudication with the following practical (at least with respect to the San Pedro River Watershed) jurisdictional boundary: All surface streams, their sources, and the subflow found within the saturated floodplain Holocene alluvium.

The Goodfarb Order's subflow definition strikes an appropriate balance between surface water and groundwater rights by initially setting the parameters of the subflow zone narrowly.[31] It also employs reasonable assumptions based upon reliable data to include water uses within this limited area in the adjudication. To insure that groundwater users are not unfairly included within the adjudication, our courts have rejected attempts to expand the scope of the subflow zone to

[30] *Gila IV*, 198 Ariz. at 337, 9 P.3d at 1076.

[31] In *Gila IV,* the Supreme Court commented on the trial court's compliance with the direction in *Gila II* that the subflow zone be narrowly construed: "contrary to the groundwater users' argument that the trial court's definition of subflow is broader than *Gila River II* and *Southwest Cotton* permit, the record reflects that saturated floodplain Holocene alluvium occupies only very narrow portions of the alluvial basins." *Gila IV*, 198 Ariz. at 342, 9 P.3d at 1081.

include the entire floodplain alluvium underlying surface waterways and have limited the adjudication's jurisdiction to the Holocene alluvium because it constitutes "the only stable geologic unit which is beneath and adjacent to most rivers and streams…."[32]

It is important to note that determination of the subflow zone does not adversely affect substantive rights of surface or groundwater users. It merely sets parameters with respect to the Court's water use inquiry. As some parties have mentioned, "Arizona is currently in the depths of an extended and severe drought. This drought, a natural and recurring event, has undoubtedly had an effect on the saturated extent of the Holocene alluvium."[33] Should the dynamic nature of a river or stream exclude water users from this Court's jurisdiction who would have been subject to having their rights declared when the proceeding was initiated?[34] While the Special Master and the objectors are correct that the Supreme Court has directed that ADWR and this Court insure that determinations are as accurate

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[32] Goodfarb Order at 56; Special Master's Report at 33.

[33] Arizona Public Service Company's and Phelps Dodge Corporation's Response to Objections to the Special Master's Report on ADWR's Subflow Technical Report, San Pedro River Watershed (Nov. 1, 2004) ("APS/PD Response") at 6-7.

[34] The Apache Tribes correctly point out that Arizona's river systems' dynamic nature, coupled with the fact that ADWR must map various subflow zones in phases, dictates that any temporally limited measurement would be arbitrary. Apache Tribes' Response to the Objections of Certain Parties to the Report of the Special Master on Arizona Department of Water Resources' Subflow Technical Report (Nov. 1, 2004) ("Apache Tribes' Response") at 8-9.

as possible, it also has consistently acknowledged that "subflow" is an "artificial and fluid" term that has purely legal, as opposed to scientific or hydrological relevance.[35] The Supreme Court has made clear that the adjudication court is authorized to adopt reasonable assumptions in order to permit the adjudication to fulfill its functions.[36]

ADWR's saturation assumption is reasonable, practical, and consistent with the goal of permitting this adjudication to be completed "within the lifetime[s] of some of those presently working on the case"[37] (or at least their children's). And the Supreme Court's requirement that subflow be narrowly defined, coupled with the specific recognition that even wells pumping *de minimis* amounts of subflow may be excluded from the

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[35] *Gila II,* 175 Ariz. at 392, 857 P.2d at 1246; *Gila IV,* 198 Ariz. at 334, 9 P.3d at 1073.

[36] *Gila IV* explicitly recognized this Court's duty to balance accuracy and expediency in undertaking adjudication tasks when it discussed establishing a test for determining the cone of depression created by withdrawals from a well:

> The [trial] court recognized that each well must be separately evaluated "to compute drawdown at the 'subflow' zone" and that "whatever test ADWR finds is realistically adaptable to the field and whatever method is the least expensive and delay-causing, yet provides a high degree of reliability, should be acceptable."
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> We agree with the trial court.

Gila IV, 198 Ariz. at 343, 9 P.3d at 1082 (quoting Goodfarb Order at 62).

Likewise, in rejecting the argument that even water claims having a *de minimis* effect on stream flow must be subject to the lengthy adjudication process, the Supreme Court noted, "[p]resumably, Congress expected that water rights adjudications would eventually end. It is sensible to interpret the McCarran Amendment as permitting the trial court to adopt reasonable simplifying assumptions to allow us to finish these proceedings within the lifetime of some of those presently working on the case." *Gila II,* 175 Ariz. at 394, 857 P.2d at 1248.

[37] *Gila II*, 175 Ariz. at 394, 857 P.2d at 1248.

adjudication, ensures that groundwater users' rights will be protected.

3. Use of Predevelopment or Current Conditions

Assuming the floodplain Holocene alluvium is saturated requires adopting a standard not entirely tied to current geological and hydrological conditions. The subflow definition incorporating this assumption uses historical data to prevent hydrological conditions during a specific timeframe from having a disproportionate impact on the adjudication's jurisdictional limits.[38] Some claimants urge the Court to expand on this concept when mapping the subflow zone. They believe that it would be unfair for ADWR to undertake an analysis that determines stream flows based solely upon current conditions. These parties argue that utilizing only current conditions runs the risk of "allow[ing] those who are wrongfully and illegally using appropriable water to continue to do so and would make it more likely that the hydrologic connection between the underground

[38]ADWR states:

> Due to variations in the depth of the water table, the portion of the floodplain Holocene alluvium that is saturated changes over time, making the determination of the jurisdictional subflow zone difficult. And these variations are not unique to recent times, but apparently also occurred during predevelopment conditions....
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> . . . .
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> The variety of conditions ... were present ... during both predevelopment and recent times making a determination of the water levels only possible at a particular point in time.

Subflow Report at 15-16.

water and the surface stream is broken."[39] They suggest that using a current conditions methodology will promote disparate treatment between those whose claims are adjudicated earlier vs. later in the adjudication process.[40]

Those objecting to ADWR's use of the alternative to a current conditions methodology - predevelopment stream flow analysis - argue that "predevelopment" is an ambiguous, indeterminate standard, and that there is no accurate, reliable data available to establish appropriate predevelopment conditions.[41] They also point to a portion of the Goodfarb Order's definition of subflow they contend establishes that only current stream flow conditions are relevant.[42]

The Special Master considered whether predevelopment or current conditions data should be used when calculating stream flows. The issue was separately briefed and a provisional ruling issued. After considering additional arguments and evidence, the

[39] Salt River Project's Response to Objections to Special Master's Subflow Report (Nov. 1, 2004) ("SRP's Response") at 14.
[40] *Id*. at 14-15 ("If the [effective] date is when ADWR performs [its subflow] analysis, each pumper would have [a] substantial incentive to make sure that the watershed in which its well is located would be analyzed as close to the end of these proceedings as possible.") Apache Tribes' Response at 9-10 (It would be unjust "for a claimant to be able to 'pump his way out' of ... the jurisdiction of the Court by depleting the subflow zone ... in order to create 'current stream conditions' that are ephemeral").
[41] APS/PD Objections at 12; Objections of ASARCO Incorporated and Arizona Water Company to the Report of the Special Master on the Arizona Department of Water Resource's Subflow Technical Report (Oct. 1, 2004) ("ASARCO's Objections") at 8-11; Bella Vista Water Co., Inc., Pueblo Del Sol Water Co. and City of Sierra Vista Objections to the Report of the Special Master on the Arizona Department of Water Resource's Subflow Technical Report (Oct. 1, 2004) ("Bella Vista's Objections") at 4-6.

[42] *See, e.g.*, APS/PD Objections at 18-19.

Special Master expanded on and modified his original determination.[43] His report lists various timeframes targeting periods beginning as early as 1848 to as late as 1978, which some parties suggested as appropriate predevelopment reference points. The Special Master recognized that any period selected "must consider the feasibility of obtaining the requisite technical data and evidence; potential delay and expense of those efforts and of subsequent investigations; level of accuracy and reliability of the subflow analysis; confidence of meeting the clear and convincing evidentiary standard; and fairness."[44] He found that ADWR has not yet had the opportunity to obtain and review maps, reports, and other documents evidencing predevelopment conditions and, therefore, "[i]t is premature to conclude that ADWR cannot obtain reliable evidence of predevelopment stream flow conditions."[45]

In 2002, this Court stated its belief that a proper analysis of subflow required consideration of stream conditions "prior to widespread diversion and depletion of Arizona's stream

[43] The Special Master's Report discusses the claim that both the adjudication and appellate courts have already ruled that current conditions must be used in making subflow zone determinations. After a thorough review of the relevant history of the adjudication, the Special Master properly rejected the argument that "the trial court ruled, and was affirmed by the Supreme Court, that subflow analysis must consider current and not predevelopment stream flow conditions, entitling the affirmed ruling to *stare decisis*." Special Master's Report at 47.
[44] *Id*. at 51.
[45] *Id*. at 50.

flows."[46] The Special Master's Report correctly recognizes that "widespread diversion" does not refer to every activity occurring within a water system. The predevelopment stream flow conditions ADWR considers in its stream flow analysis should be those existing during an identifiable chronological year or range of years immediately prior to regular, discernable diversion or depletion of stream flows resulting from human activity.

The Court agrees with those suggesting ADWR should take a practical approach and adopt the earliest predevelopment timeframe for which accurate and reliable data is available. The Department may find the appropriate predevelopment period differs even within various watersheds due to the quantity and quality of available data. The Department may use its discretion in excluding from its analysis human generated depletions or diversions it concludes were minimal, localized, or sporadic. This approach will ensure the adjudication adopts a jurisdictional standard that assures surface water users that their rights are not prejudiced by the mere passage of time, while recognizing the legal protections supplied groundwater users.

Objectors arguing that the adopted subflow definition restricts stream flow analysis to current conditions rely on the following two guidelines found in the Goodfarb Order:

[46] M. E. 2, n.1, *supra*.

1. The "subflow" zone must be adjacent and beneath a perennial or intermittent stream.
2. *It may not be adjacent or beneath an ephemeral stream. However, it may be adjacent or beneath an ephemeral section of a perennial or intermittent stream, if the ephemeral section is caused by adjacent surface water diversion or groundwater pumping.* There must, however, be a saturated zone beneath connected to similar zones beneath the upper and lower perennial or intermittent stream sections. (Emphasis supplied.)[47]

Some parties refer to the italicized language above as the "ephemeral stream exception."

Those urging use of current conditions assert that the "ephemeral stream exception language demonstrates that the trial judge intended that the subflow exception be adjudicated under current and not predevelopment conditions because no groundwater pumping or surface water diversion existed" in the predevelopment era.[48] They believe that any proposed definition of "predevelopment" is automatically at odds with the ephemeral stream exception because the diversions and depletions mentioned in the exception could not have occurred in a predevelopment period.[49]

[47] Goodfarb Order at 35.
[48] Cities' [of Chandler, Glendale, Mesa, and Scottsdale] Response to Comments and Objections to Special Master's Subflow Report on the Arizona Department of Water Resources' Subflow Technical Report (Nov. 1, 2004) ("Cities' Response") at 5.

[49] APS/PD Objections at 19.

Although finding that no court has resolved the predevelopment or current conditions dispute, the Special Master found "that in order to give effect to the plain language of the exception, and incorporate it into the subflow analysis, the applicability of the ephemeral stream exception must be determined using post-development conditions."[50] This Court believes that when read in proper context, the ephemeral stream exception supports use of predevelopment conditions to delineate the subflow zone.

At its core, the Goodfarb Order provides that the subflow zone may only be comprised of areas related to perennial and intermittent streams. That is the rule. No ephemeral streams may be included. The exception to this rule arises when evaluating streams that would legitimately be categorized as ephemeral, but only because of the effect of surface water diversions or groundwater pumping. The exception requires, in effect, that these streams be considered in a predevelopment state. That is, if one assumes away the effects of diversions and pumping, would the subject streams share the characteristics of an adjacent intermittent or perennial stream? If the answer is "yes," they can be included within the subflow zone due to their predevelopment attributes. Instead of an admonition to use only current conditions, the ephemeral stream exception is evidence that the Goodfarb Order contemplated that ADWR would outline the

[50] Special Master's Report at 47.

subflow zone without having to be concerned that human generated water diversions or depletions might artificially divest jurisdiction over water right claims this Court is charged with adjudicating.

The remainder of the Special Master's recommendations concerning subflow analysis, namely Recommendation Nos. 1 through 10, 18, and 19, provide guidance as to how ADWR should map the subflow zone and are less controversial than those discussed above. The parties and this Court generally agree that the Department should incorporate the definitions of "perennial, intermittent and ephemeral streams" announced in the Goodfarb Order, consider a wide variety of resources (*e.g.*, historical data, scientific reports, aerial photography, and field studies) when attempting to locate all the streams within a watershed, and take special care to ensure that the mapping methods used are as accurate as possible.[51]

The Cone of Depression Test

In *Gila IV*, the Arizona Supreme Court held that the rights to withdraw water from some wells located outside of the jurisdictional subflow zone are to be adjudicated by this Court. The included wells are those:

[51] *Id*. at 24-39. In approving the Special Master's Report Recommendation No. 6, which provides that "[t]he Court should direct ADWR to exclude from the subflow analysis the ephemeral streams shown in the NRCS soils survey maps," the Court does not intend to modify its ruling as to how ADWR is to apply the ephemeral stream exception when mapping the subflow zone.

> [L]ocated outside the lateral parameters of the defined 'subflow' zone … [whose] 'cones of depression' reach the 'subflow' zone and the drawdown from the well affects the volume of surface and 'subflow' in such an appreciable amount that is capable of measurement…. [A] well may be subject to the adjudication if its 'cone of depression' caused by its pumping has now extended to a point where it reaches an adjacent 'subflow' zone, and by continual pumping will cause a loss of such 'subflow' as to affect the quantity of the stream.[52]

In response to this Court's request, ADWR devised a method for determining whether water pumped from a well located outside the subflow zone creates a cone of depression that intercepts and withdraws subflow. The second series of issues discussed in the Special Master's Report address the recommendations for implementing the Department's proposals for measuring cones of depression created by well pumping.

[52] *Gila IV*, 198 Ariz. 342-43, 9 P.3d 1081-82.

1. Testing Standards and Techniques

ADWR proposes an eleven-step cone of depression test.[53] The Department recommends that determinations should be made on a well-by-well basis, but that some components of its test should be combined to permit more efficient collection of data relating to wells located within a general area. To increase efficiency and reliability, the Department desires to use analytical and numerical models as part of its testing process. The Special Master's Report describes these models as "sets of mathematical flow equations whose solutions yield simulations of the behavior of aquifers in response to stresses."[54] Use of models is intended to provide ADWR with a simplified representation of an aquifer based upon available hydrogeologic information concerning local conditions and aquifer properties. When mapping the subflow zone in an area comprised of simple geology, ADWR proposes to use an

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[53] The Department will:

1. Determine well location, elevation, and distance from jurisdictional subflow zone;
2. Determine pumping history;
3. Determine frequency of pumping;
4. Determine how the well was constructed;
5. Characterize local hydrogeologic conditions;
6. Define local aquifer properties;
7. Construct a conceptual model of the aquifer system;
8. Select a mathematical model;
9. Input data and run a simulation using mathematical model;
10. Analyze model output; and
11. Determine whether a well should be adjudicated.

Subflow Report at 23.

[54] Special Master's Report at 74

analytical computer program to determine a well's cone of depression. When confronted with areas in which an aquifer is more complex, the Department will shift to a numerical model, the use of which is more time consuming and requires supplemental field data for proper calibration.

In order for a well to be included in the adjudication, ADWR suggests that two conditions must be met as of the time of the modeling:

1. The well's "simulated cone of depression has reached the edge of the jurisdictional subflow zone and drawdown at that point is greater than or equal to 0.1 foot;" and

2. The "water level in the well is *below* the water level in the jurisdictional subflow zone during pumping… " (Emphasis in Subflow Report.)[55]

Criticism of the 0.1 foot standard focuses on the claim that ADWR's computer models cannot provide consistently accurate measurements of the extent of drawdown at the edge of the subflow zone.[56] Objectors concede it is possible to obtain accurate water level measurements at 0.1 foot increments, but argue these results cannot be acquired solely by using the

[55] Subflow Report at 31.

[56] One claimant asserts that the Goodfarb Order held that the 0.1 foot criterion couldn't be used. ASARCO's Objections at 13. The Court agrees with the Special Master that the trial court's belief in 1994 that drawdown measurements at 0.1 foot increments would be "difficult" proved to be incorrect and, in any event, does not serve as an impediment to adopting an appropriate method for evaluating a cone of depression. Special Master's Report at 63.

models endorsed by the Department.[57] They claim that absent field test corroboration, ADWR's use of computer modeled simulated water levels will fail to satisfy the requisites for cone of depression measurements announced in *Gila IV*.

The Special Master carefully considered arguments for and against ADWR's proposal and concluded:

> *Gila IV* requires that the cone of depression test must yield results with a high degree of reliability. Under the clear and convincing evidentiary standard, ADWR's determination that a well's cone of depression impacts the subflow zone means it is highly probable the cone of depression has reached the edge of the subflow zone. The Special Master finds that a computer model's simulation of a greater than or equal to 0.1 foot drawdown can satisfy the degree of reliability required by *Gila IV* and the highly probable standard of clear and convincing evidence. The requisite reliability will depend … on the quality and quantity of parameter inputs. A focused and reasonable effort to collect and use reliable data and information must be made if a high degree of reliability is to be attained.[58]

In evaluating the Department's proposed cone of depression test, the Court must keep in mind both that absolute accurate quantification is not possible, and a hodgepodge system of uncertain reliability is not acceptable. Even though some requisite data for accurate cone of depression measurements

[57] BHP Copper Inc.'s Objection to Report of the Special Master on the Arizona Department of Water Resources' Subflow Technical Report, San Pedro Watershed (Oct. 1, 2004) ("BHP's Objection") at 5-9; APS/PD Objection at 22-27.

[58] Special Master's Report at 65.

"will often be either unknown or poorly known,"[59] ADWR is charged with adopting a test that is "realistically adaptable to the field" and measurement standards that are "the least expensive and delay-causing" efficient methods that provide "a high degree of reliability."[60] In judging whether the Department has satisfied these directions, the Court accepts that "[c]onducting cone of depression tests requires numerous assumptions and considerable judgment and, in many cases, the test results will only provide a rough approximation of actual field conditions."[61]

ADWR's modeling proposal, as clarified by the Special Master's Report, is an affordable, delay-avoiding, adaptable method of determining cones of depression that provides an acceptable degree of reliability and accuracy. The parties agree that the 0.1 foot drawdown criterion comports with the "appreciable" and "measurable" standards put in place as a result of the decisions in *Southwest Cotton* and *Gila II*. The only legitimate concern is whether computer models can accurately reflect a well's drawdown.

At the hearing held on this issue, testifying experts uniformly acknowledged that they "use analytical and numerical computer models to estimate drawdown to 0.1 foot (or smaller) and that they report such results to their clients with the

[59] Subflow Report at 21.
[60] *Gila IV*, 198 Ariz. at 343, 9 P.3d at 1083.
[61] Subflow Report at 21-22.

expectation that the clients will rely upon those results."[62] While this observation is not determinative, it is instructive as to how those in the industry regard the use of modeling. More important, the evidence before the Special Master established that any error potential can be dramatically reduced by paying close attention to the accuracy of the data relied upon when setting the parameters used by the computer models. The Special Master's recommendation with respect to cone of depression measurements addresses the objectors' concerns by making clear that ADWR's proposed methods will satisfy the requirements of *Gila IV* and the "highly probable" clear and convincing evidentiary standard only if the Department implements a focused and reasonable mechanism for obtaining highly reliable data which are used in setting model parameters.[63]

ADWR's second condition for including a well within the adjudication is that the well's water level is below the water level in the jurisdictional subflow zone during pumping. The Department believes that a well should not be included in the adjudication if it is not located within a topographic area conducive to causing water to flow from the subflow zone to the well. Under this definition, subflow drawdown potential would be

[62] SRP's Response at 22; *see* Special Master's Report at 61.
[63] Special Master's Report at 65. The Court also agrees with the Special Master's rejection of the alternative methods suggested for determining a well's cone of depression because due to inaccuracy, cost, problems with implementation, and delay, they do not satisfy the economy, expediency, and reliability criteria set forth in *Gila IV*. *Id*. at 68 & 70-71.

determined based upon the hydraulic gradient between a stream and a well.[64] Making these determinations regarding the nearly 6,500 wells in the San Pedro River Watershed would be costly and potentially delay subflow zone determination for some time. The Special Master concluded this process was neither feasible nor practical and would not comply with ***Gila IV's*** economy and expediency criteria.[65]

The Special Master also noted that tying a well's inclusion in this adjudication to hydraulic gradient reversal is not consistent with the following findings made in the Goodfarb Order:

> [S]tream depletion occurs as soon as the "cone of depression" reaches the stream, even though it may be some time before the hydraulic gradient at the river is reversed, and may be many years before a particle travels from the stream to the well. (Citation to transcript omitted). [Expert witnesses] Ford and Page contend that streamflow depletion first takes place when the cone intersects the stream, not when the hydraulic gradient is reversed or the molecule of streamflow is ejected by the well. (Citations to transcript omitted). <u>It is beyond dispute that even before the gradient is reversed, a measurable drawdown at the stream's "subflow" zone necessarily results in water leaving the zone in order to fill the void which has been created by the well.</u> Ford's Report, (citation omitted) [when the cone intersects the "subflow" zone,

[64] Under this test, ADWR would determine if there was hydraulic gradient reversal over the entire distance between a well and a stream. That is, does the gradient flow downward continuously from the stream to the well? *Id*. at 70.
[65] *See* n.64, *supra*.

> it "induce[s] subflow to leave (deplete the Subflow Zone and the stream")]. This is true even where the gradient has not been reversed everywhere between the well and the stream. (Emphasis by Special Master.)[66]

The *Gila IV* court's affirmance of the Goodfarb Order, which included the language quoted above, 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.

2. Transient or Steady State Modeling

Having approved the use of analytical and numerical computer modeling, the Court must address the temporal parameters to be used when testing. ADWR suggests that only the time of modeling be considered when applying the cone of depression test. This test method is called "transient state modeling." Its major deficiency is that it is a snapshot approach that does not account for the fact that a well's cone of depression is dynamic. The parties agree that a well's cone of depression generally stabilizes gradually, expanding or decreasing after the period of modeling. Transient state models do not account for the prospective impact of well withdrawals. This testing approach may result in wells that will impact the subflow zone for only the briefest portion of the next millennium being included in the adjudication, while other wells

[66] Special Master's Report at 73 (quoting Goodfarb Order at 61).

that will have a dramatic impact on the subflow zone (but not during the relatively short modeling period) are not included.

Those criticizing ADWR's proposed approach urge the Court to direct the Department to use a steady state model.[67] While no one can predict with certainty the future use of wells, the steady state model does not have a temporal limit and purports to account for the future impact of withdrawals by using long-term average hydrologic data to establish an equilibrium between a pumping well and the amount of water the well withdraws from streams and underground sources.[68] The weakness of steady state modeling is that it does not as accurately account for conditions during a specific time period and, according to its critics, cannot effectively simulate either the dynamic hydrologic systems in Southwestern deserts or changes in groundwater storage.[69]

It is clear that if a more accurate result is desired with respect to a relatively narrow timeframe, transient state modeling is preferable, but if long-term accuracy is needed, the steady state model will, over time, be more useful. Which approach is more appropriate for the adjudication?

The Special Master resolved this issue by focusing on the following excerpt from *Gila IV*:

[67] Special Master's Report at 82.
[68] *Id*.
[69] *Id*. at 83.

> [A] well may be subject to the adjudication if its " 'cone of depression' caused by its pumping has now extended to a point where it reaches an adjacent 'subflow' zone, and by continual pumping will cause a loss of such 'subflow' as to affect the quantity of the stream."
>
> … DWR may seek to establish that a well located outside the limits of the saturated floodplain alluvium is in fact pumping subflow and is therefore subject to the adjudication, by showing that the well's cone of depression extends into the subflow zone and is depleting the stream. (Emphasis by Special Master.)[70]

Relying on the language above, the Special Master concluded that the steady state model's attempt to consider the future impact of a well's cone of depression does not comport with the requirements announced in ***Gila IV*** because to be included within this Court's jurisdiction, a well's cone of depression must extend into the subflow zone, and the well must be *currently* depleting a stream.[71] Review of relevant sections of the Goodfarb Order and the ***Gila IV*** opinion cause this Court to reach a contrary conclusion.

After narrowly defining the area in which subflow may be found, the Arizona Supreme Court adopted a more expansive standard with respect to who, within this narrow zone, is

[70] *Id*. (quoting *Gila IV*, 198 Ariz. at 343, 9 P.3d at 1082).
[71] Even though he viewed ADWR's transient state modeling proposal favorably, the Special Master was apparently uncomfortable with the potential unjust results that can flow from snapshot measurements. *Id*. at 84 ("Although *Gila IV* and the evidence do not support rejecting ADWR's recommendation, the impact of expanding cones of depression must be taken into account.").

subject to the adjudication.[72] Adopting the reasonable assumptions made in steady state modeling is consistent with the principles announced in the Goodfarb Order and approved by the *Gila IV* court. The Goodfarb Order explicitly recognized that cones of depression expand over time and can have a long-term effect on subflow even after well pumping ceases:

> [The] facts show … that "cones of depression" have long-term effects even after the wells are shut down. Two recent Colorado cases make that clear. Danielson v. Castle Meadows, 791 P.2d 1106 (Colo. 1990) and State Engineer v. Castle 6 Meadows, 856 P.2d 406 (Colo. 1993) discuss the long-term effect of post-pumping depletion. In the "Danielson" case the trial court had found that post-pumping depletions could continue up to and after 200 years. In the remanded trial which took place in 1991, the trial court found the post-pumping depletions could continue up to and after 400 years. In both cases the Colorado Supreme Court found that these post-pumping depletions had to be remedied by the pumps to protect surface water users….
>
> All of the principal witnesses agreed that even wells located outside of a stream's "subflow" could, over time, build up extensive "cones of depression" which could severely affect the volume of stream flow and the "subflow" which supported it.[73]

The trial court's finding that "stream depletion occurs as soon as the 'cone of depression' reaches the stream, even though it may be some time before the hydraulic gradient at the river

[72] *Gila IV*, 198 Ariz. at 343, 9 P.3d at 1082.
[73] Goodfarb Order at 60.

is reversed, and may be many years before a particle travels from the stream to the well" evidences that the court intended for future pumping consequences to be considered when setting the adjudication court's jurisdiction.[74] When this ruling is read in conjunction with the quote from ***Gila IV*** relied upon by the Special Master, an alternative interpretation appears:

> [A] well may be subject to the adjudication if its " 'cone of depression' caused by its pumping has now extended to a point where it reaches an adjacent 'subflow' zone, and by continual pumping will cause a loss of such 'subflow' as to affect the quantity of the stream." (Emphasis supplied.)

The language cited above is consistent with the Goodfarb Order and requires that a well with a cone of depression reaching the subflow zone be subject to adjudication if the extent of the well's current or prospective depletive effect on the stream is measurable by reasonably accurate means. Only steady state modeling adequately addresses the need to consider the future consequences of existing well characteristics that was contemplated by the Goodfarb Order.

3. Cumulative Effect of Multiple Well Drawdowns

The ***Gila IV*** opinion requires that wells must be individually evaluated to determine if they are subject to the adjudication. The Special Master's Report asks whether, in

[74] *Id*. at 61.

addition to this individual analysis, the cumulative drawdown effect of groups of wells should be reviewed.[75] Parties favoring cumulative testing claim that available numerical models easily and accurately calculate the cumulative impact of clusters of wells.[76] They argue that the Court must direct ADWR to undertake individual and cumulative analysis in order to adequately protect surface water rights. Other parties argue that cumulative testing will detract from the Department's efforts to complete higher priority tasks directly related to statutorily mandated tasks.[77] The Special Master's Report adopts a hybrid position and recommends that ADWR select one or more groups of wells to test whether cumulative analysis is warranted.

Because the jurisdictional limits of the subflow zone are strictly drawn, the better approach is to undertake such analysis as is required to identify all wells within this narrow region that are affecting subflow. The Special Master's Report indicates that an anticipated hydrological study of the Sierra Vista Subwatershed may provide additional relevant information regarding the individual and cumulative effects of well

[75] Special Master's Report at 86.
[76] Apache Tribes' Objections to the Report of the Special Master on Arizona Department of Water Resources' Subflow Technical Report (Oct. 1, 2004) ("Apache Tribes' Objections") at 21-22; United States' Response to Exceptions to the Report of the Special Master on the Arizona Department of Water Resources' Subflow Technical Report, San Pedro River Watershed (Nov. 1, 2004) ("U.S. Response") at 14-15.
[77] ASARCO Incorporated's and Arizona Water Company's Reply in Support of Objections to the Report of the Special Master on the Arizona Department of Water Resources' Subflow Technical Report, San Pedro River Watershed (Dec. 1, 2004) ("ASARCO's Reply") at 9.

pumping.[78] At least with respect to the San Pedro watershed, the Department should ascertain whether significant withdrawals of subflow occur as the result of pumping by one well or a group of wells.

De Minimis Uses

With one limitation, the *Gila IV* decision requires wells located within the lateral limits of a subflow zone to be subject to this adjudication. The exception excuses those wells "that, though pumping subflow, have a de minimis effect on the river system…. [Those wells] may be excluded from the adjudication based on rational guidelines for such an exclusion, as proposed by DWR and adopted by the trial court."[79] *Gila II* also sanctions summary adjudication of *de minimis* water rights.[80]

The Subflow Report describes the work done by then Special Master John Thorson to determine if certain stockwatering, stockponds, or domestic water uses in the San Pedro River Watershed qualified for summary adjudication. Special Master Thorson concluded that when measured individually these uses had a *de minimis* impact on the watershed, and even though their cumulative impact was not *de minimis*, he found that the resources required to individually adjudicate and administratively manage these water rights justified summary

[78] Special Master's Report at 88.
[79] *Gila IV*, 198 Ariz. at 344, 9 P.3d at 1083.
[80] *Gila II*, 175 Ariz. at 394, 857 P.2d at 1248.

adjudication. ADWR accepted the Special Master's definitions of what constitutes a *de minimis* domestic, stockpond, or stockwatering use, but the Department did not agree with the Special Master that these uses should be adjudicated summarily. Because the Subflow Report was filed on March 29, 2002, the Department's discussion did not reflect that on September 26, 2002, this Court approved Special Master Thorson's proposed *de minimis* definitions and adopted his recommended summary adjudication procedures.[81]

Some claimants suggest that the Court direct ADWR to propose guidelines for determining when non-domestic water uses (*e.g.*, agricultural, municipal, industrial, and other uses) have a *de minimis* effect on a watershed.[82] They believe the Department should propose a set of *de minimis* criteria that apply irrespective of the type of water use.[83] The Court agrees with these parties that a prime consideration when determining if a water use has a *de minimis* effect on a watershed is its quantifiable impact on the subflow zone. Until ADWR proposes an accurate and reliable method for determining quantifiable impacts, its *de minimis* proposal will be deficient."[84]

The Special Master's Report and some comments indicate that the parties did not extensively brief this issue, and it may

[81] Memo. Dec. (Sept. 26, 2002).
[82] Special Master's Report at 93.
[83] APS/PD Objections at 37.
[84] *Id*.

"best be considered at such time as ADWR and the parties have more new or updated data."[85] The Special Master will be directed to seek input from the Department and claimants, and conduct such proceedings as he deems necessary to craft a workable, reasonably accurate *de minimis* standard that can be applied to non-domestic water users.

Implementation of Procedures

The Department and the Special Master have supplied a number of recommendations responding to the Court's request that ADWR propose a schedule for completing the tasks outlined in its report. The Court agrees with the Special Master that ADWR's proposal of first mapping the subflow zone in a watershed, then identifying *de minimis* uses, and finally conducting cone of depression tests is appropriate.[86] The parties generally agree with this plan, although some disagree with the Special Master's recommendation of a period of one hundred twenty (120) days for filing objections to ADWR's technical report delineating the subflow zone.[87] The Court does not challenge the Special Master's analysis of the applicable statutory authority governing the filing of objections, but it will accommodate the desire of claimants requesting a one hundred eighty (180) day period for the timely filing of objections and comments to a technical

[85] Special Master's Report at 93; *see* SRP's Response at 36-37.
[86] Subflow Report at 45; Special Master's Report at 96.
[87] APS/PD Objections at 38-39.

report. The Court agrees with the remainder of the Special Master's recommendations regarding the implementation of procedures.

The foregoing discussion constitutes the Court's findings of fact and conclusions of law with respect to the Special Master's Report and the Department's Subflow Report. Based upon these findings and conclusions,

IT IS ORDERED, approving the Subflow Report as modified by this Order.

IT IS FURTHER ORDERED, that with respect to the recommendations set forth in the Special Master's Report:

1. The Court approves and adopts, as modifications to the Subflow Report, Recommendation Nos. 1, 2, 3, 4, 5, 7, 8, 9, 10,11 ,13, 14, 20, 21, 22, 23, 24, 25, 26, 27, 30, and 31.
2. With respect to Recommendation No. 6, the Court approves and adopts this recommendation, but notes that ADWR shall include as part of the subflow zone any areas determined to fall within the ephemeral stream exception discussed above.
3. If ADWR determines, with respect to any specific area, it cannot delineate a reasonably accurate and reliable subflow zone, it shall proceed in accordance with Recommendation No. 12.

4. Recommendation No. 15, as clarified by this Order, is approved and adopted.
5. Recommendation Nos. 16, 17, and 32 are not approved and adopted.
6. Recommendations Nos. 18, 19, 29, 33, 34, 36, 37, 38, and 39 are approved and adopted to the extent consistent with this Order.
7. Recommendation No. 28 is not approved and adopted. ADWR shall utilize a reasonably reliable steady state model for use in evaluating the effect of cones of depression.
8. The Court approves and adopts Special Master's Recommendation No. 35 to the extent modified by this Court's holdings.
9. The Special Master is directed to seek input from the Department and claimants and take such other necessary steps to fashion standards for identifying non-domestic *de minimis* water uses.

IT IS FURTHER ORDERED, that claimants shall be provided a period of one hundred eighty (180) days from the filing date to file timely objections and comments to technical reports containing ADWR's subflow zone determinations.

DATED: September 28, 2005.

/s/ Eddward P. Ballinger, Jr.
EDDWARD P. BALLINGER, JR.
Judge of the Superior Court

SUPERIOR COURT OF ARIZONA
MARICOPA COUNTY

09/15/2005 CLERK OF THE COURT
FORM V000

HONORABLE EDDWARD BALLINGER, JR. M. Wetherell
Deputy

W-1, W-2, W-3, W-4(Consolidated)
Contested Case No. W1-103

* * * *

A copy of this minute entry is mailed to all parties on the Court-approved W-1, W-2, W-3 and W-4 mailing list dated June 15, 2005, and the parties listed below.

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