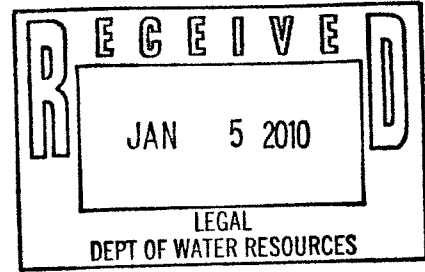


1 Jennifer K. Giff, 018366  
John T. Hestand, 005087  
2 Ann Marie Chischilly, 023612  
Post Office Box 97  
3 Sacaton, AZ 85247  
(520) 562-9760  
4



5 Attorneys for the Gila River Indian Community

6 **IN THE SUPERIOR COURT OF THE STATE OF ARIZONA**

7 **IN AND FOR THE COUNTY OF MARICOPA**

8 IN RE:

9 THE GENERAL ADJUDICATION OF ALL  
RIGHTS TO USE WATER IN THE GILA  
RIVER SYSTEM AND SOURCE.

No. W-1 (Salt)  
No. W-2 (Verde)  
No. W-3 (Upper Gila)  
No. W-4 (San Pedro)  
(Consolidated)

Contested Case No. W1-103

**GILA RIVER INDIAN COMMUNITY  
COMMENTS TO THE ARIZONA  
DEPARTMENT OF WATER  
RESOURCES SUBFLOW ZONE  
DELINEATION REPORT FOR THE  
SAN PEDRO RIVER WATERSHED**

(Assigned to the Hon. Eddward P.  
Ballinger, Jr.)

18  
19  
20 **Descriptive Summary:** The Gila River Indian Community submits its Comments to the  
Arizona Department of Water Resources Subflow Zone Delineation Report for the San  
Pedro River Watershed.

21 **Statement of Claimant Nos.:** 39-11-54-78, 39-05-41142, 39-07-12652, 39-U8-60083,  
22 39-L8- 36340, and 39-L8-37360 (Gila River Indian Community)

23 **Date of Filing:** December 28, 2009

24 **Number of Pages:** 7

1 The Gila River Indian Community (“Community”) submits its Comments to the  
2 Arizona Department of Water Resources Subflow Zone Delineation Report for the San Pedro  
3 River Watershed. The Community’s overall impression is that the foundational geologic and  
4 hydrologic work performed by the Arizona Department of Water Resources (“ADWR”) were  
5 well done and well documented. However, the Community notes that ADWR did not use the  
6 geologic information correctly in delineating the Floodplain Holocene Alluvium (FHA).  
7 Specifically, ADWR selected only the current, visible extents of the fluvial deposits of the  
8 San Pedro and Babocomari Rivers and Aravaipa Creek and ignored where the deposits were  
9 covered by alluvial fans encroaching from the sides. The result is too narrow in general and  
10 significantly so in numerous locations.

#### 11 **GENERAL COMMENTS AND RECOMMENDATIONS**

12 ADWR contracted with the Arizona Geological Survey (“AZGS”) to do the  
13 foundational work of delineating the FHA for this basin. AZGS described all surface  
14 geologic units within one mile on either side of the San Pedro and Babocomari Rivers and  
15 Aravaipa Creek for their entire extents within the United States. This is a significant and  
16 valuable contribution to understanding the hydrogeology of this basin. AZGS’ merged the  
17 mix of available geologic mapping in GIS, viewing the latest 2007 aerial photography and  
18 visiting and documenting their observations at one-mile intervals along the entire stretch.  
19 However, AZGS used only the current, surface extents of FHA.

20 ADWR determined from an impressive collection of source material that the entire  
21 San Pedro and much of the Babocomari River and Aravaipa Creek were perennial or  
22 intermittent prior to development. Therefore these same extents are subject to Subflow  
23 evaluation and indicate saturation. However, in the process of delineating the FHA, ADWR  
24

1 did not recognize the most stable, key features defining the edges of the FHA, which have  
2 now been made much clearer by AZGS' foundational geologic mapping effort.

3 ADWR's report used parts of AZGS' detailed geologic mapping and GIS to  
4 delineate the FHA. This was required because AZGS delineated many units that qualify as  
5 FHA. To this combined mapping, ADWR applied setbacks for tributary and basin fill  
6 aquifers to define the Subflow Zone. ADWR's selection process comprehensively  
7 excluded current, surface Holocene alluvial fan units. Both the AZGS and ADWR clearly  
8 recognize that Holocene fluvial (river) deposits may be present beneath the encroaching  
9 alluvial fans. The surface floodplain and alluvial fan deposits engage during each major  
10 flood event in a persistent tug of war along their boundaries. Comparison of recent aerial  
11 photography with aerial photographs from 1935 clearly shows that this persistent battle  
12 significantly shifts this surface boundary.

13 ADWR's sole reliance on current, surface FHA for their delineation does not result  
14 in the stable geologic structure recognized by Judge Goodfarb. Each judicial review since  
15 Judge Goodfarb's decision applauded his definition of, and echoed the critical need for, a  
16 stable geologic unit. ADWR should strive for a geologic expression of a boundary in the  
17 subsurface to the Floodplain Holocene Alluvium. That expression in the subsurface is the  
18 Holocene Trough. The Holocene Trough contains the FHA at the surface and at depth. The  
19 Holocene Trough is the last (so far) of a series of troughs cut into the Tertiary Basin Fill  
20 and filled with primarily coarse-grained floodplain alluvium and forms stable boundaries  
21 for sediment movement along major streams. In contrast, the boundary between the current  
22 surface floodplain and alluvial fan units shift with major floods.

1 The lack of stability of current, surface boundaries for floodplain alluvium causes  
2 the ADWR approach to become entangled in local juxtapositions of geologic units and  
3 resulted in ADWR drawing arbitrary lines through plowed and disturbed areas. ADWR  
4 proposed a method for dealing with the problems arising from drawing lines between  
5 current surface materials in Appendix D-4, but the Community is concerned because it is  
6 arbitrary and therefore problematic for long-term, sustained use in the Adjudication. A  
7 simpler and sounder approach is to draw a smooth curve connecting the exposures of units  
8 clearly older than Holocene where they come closest to the river of interest.

9 The Floodplain Holocene Alluvium delineated, based on the surface expressions of the  
10 Holocene Trough edges, is wider than the current surface extents of the Floodplain  
11 Holocene Alluvium selected by ADWR for their process of defining the Subflow Zone.  
12 However, it is still quite narrow compared to the extents of the groundwater basin. Sudden  
13 movements and shifting of the surface fluvial or alluvial fan deposits are contained within  
14 the Holocene Trough, a stable geologic unit that won't be shifted by a sudden flood or lost  
15 to development for irrigated fields or municipal uses.

#### 16 **SPECIFIC COMMENTS AND RECOMMENDATIONS**

17 Pages 1-6, Par. 3 to Page 1-7, Par. 1 – ADWR did not include “mountain front  
18 streams”, though one could view the Babocomari River and Aravaipa Creek as such.  
19 ADWR justifies ignoring the other streams based on their being short, often isolated,  
20 restricted or difficult as to access, and therefore require research to map. Because  
21 excluding mountain front streams is inconsistent with the criteria issued by the  
22 Adjudication Court, all mountain front streams should be included.

1 Page 2-3, Par 2 – ADWR says they were to exclude all ephemeral streams shown on  
2 NRCS soil survey maps. It is not clear that the NRCS has expertise in stream flow duration  
3 analysis superior to that of ADWR such that ADWR should defer to NRCS on this issue.

4 Page 2-5, Par. 3 – ADWR notes that they had to develop other criteria or require  
5 further direction from the Adjudication Court. The outcomes of addressing these anomalies  
6 are not provided in this report.

7 Pages 4-9 – 4-11, Section 4.2.5 – The Community concurs with the selection and  
8 definition of individual geologic units presented here by the AZGS. However, the  
9 Community notes that the subsurface distribution of an individual unit may vary from that  
10 mapped at the surface.

11 Pages 4-11 to 4-12, Section 4.3 –ADWR’s grouping of AZGS’ geologic units into  
12 Floodplain Holocene Alluvium, Tributary Holocene Alluvium, Basin Fill, and Bedrock is  
13 too simplistic in that part of the Tributary Holocene Alluvium is Floodplain Holocene  
14 Alluvium at depth. At some point the current surface Tributary Holocene Alluvium crosses  
15 the edge of the Holocene Trough and drapes over some area of the Trough.

16 Page 4-12, Section 4.3 – The Community disagrees that “disturbed area” is of the  
17 nature of a geologic unit. It is a modification by man of a geologic unit that has obfuscated  
18 its identification. The Community recommends instead that disturbed areas be noted, but  
19 not mapped as geologic units. Perhaps they can simply be defined areas of greater  
20 uncertainty in identification and delineation, but they are not geologic units.

21 Page 4-13, Par. 1 – ADWR clearly says that the tributary Holocene alluvium (fans  
22 spread on the surface towards the stream of interest) are not FHA. In Appendix D-4,  
23 ADWR proposes a method for including some tributary Holocene alluvium into the  
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1 subflow zone (see later comment). AZGS also recognizes (see Page 10 of their report) that  
2 Holocene alluvial fans may cover Floodplain Holocene Alluvium or be inter-bedded in the  
3 subsurface with Floodplain Holocene Alluvium. While ADWR has chosen to exclude all of  
4 the current, surface extents of tributary Holocene alluvium, this extreme position is  
5 problematic for them due to the unusual shapes. The edge of the Holocene Trough is a  
6 more appropriate dividing line as it contains all FHA at depth.

7 Appendix D-4 – The perimeter/length parallel to the stream (P/L) criteria for  
8 including tributary Holocene alluvium into the subflow zone is arbitrary. Yet this indicates  
9 that ADWR recognizes that some of the tributary Holocene alluvium mapped currently at  
10 the surface should be included in an overall delineation of Floodplain Holocene alluvium.  
11 A simpler and more robust approach considers the key issue of what volume of geologic  
12 material has a close relationship to the stream. The extents of Floodplain Holocene  
13 Alluviums beneath the current surface tributary Holocene alluvium constitute a better  
14 criterion.

## 15 CONCLUSION

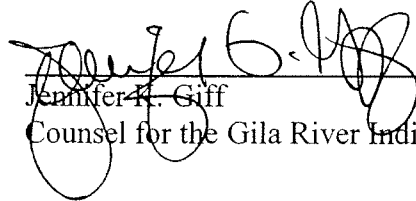
16 On balance, ADWR has done an excellent job of confirming the extent of the  
17 Floodplain Holocene Alluvium in the San Pedro River Watershed and the perennial and  
18 intermittent streams that, prior to human development, created the Floodplain Holocene  
19 Alluvium. The Community believes that the admirable work performed by ADWR can be  
20 made even more accurate, reliable, and usable by considering the subsurface geologic  
21 composition of the San Pedro River Watershed, rather than focusing exclusively on current  
22 surface appearances. The Community recommends that ADWR incorporate the pertinent  
23 subsurface geologic conditions by applying the scientific knowledge of the Holocene Trough.

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RESPECTFULLY SUBMITTED this 28<sup>th</sup> day of December, 2008

GILA RIVER INDIAN COMMUNITY

  
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Jennifer K. Giff  
Counsel for the Gila River Indian Community

ORIGINAL and ONE COPY of the foregoing hand-delivered this 28th day of December, 2009, to:

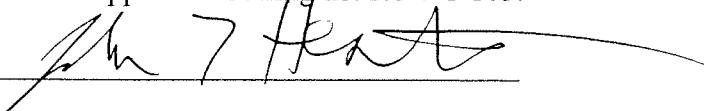
Clerk of the Superior Court of Maricopa County  
Attention: Water Case  
601 W. Jackson Street  
Phoenix, AZ 85003

COPY of the foregoing mailed this 28th day of December, 2009, to:

The Honorable Eddward P. Ballinger, Jr.  
Judge of the Superior Court  
Northeast Regional Court Center  
18380 N. 40th Street, Suite 120  
Phoenix, AZ 85032

The Honorable George A. Schade Jr.  
Special Master  
Arizona General Stream Adjudications  
Superior Court of Arizona  
Central Court Building  
201 W. Jefferson Street  
Phoenix, AZ 85003

AND A COPY of the foregoing mailed this 29th day of December, 2009, to all parties appearing on the Court-approved mailing list for W1-103.

By  \_\_\_\_\_