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BEFORE THE ARIZONA CORPORATION COMMISSION

IN THE MATTER OF THE APPLICATION OF PAYSON WATER CO., INC., AN ARIZONA CORPORATION, FOR A DETERMINATION OF THE FAIR VALUE OF ITS UTILITY PLANTS AND PROPERTY AND FOR INCREASES IN ITS WATER RATES AND CHARGES FOR UTILITY SERVICE BASED THEREON.	DOCKET NO: W-03514A-13-0111
IN THE MATTER OF THE APPLICATION OF PAYSON WATER CO., INC., AN ARIZONA CORPORATION, FOR AUTHORITY TO: (1) ISSUE EVIDENCE OF INDEBTEDNESS IN AN AMOUNT NOT TO EXCEED $1,238,000 IN CONNECTION WITH INFRASTRUCTURE IMPROVEMENTS TO THE UTILITY SYSTEM; AND (2) ENCUMBER REAL PROPERTY AND PLANT AS SECURITY FOR SUCH INDEBTEDNESS.	DOCKET NO: W-03514A-13-0142

ORIGINAL

INTERVENOR RESPONSE TO SUPPLEMENTAL REJOINDER TESTIMONY - PHASE 2

Kathleen M. Reidhead, "KMR", is an Intervenor in the above-captioned matter. She resides part-time in the Community of Deer Creek Village, "DCV".

Payson Water Company, "PWC", has not filed a rate application in 13 years. It's ratepayers finally got their first glimpse at its books and management practices after the inaccurate public notice announcing the rate case was delivered late and in a mysteriously nondescript envelope[1]. KMR received her notice on September 20, 2013 and attended the Phase 1 Hearing on September 25, 2013, gave a Public Comment and the next day filed her Motion to Intervene. Seven people in total, from 6 of the 8 separate communities served by PWC filed a Motion to Intervene and were granted Intervenor status in the case. What they saw in that public notice and in the Company's numerous and lengthy filings was appalling. Amongst the filings, there was a 279 page original rate application, along with a 23 page financing application, plus a 19 page Motion/Request to consolidate the 2 cases, plus a 36 page Rebuttal

[1] See the Surrebuttal Testimony of Suzanne Nee, Document #151202, Page 1, lines 39-45 and Page 2, lines 1-27.

Testimony (Phase 1), a 60 page Miscellaneous Notice of Filing (Phase 1), a 173 page Rebuttal Testimony (Phase 2), a 147 page Rejoinder Testimony (Phase 2) and finally a 75 page Supplemental Rejoinder Testimony (Phase 2) filed by the Company. It seemed the goal of the Company's filings was to confuse and disarrange the ratepayers at every turn, as the ratemaking design changed 3 times over the course of this case, from Original Filing, at Phase 2 Rebuttal and again at Phase 2 Rejoinder Testimony, delivered only one week before the Phase 2 Hearing was initially scheduled to begin.

These ratepayers had already been disillusioned by many years of poor service from the Company, as attested to via some of their Public Comments, so they were not easily dissuaded from the challenge of sorting through the volume of filings. KMR undertook an exhaustive study of the filings in an effort to untangle the facts from the fiction. One thing that remained consistent throughout KMR's examination of the details is that the evidence did not support the story that PWC has told. Attached as Exhibit KMR-J is a listing of some of the imprudent, unreasonable, false and misleading actions that PWC has taken throughout the course of this rate case that caused a high level of suspicion and distrust by its ratepayers.

The 147-page Rejoinder Testimony was filed with significant changes to PWC's proposals thus far. It altered the ratemaking design in the 11th hour, showing that PWC was taking actions to "move the goalpost" at a very late stage of the case. It seemed the Company was determined to disturb and disarrange the Intervenors yet again. This shows a callous disregard for the people PWC serves, who have already suffered greatly with poor service over many years, as stated throughout the record.

A large payment the Company received from the condemnation sale of the Star Valley plant was adjusted off the books during the Test Year which altered the value of the Company's property and would certainly impact the setting of rates, and someone is responsible for that. The human being that formerly ran the Company was Mr. Robert Hardcastle. The human being that currently runs the Company is Mr. Jason Williamson. We do not know if there is any collusion between the two men, as KMR was not answered on her Discovery Questions relating to their relationship. She filed a Motion to Compel Discovery, yet answers were still not forthcoming. At any rate, Mr. Jason Williamson has adopted and is supporting the application that was originally submitted under Mr. Robert Hardcastle's testimony, which contains the evidence of that transaction.

In Supplemental Rejoinder Testimony, PWC states that KMR claims the Star Valley/Quail Valley system is an asset that is "missing"[2], but KMR clearly stated that the removal of the monetary asset gained as a result of the sale of the Star Valley/Quail Valley plant was the asset she was concerned about[3]. PWC adjusted their Income Statement to claim a monetary gain from the sale of the Star Valley plant as an increase and a decrease to the assets[4]. Manipulation of the books of PWC allowed the Company to paint a misleadingly dire picture of PWC's finances during the Test Year, showing PWC in a

[2] Per the Supplemental Rejoinder Testimony of Jason Williamson, Document #150824, at Page 2.
[3] Per the Surrebuttal Testimony of Kathleen M. Reidhead, Document #149903, Page 3, lines 38-41 and Page 4, lines 1-24.
[4] Per the Exhibit Schedule C-1 of Thomas Bourassa Testimony, Document #145511, Page 144/279 of the original rate application.

loss position, which would impact the setting of rates, as PWC would claim a desperate financial picture, justifying a large rate increase (to restore the Company to financial health) and necessitating expedited handling of the rate case. Expedited handling of the case might hinder scrutiny on the details contained within the lengthy filings. As stated in her Surrebuttal Testimony, KMR believes these actions are illegal, a violation of A.R.S. §40-426. KMR is not an attorney, however, and recognizes that other statutes may apply. Perhaps A.R.S. §44-1522, A.R.S. §44-1211, A.R.S. §44-1212, A.R.S. §44-1376.03 or others. It is certainly a violation of business and moral ethics, however, and even if no law was broken (theoretically), by taking the gain of $755,709 and distributing any portion of it to shareholders instead of using it to aid the renovation of some of the other aging and deteriorating water systems it serves, it denied the health of the Company and now asks the ratepayers to pay exorbitantly higher rates so that it can "regain" a sound financial condition. This, combined with other accounting irregularities[5] and misleading statements made, seems to show a pattern to deceive, which may rise to the level of predatory business practices and may be unlawful, as per A.R.S. §44-1522 or other statutes.

In the Company's latest filing, Supplemental Rejoinder Testimony, PWC provides ***SQV - Detail for Disposition Journal - Accounts & Balances Mapping***[6] that shows a recap of the journal entries, posting a credit of $755,708.53 to the account labeled "Gain on sale of disposition". A credit is a decrease to an asset account, so a debit (an increase) of $771,755.47 was posted to the Cash account, while a credit (a decrease) of $755,708.53 is shown labeled as "Gain on sale of disposition". Even the label is misleading, as a credit to an asset account is a decrease, not a "gain". But the important detail is that the monetary gain of $755,708.53 was removed from the Company's books. At the bottom right corner of this exhibit, Journal Entry 3321 is referenced, changing the original accounting entry and stating it as a "temporary posting". This adjustment is confusing, as it shows a posting of $515,055.39 as a credit to the account number 05.05.9030.01, which is shown on the bottom left side of the exhibit as "Gain on sale of disposition". This differs from the "Recap of the journal entries" shown on the left side of the page. This adjustment is being made at Supplemental Rejoinder Testimony, only after scrutiny has come to bear on the disposition of that monetary asset which resulted from the sale of the Star Valley/Quail Valley system. The original entry clearly shows the money going on and off the books[7]. The new JE 3321 entry appears to be an effort to confuse the matter.

Mr. Williamson claims the $755,709 was "used primarily to pay bills as well as to provide a dividend to the previous shareholder before we bought the stock".[8] Mr. Bourassa expands on this testimony to say, "Ultimately, the proceeds were used by PWC to pay its bills and provide a dividend to its previous shareholder. For example, the Company owed approximately $285,000 to BUI at the end of 2011. The proceeds also helped to pay 2012 operating expenses."[9] What they both fail to acknowledge is that the entire proceeds belonged to the Company and would have shown the Company's financial condition in a much better position if that money had remained. In private enterprise, a Company

[5] Per the Supplement to Pre-Filed Testimony of Suzanne Nee, Document #150692, at Page 1, lines 33-44 and Page 2, lines 1-23.
[6] Per Supplemental Rejoinder Testimony, Document #150824, at Page 74/75, Exhibit TJB-SRJ1 by Thomas Bourassa.
[7] Per Original Rate Application, Document #145511, Thomas Bourassa Schedule C-1 Page 1, line 39 (Page 144/279).
[8] Per the Supplemental Rejoinder Testimony of Jason Williamson, Document #150824 at Page 2, lines 17-18.
[9] Per the Supplemental Rejoinder Testimony of Thomas Bourassa, Document #150824 at Page 3, lines 11-14.

usually only pays dividends to shareholders if they have an operating profit or if the owner's equity is substantial. It is highly unusual that PWC paid a dividend to the former shareholder during a Test Year for rates, which substantially altered the Company's financial picture.

In her research of the case, KMR often wondered why the Company would engage in such an elaborate web of deceptions, until she found a study called ***Mogollon Rim Water Resources Management Study*** conducted by the U.S. Department of the Interior - Bureau of Reclamation at this link: usbr.gov/lc/phoenix/reports/mogollonrim/mrwrfr.html . The ***Report of Findings*** was published in April 2008, coincidentally the same month that Robert Hardcastle wrote a letter to Town of Payson asking to participate in discussions about obtaining water supplies from the Cragin Reservoir[10]. The study is related to the future demands of water for Payson and the surrounding area and how those needs can be served by the Cragin Reservoir, which is under the supervision of the Federal Government. KMR has put only a portion of this Study into evidence (58 pages) due to the size, attached as Exhibit KMR-K - the Report of Findings is 171 pages and the 12 appendices are several hundred additional pages. The included pages detail Brooke Utilities participation in this study. Brooke Utilities was the parent Company to PWC at the time. On page 17 of this Exhibit KMR-K is a map of the Study area. Six of the eight communities currently served by PWC are located within the Study area. The communities of Geronimo Estates, Whispering Pines and Mead Ranch are located within Sub-Region 1. The communities of East Verde Park, "EVP", Flowing Springs and Mesa del Caballo, "MdC", are located within Sub-Region 3. The communities of Gisela and DCV were not included in the study, as they are located approximately 15 miles south of the Payson area, in a different water basin (the Tonto Creek Water Basin, with abundant water resources, as previously established via Exhibit KMR-1)[11]. Pages 43-58 of the ***Report of Findings*** details the communities' existing conditions and current water use. MdC's conditions are detailed on page 56. The summary states, "The 7 wells yield a total of 45 to 50 gpm, enough capacity to supply 70 to 80 af/yr. The wells have apparently been operationally stable over the past 6 to 8 years, with only periodic water supply shortages." This data is considerably different than what PWC claims in their rate application, which shows a combined total yield of only 17.7 gpm from these 7 wells.[12]

3,500 acre feet per year of Cragin water is part of a water plan to serve the Upper Gila County area's growth through the year 2040. Town of Payson has agreed to use 3,000 acre feet per year, which leaves 500 acre feet of water available to other communities in the surrounding area. It seems clear that Robert Hardcastle had an interest in bringing some of that 500 acre feet of available Cragin water to a number of communities served by Brooke Utilities/Payson Water Company, possibly MdC, EVP and others. The problem is that he didn't state that interest to his ratepayers. MdC was not experiencing a chronic water deficiency problem, as far as the evidentiary record shows, at the time Robert Hardcastle wrote a letter to the Town of Payson in April 2008[13] expressing an interest in working with them to

[10] Per Exhibit KMR-H attached to Supplement to Pre-Filed Testimony submitted by Kathleen M. Reidhead on January 7, 2014, Document #150679.
[11] Per Surrebuttal Testimony of Kathleen M. Reidhead, Document #149903.
[12] Per Rate Application, Document #145511, Exhibit A, pages 41-45/279.
[13] Per Exhibit KMR-H attached to Supplement to Pre-Filed Testimony submitted by Kathleen M. Reidhead on January 7, 2014, Document #150679.

obtain supplemental water supplies from the Town of Payson's Cragin pipeline. That is backed up by Exhibit KMR-K, the ***Mogollon Rim Water Resources Management Study***, published in April 2008 that reports MdC had "stable wells with only periodic supply shortages" . Only 13 months later did water hauling exercises commence in MdC. Water hauling has continued for the last 5 summers in MdC , with great hardship caused to the people of MdC, as evidenced by Public Comment given. To date, PWC has entered no evidence in this rate case to support their claim that water hauling exercises were necessary or prudent. KMR has produced evidence of PWC's claims of low performance wells in MdC, which is contrary to those wells' tested capabilities[14]. No evidence is presented by PWC to explain why their wells are performing so poorly or what efforts PWC has made to investigate and correct that situation. Other wells have been drilled in MdC, 9 private wells in the last 3 years[15], and all of those successfully obtained water at depths ranging from 120 to 276 feet. The evidence shows Robert Hardcastle commenced water hauling exercises in MdC in Summer 2009[16]. On March 31, 2010 the Company filed an application for the emergency implementation of a water augmentation surcharge for it's MdC system. Robert Hardcastle met with customers in MdC on April 8 and 10, 2010[17] to inform the customers of what it would cost to haul water. 95 Residents of MdC signed a petition to support the Company's efforts to develop additional water supplies, but it should be noted that nowhere on that petition is Cragin water mentioned as a source of additional water supplies[18]. A water augmentation tariff for MdC went into effect on September 28, 2010 via ACC Decision 71902. By August of 2011, residents of MdC were desperately seeking a solution to alleviate their high summer water bills due to the high cost of water hauling. Robert Hardcastle met with MdC residents on August 25, 2011 to discuss various options[19] for alleviating their frustrations, amongst those options - the Cragin water option. An article from the Payson Roundup published on August 30, 2011[20] indicates that residents were being offered an opportunity to vote on which option they wanted. If a vote was taken, it has not been entered into evidence by PWC in this rate case. At the present time, the public opposition to the expensive Cragin pipeline project proposed by PWC has been loudly voiced by ratepayers from all of the 8 systems after receiving public notice of the Company's proposal in late September 2013.

It is reasonable to conclude that a small water Company, like PWC, would face obstacles gaining support from its ratepayers for a large rate increase tied to the high cost of Cragin water unless growth demanded it or a water shortage crisis existed.

The actual costs PWC has spent in the past for drilling wells in MdC was put into evidence by the Company[21], showing costs ranging from $6,505.83 to $8,309.66 each. It is objectionable, therefore, that

[14] Per Supplement to Pre-Filed Testimony submitted by Kathleen M. Reidhead on January 6, 2014, Document #150656 at Page 2, lines 12-15.
[15] Per Exhibit KMR-G attached to Supplement to Pre-Filed Testimony submitted by Kathleen M. Reidhead on January 7, 2014, Document #150656.
[16] Per ACC Decision 71902, Page 6, Document #118338 on Docket No. W-03514A-10-0116 & -0117
[17] Per ACC Decision 71902, Page 5, lines 20-22.
[18] Per Document #113908 filed on July 8, 2010 on Docket No. W-03514A-10-0116 & -0117.
[19] Per the Direct Testimony of Kathleen M. Reidhead, Document #149527, pages 9-12 of Exhibit A.
[20] Per the Direct Testimony of Kathleen M. Reidhead, Document #149527, pages 9-12 of Exhibit A.
[21] Per the Rebuttal Testimony of Jason Williamson, Document #150385, Exhibit JW-RB1.

PWC has spent between $52,000[22] to $88,000[23] per summer to haul water over these last 5 years to MdC and EVP when they could have drilled 6-10 new wells each year for a similar amount of money and/or added larger storage tanks. Any responsible Company would have done this simple cost/benefit analysis and acted prudently.

Steve Prihan stated in his public comments at the January 13, 2014 Hearing[24], "Gila County put up $4 Million to make sure the pipeline was adequate size in order to bring the water to outlying communities." Per attached Exhibit KMR-L found at this link: http://www.gilacountyaz.gov/government/clerk_of_the_board/Resolutions2008.php, the Gila County Board of Supervisors passed Resolution No. 08-09-01 on September 9, 2008, allocating up to $4 Million dollars for construction of a single pipeline to deliver Cragin Reservoir water to Payson and northern Gila County communities. This evidence shows that Gila County officials were supportive of the long term water plan and eager to assist. However, the Resolution clearly states that "Gila County wishes to ultimately recover costs of the upsized pipeline from the communities and water purveyors that will use the pipeline." This makes it clear that PWC would be obligated to pay back a share of this $4 Million dollar commitment from the County if/when they obtained legal authority to participate in the Cragin water. It is clear now that the Cragin water plan has been developing since 2008 and that the State of Arizona, SRP, Town of Payson and Gila County are supporting a longterm water plan for northern Gila County's future water needs, using Cragin Reservoir water. This long term water plan has not been clearly and forthrightly disclosed to the ratepayers by PWC, however. No effort has been made to inform the ratepayers of the benefits of the long term plan. Nowhere has PWC disclosed that their participation in the Cragin pipeline would obligate PWC to pay Gila County back for a portion of the $4 Million they put forward. Nor has there been any disclosure of the specific costs PWC would incur for that. Instead, it appears a complicated and devious effort has been made to conceal these and other details from the ratepayers. Only through the diligence of the Intervenors has this information been found and brought forth. Once again, this concealment of key information seems to show a pattern to deceive, which may rise to the level of predatory business practices and may be unlawful, as per A.R.S. §44-1522 or other statutes.

It's difficult to know exactly what the Company's devious plan entails, but it is clear that a devious plan exists. PWC should be investigated and held accountable for their actions. Mr. Shapiro misrepresented the facts of the matter to the Commissioners at the October 16, 2013 Open Meeting when he said (referring to PWC), "They're going to do everything they can to get water sooner and cheaper to the people of MdC"[25] "Cheaper" has been refuted in KMR's Surrebuttal Testimony, specifically Exhibit KMR-5, and the premise that MdC needs to "get water" is in question based on Exhibit KMR-G[26] and Exhibit KMR-K (attached). It seems clear now that the Company's goal was to

[22] Per the Rejoinder Testimony of Jason Williamson, Document #150671, page 14, lines 22-23.
[23] Per Rebuttal Testimony of Jason Williamson, Document #150385, Page 9, lines 17 & 18.
[24] Public Comment given by Steve Prihan of Elusive Acres on January 13, 2014 @ 29:37 - 32:51 of the video archive.
[25] Per the testimony of Jay Shapiro at the October 16, 2013 Open Meeting, 03:29:30 - 03:31:29 of the video archive.
[26] See the Supplement to Pre-Filed Testimony submitted by Kathleen M. Reidhead on January 7, 2014, Document #150679.

obtain access to Cragin water resources without being straightforward and honest with their ratepayers about the reasons and the costs.

PWC is now attempting to spread the cost of the TOP/MdC pipeline project onto all of its ratepayers[27], despite their claims to the contrary[28], even those ratepayers who will never benefit from one drop of water from the TOP/MdC pipeline or the Cragin Reservoir, like those in Deer Creek Village and Gisela. This goes against the assurances given by PWC to the Commissioners at the October 16, 2013 Open Meeting[29]. The Rejoinder Testimony of Thomas Bourassa shows the $275,000 added into the rate base[30] as the Net Utility Plant in Service (for Test Year ending December 31, 2012) is increased via an adjustment. This seems to be retroactive ratemaking, which KMR believes is a violation of the law. How can PWC place a pipeline in service in 2012 before it has yet been constructed in 2014? KMR believes this is a violation of A.R.S. §40-203. The Rejoinder Testimony rate design (H Schedules) shows conflicting information to this data, however, so it is difficult to state with any degree of certainty exactly what the Company is proposing, as the irregularities in the data supplied by PWC gives very little confidence in the integrity of their claims. These actions seem to show a pattern to deceive, which may rise to the level of predatory business practices and may be unlawful, as per A.R.S. §44-1522 or other statutes.

Whether the actions by PWC were intended to deceive or defraud the ratepayers remains uncertain, but KMR believes it warrants a criminal investigation. She asks the ACC to contact the Attorney General and to aid in an investigation, as per A.R.S. §40-421.

In the meanwhile, it seems reasonable to request the ACC order an inspection by an outside, independent, 3rd party entity of all the PWC-owned and Brooke Utilities-owned wells in MdC and EVP for pump test capacity verifications. Upon determination of the results of that examination, routine maintenance and repair be performed on any wells determined to be underperforming in order to bring them to peak operational condition. Likewise, the ACC could order a system monitoring exercise, similar to the one ordered for Geronimo Estates in 2005, referenced in ACC Decision #67747 and ACC Decision #68696. After one of those exercises, a final assessment of the well performance capabilities can be stated with certainty. Perhaps adding additional wells or additional storage tanks would alleviate the problems at a cost less than the $275,000 cost for the temporary TOP/MdC interconnect pipeline. Proactive and responsible action can, and should be taken as soon as possible to address the MdC and EVP system deficiencies.

The ratepayers and the ACC have ample reason to doubt the integrity of claims made by PWC, based on evidence of their conduct as established throughout this rate case. Therefore, KMR urges the ACC to order cost of service studies be conducted and approve a just and reasonable rate for each of the water systems served by PWC that is rooted in actual cost of service and actual hydro-geological data

[27] Per Rejoinder Testimony of Jason Williamson, Document #150671, at Page 3, lines 7-10.
[28] Per Rejoinder Testimony of Jason Williamson, Document #150671 , at Page 14, lines 6-8.
[29] Per Comments by Jay Shapiro at the October 16, 2013 Open Meeting, 03:39:40 - 03:40:02 of the video archive.
[30] Per Rejoinder Testimony of Thomas Bourassa, Document #150671, at Rate Base Schedules: Schedule B-2, Page 1 (Page 62/147).

relevant to their system(s). DCV and Gisela should be on a separate rate structure than the other 6 systems, as it has been shown that different hydro-geological conditions exist in the Tonto Creek Water Basin than in the Verde River Basin. The costs of the TOP-MdC Interconnect pipeline and/or any costs associated with Cragin Reservoir water should not be imposed on any of these rural communities until it can be shown to be necessary and prudent or the Company obtains genuine public support for it via transparent disclosure of the details. KMR also requests the ACC amend the Curtailment Tariff issued by Decision #67821 and remove DCV from that order.

For many years, Payson Water Company and its parent Company, Brooke Utilities, have hurt the people they serve. They planned to harm them further during the present rate case. While they state, "The approvals sought herein are compatible with the public interest and with the proper performance of PWC's duties as a public service Corporation"[31], their actions have been shown to be far from proper, as shown by Exhibit KMR-J. Their consolidation of rates proposal went so far as to attempt to hurt the people in the Tonto Creek Basin, where water resources are known to be abundant[32]. It appears that PWC has gone to great lengths to acquire access to Cragin water resources, for reasons that are still unclear. But whatever those reasons, the ratepayers of PWC deserve more ethical treatment from this Company in the future. This is a grave reminder that the societal and economic dangers of monopolies are very real, which is why it is necessary to regulate and monitor monopolistic businesses closely.

Respectfully submitted this 27th day of January, 2014.

By Kathleen M. Reidhead

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ORIGINAL and thirteen (13) copies of the foregoing were filed this 27th day of January, 2014 with:

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Arizona Corporation Commission
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[31] Per the Direct Testimony of Robert Hardcastle, Document #145599, Page 4, lines 17-18.
[32] Per Surrebuttal Testimony of Kathleen M. Reidhead, Document #149903, at Page 2, lines 10-39 and Page 3, lines 1-16.

COPY of the foregoing was mailed
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EXHIBIT KMR-J

IMPRUDENT, UNREASONABLE, FALSE & MISLEADING PWC ACTIONS

1. **IMPRUDENT:** Consolidating, bifurcating and expediting the rate case, causing high levels of confusion and distrust amongst the ratepayers.[1]
2. **IMPRUDENT & MISLEADING:** Publishing a late and inaccurate public notice for the rate case.[2]
3. **IMPRUDENT:** Not informing the ratepayers from the other 7 systems outside of MdC about the MdC/Cragin project or of any other efforts taken to resolve claimed water deficiency issues in MdC prior to the public notice being delivered.
4. **IMPRUDENT:** $275,000 TOP/MdC pipeline project. The cost of this project will encumber MdC ratepayers with debt over 20 years and cost far more than the cost of water hauling likely would have cost each individual ratepayer, as shown on Exhibit KMR-5[3]. Later in the rate case, PWC placed the responsibility for this project onto all ratepayers (after repeated statements that only MdC ratepayers would pay for this project) by placing the $275,000 TOP/MdC Interconnect pipeline into the rate base as a Net Utility Plant in Service (for Test Year ending December 31, 2012)[4] even though the pipeline has not yet been constructed.
5. **FALSE:** Mr. Williamson states, "It is clear in the record that we are requesting that MDC pay any extra costs associated with financing, building and operating the TOP-MDC line"[5]. [The Phase 1 Decision #74175 called for a DSC of 1.2 or greater, which would have imposed higher rates for all ratepayers, since there was only one rate proposal for consolidation of all systems[6]. The ratemaking design was later changed (for the third time) during Rejoinder Testimony to eliminate the Phase 2 financing costs and now puts the Phase 1 TOP-MDC pipeline costs into rate base, meaning all ratepayers will indeed share those costs, if approved. Mr. Williamson contradicts his own statement in Rejoinder Testimony when he proposes including the cost of the TOP/MdC interconnection in the rate base and terminate the Phase 1 Surcharge.[7] This change is also reflected in Bourassa Rejoinder Schedule B-2, Page 1: Net Utility Plant in Service (for Test Year ending December 31, 2012) is increased from $826,561 to $1,100,886 via an adjustment, an increase of $274,325.[8]]
6. **MISLEADING:** Mr. Williamson states that "The majority has concluded that, as far as the *long term* solutions, the best means is build the TOP-MDC line and then, when completed, to connect to the Cragin pipeline."[9] [What he fails to acknowledge is that only the ratepayers in MdC were involved in the process and only 95 of them were in support of developing additional water supplies[10]. No mention of Cragin water was on that petition. None of the ratepayers from any of the other 7 systems outside of MdC were informed or offered any opportunity to weigh in on this Decision prior to the Public Notice issued, which they have clearly shown a strong opposition to since becoming aware of it. Hence, the group he cites does not qualify as a "majority".]

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[1] Per the Motion to Consolidate Proceedings and Request for Expedited Procedural Schedule, Document #147357, posted on August 15, 2013.
[2] Per the Notice of Filing, Document #149206, posted on October 30, 2013.
[3] Per the Surrebuttal Testimony of Kathleen M. Reidhead, Document #149903.
[4] Per Rejoinder Testimony of Thomas Bourassa, Document #150671 at Rate Base Schedules: Schedule B-2, Page 1 (Page 62/147).
[5] Per the Rejoinder Testimony of Jason Williamson, Document #150671 at page 14, lines 6-8.
[6] Per the Surrebuttal Testimony of Kathleen M. Reidhead, Document #149903 at page 7, lines 16-40 and page 8, lines 1-5.
[7] Per the Rejoinder Testimony of Jason Williamson, Document #150671 at page 3, lines 7-11.
[8] Per the Rejoinder Testimony of Thomas Bourassa, Document #150671 at Exhibit Rejoinder Schedule B-2, Page 1 (Page 62/147).
[9] Per the Rejoinder Testimony of Jason Williamson, Document #150671 at page 17, lines 8-10.
[10] Per ACC Decision No. 71902, Document #118338 on Docket #W-03514A-10-0116 & -0117, Petition is Document #113908 submitted on July 10, 2010.

7. **MISLEADING:** Stating that "Building the TOP/MdC Interconnection Pipeline as soon as possible is the best thing for the Company and its customers."[11] [This has been refuted by Exhibit KMR-5[12]]
8. **UNREASONABLE & MISLEADING:** Claiming that the TOP/MdC interconnect pipeline is still necessary to avoid water hauling charges[13] **after** PWC well performance data has been entered into evidence showing PWC wells underperforming, while no evidence has been presented to show any efforts to evaluate and/or improve the PWC wells in MdC has yet been attempted.
9. **MISLEADING**: PWC is now attempting to spread the cost of the TOP-MdC interconnect pipeline onto all of its ratepayers[14] despite their claims to the contrary[15], even those ratepayers who will never benefit from one drop of water from the TOP-MdC pipeline or Cragin Reservoir water, like those in Deer Creek Village and Gisela. These communities are approximately 20 miles away from the location of the pipeline and have abundant water resources underground.
10. **IMPRUDENT:** Spending "tens of thousands of extra dollars in expedited Commission proceedings"[16] to pursue an expensive solution ($1.2 M Cragin pipeline project) to a problem that has not been proven.
11. **IMPRUDENT:** Adjusting the Income Statement to claim a monetary gain from the sale of the Star Valley plant as an increase and a decrease to assets.[17] The removal of this asset from the Company altered the Test Year data, which significantly impacts the rate case. Later changing that accounting entry in the Supplemental Rejoinder Testimony to reflect different handling of that asset.[18]
12. **MISLEADING:** Stating that the Company is in very poor financial condition.[19] [The Company would not be in poor financial condition if a monetary asset of $755,709 from the sale of the Star Valley plant had not been removed during the Test Year and a large portion of it distributed to a Shareholder of Brooke Utilities.[20]]
13. **IMPRUDENT & MISLEADING:** Recording the accounting for all systems using only one accounting system and one chart of accounts. [This caused complicated adjustments to be made during the rate case, especially so due to the condemnation sale of the Star Valley/Quail Valley system. Further, late adjustments to accounting postings[21] and questionable reporting of Miscellaneous Expenses is noted.[22]]
14. **IMPRUDENT:** Not complying with ADEQ & ADWR regulations and reporting requirements.[23]
15. **UNREASONABLE:** Changing the rate design at Phase 2 Rebuttal Testimony via a 173 page document.
16. **UNREASONABLE:** Changing the rate design at Phase 2 Rejoinder Testimony via a 147 page document, at a very late stage of the rate case, presented one week before initially scheduled Hearing.
17. **MISLEADING & UNREASONABLE:** Mr. Williamson states that he does not agree that Deer Creek Village should be released from the Curtailment Tariff issued in 2005, Decision 67821, even though "it seems they have an

[11] Per the Responsive Testimony of Jason Williamson, Document #148449, Page 4, lines 22-25.
[12] Per the Surrebuttal Testimony of Kathleen M. Reidhead, Document #149903, Page 6, lines 4-16.
[13] Per Jay Shapiro at the Pre-Hearing Conference on 01/08/14, from 06:00-6:35 of the video archive.
[14] Per Rejoinder Testimony of Jason Williamson, Document #150671 at page 3, lines 7-10.
[15] Per Rejoinder Testimony of Jason Williamson, Document #150671 at page 14, lines 6-8.
[16] Per the Responsive Testimony of Jason Williamson, Document #148449, Page 4 lines 22-25.
[17] Per the Exhibit Schedule C-1 of Thomas Bourassa, Document #145511, Page 144/279 of original rate application.
[18] Per the Exhibit TJB-SRJ1 of Thomas Bourassa Supplemental Rejoinder Testimony, Document #150824, page 74/75.
[19] Per the Rejoinder Testimony of Jason Williamson, Document #150671 at page 5, lines 3-4.
[20] Per the Exhibit Schedule C-1 of Thomas Bourassa, Document #145511, Page 144/279 of original rate application
[21] See Supplemental Rejoinder Testimony, Document #150824 at Page 74/75, Exhibit TJB-SRJ1 by Thomas Bourassa.
[22] Per the Surrebuttal Testimony of Suzanne Nee, Document #151202, Page 1, lines 39-45 and Page 2, lines 1-27.
[23] Per the Direct Testimony of Jian Liu, Document #149555, Page 13.

ample water supply".[24] Abundant water resources are available in the underground aquifer that supplies DCV wells[25]. [He cites reasons that the Commission wanted all of PWC's systems subject to curtailment tariffs, showing no willingness to assist in correcting this injustice during the current proceedings.]

18. **UNREASONABLE:** Proposing conservation rates (a tiered commodity structure) on any of these rural communities. Each of these systems is an independent well system, not connected to any of the others. There is no evidence that water supply is deficient in any or all of these 8 systems and therefore, it cannot be shown that conservation is necessary or beneficial to anyone in these systems and therefore, conservation rates should not be imposed.
19. **UNREASONABLE:** Proposing consolidation of rates. Consolidation is discriminatory to ratepayers in Gisela and DCV due to the fact that these two communities have abundant and stable water resources, unlike some of the other communities served by PWC[26].
20. **FALSE:** Stating that the pipeline and any associated costs do not affect KMR "as she, herself, has recognized"[27] [The footnote points to Page 7 of KMR Surrebuttal Testimony, which in no way indicates that she has made any such statement.]
21. **MISLEADING:** Mr. Williamson states, "All of the systems are owned and operated by PWC and they are all located in the same general geographical area."[28] [This statement is made **after** it has been shown that Deer Creek Village and Gisela are physically located in the Tonto Creek Basin, with abundant water resources in underground storage, while the other 6 communities are physically located in the Verde River Basin, where different conditions may exist.[29] Furthermore, the great distance between some of these systems has been noted for the record. For example, Deer Creek Village is approximately 20 miles away from Mesa del Caballo.[30]]
22. **MISLEADING**: Mr. Bourassa states, "As far as I am aware, the missing plant invoices and the Star Valley/Quail Valley related CIAC are the only record keeping issues in the case."[31] [This statement is made after it has been shown that PWC's Miscellaneous Expenses are exceedingly high, per Sue Nee[32].]
23. **MISLEADING**: The ***SQV-Detail for Disposition Journal - Accounts and Balances Mapping***[33] shows misleading labels for the accounting entries detailing the disposition of the monetary asset received from the condemnation sale of the Star Valley/Quail Valley plant. This document also shows a change to the original Journal Entry 3321, stating the previous entry as a "temporary posting".
24. **MISLEADING**: Per Exhibit KMR-L and as stated by Steve Prihan in his public comments at the January 13, 2014 Hearing[34], "Gila County put up $4 Million to make sure the Cragin pipeline was adequate size in order to bring water to outlying communities." This evidence shows that Gila County officials were supportive of the long term water plan. Though it has been developing since 2008, nowhere has this long term water plan been

[24] Per the Rejoinder Testimony of Jason Williamson, Document #150671 at page 16, lines 5-6.
[25] Per the Surrebuttal Testimony of Kathleen M. Reidhead, Document #149903, Exhibit KMR-1.
[26] Per Surrebuttal Testimony of Kathleen M. Reidhead, Document #149903, Page 2-3 & Exhibit KMR-1.
[27] Per the Rejoinder Testimony of Jason Williamson, Document #150671 at page 15, lines 14-15.
[28] Per the Rejoinder Testimony of Jason Williamson, Document #150671 at page 13, lines 13-15.
[29] Per the Surrebuttal Testimony of Kathleen M. Reidhead, Document #149903 at pages 2-3.
[30] Per the Direct Testimony of Kathleen M. Reidhead, Document #149527 at page 2, lines 6-8.
[31] Per the Supplemental Rejoinder Testimony of Thomas Bourassa at page 4, lines 22-23 (Pg. 69/75) and page 5, lines 1-7 (Pg. 70/75).
[32] Per the Supplement to Pre-Filed Testimony of Suzanne Nee, Document #150692, at Page 1, lines 33-44 and Page 2, lines 1-23.
[33] Per the Supplemental Rejoinder Testimony by Thomas Bourassa, Document #150824 at page 74/75, Exhibit TJB-SRJ1.
[34] Public Comment given by Steve Prahin of Elusive Acres on January 13, 2014 @ 29:37 - 32:51 of the video archive.

clearly and forthrightly disclosed to the ratepayers by PWC. No effort has been made to inform the ratepayers of the benefits of the long term plan. Nowhere has it been disclosed that PWC's participation in the Cragin pipeline would obligate PWC to pay Gila County back for a portion of the $4 Million they put forward. Nor is there any disclosure of what the costs would be for that. Instead, a complicated and devious effort to hide those details has been made.

25. **IMPRUDENT**: PWC has shown costs spent for drilling wells in the past in MdC[35] ranging from $6,505.83 to $8,309.66 each. It is objectionable, therefore, that PWC has spent between $52,000[36] to $88,000[37] per summer to haul water over these last 5 years to MdC and EVP. PWC could have drilled 6-10 new wells each year for that amount of money and/or added additional larger storage tanks. Any responsible Company would have done this simple cost/benefit analysis and acted prudently.

[35] Per the Rebuttal Testimony of Jason Williamson, Document #150385, Exhibit JW-RB1.
[36] Per the Rejoinder Testimony of Jason Williamson, Document #150671, page 14, lines 22-23.
[37] Per Rebuttal Testimony of Jason Williamson, Document #150385, Page 9, lines 17 & 18.

EXHIBIT KMR-K

Mogollon Rim Water Resources

Management Study - Report of Findings

(58 pages of 171 pages)

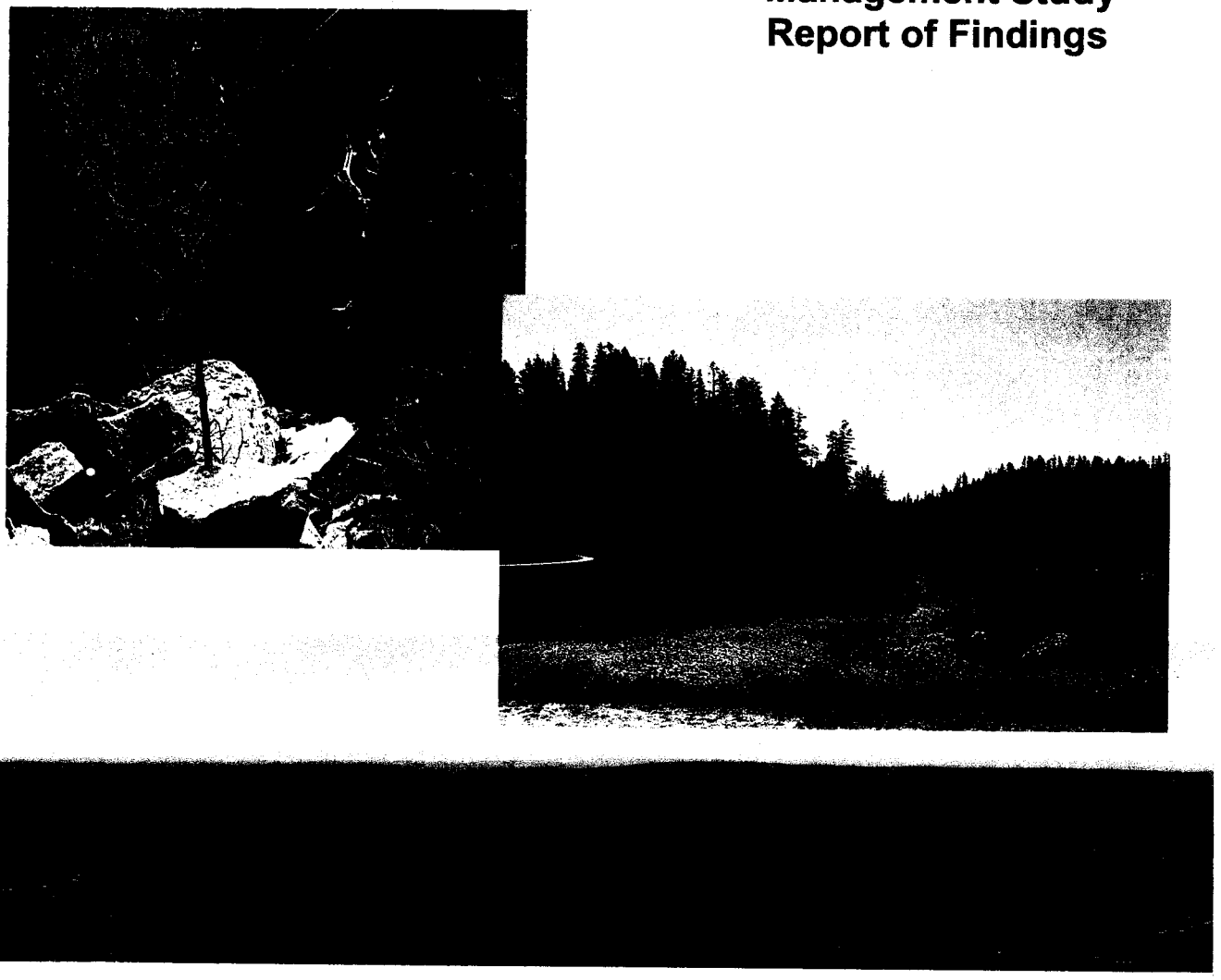
NOTE: Pages 30-37 and 59-171 are intentionally removed due to size considerations. This is a portion of the complete report, which can be found at: usbr.gov/lc/phoenix/reports/mogollonrim/mrwrfr.html

RECLAMATION

Managing Water in the West

Mogollon Rim Water Resources

Management Study Report of Findings



U.S. Department of the Interior
Bureau of Reclamation
Phoenix Area Office

April 2008

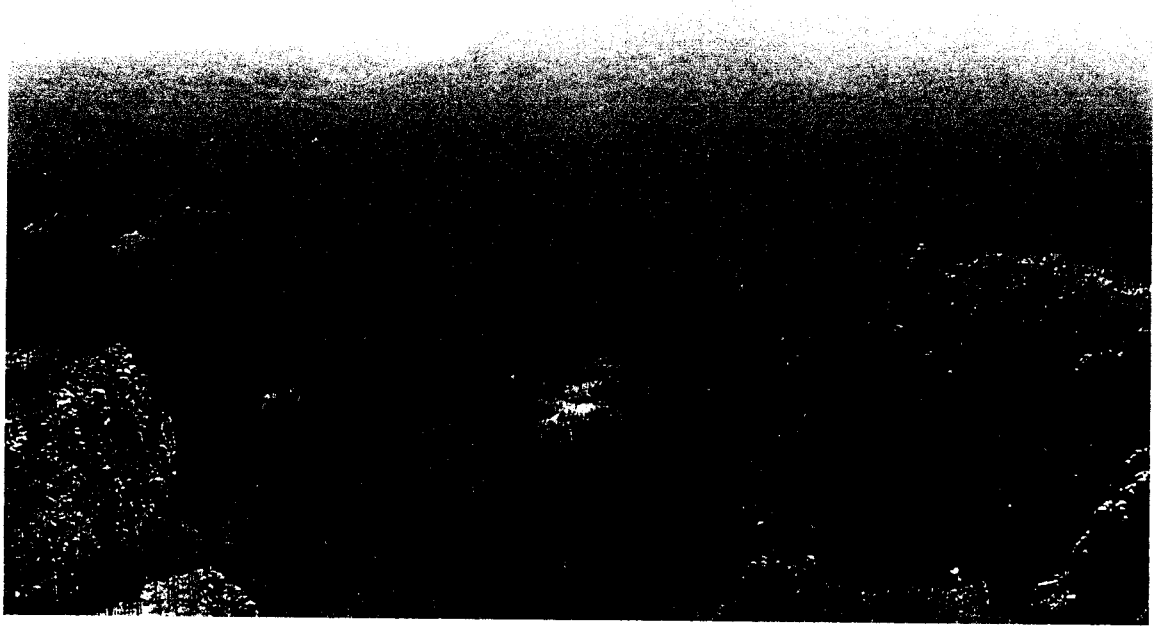
Mission Statements

The U.S. Department of the Interior protects America's natural resources and heritage, honors our cultures and tribal communities, and supplies the energy to power our future.

The mission of the Bureau of Reclamation is to manage, develop, and protect water and related resources in an environmentally and economically sound manner in the interest of the American public.

Mogollon Rim Water Resources

Management Study
Report of Findings



U.S. Department of the Interior
Bureau of Reclamation
Phoenix Area Office

April 2008

Mogollon Rim Water Resources Management Study Report of Findings

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Mogollon Rim Water Resources Management Study Report of Findings

Executive Summary

There are 44 communities located within the Mogollon Rim Water Resources Management Study (Study) area. The communities are comprised of Towns and unincorporated communities with water services from municipal systems, private water companies, domestic water improvement districts, cooperatives and homeowners associations. The population projected for build out in the Study area of Northern Gila County, AZ is more than triple the present population. Most communities are already experiencing chronic water shortages due to increased seasonal water use, drought conditions, and reliability issues. The primary goal of this study is develop regional alternatives with the potential of resolving the urgent and compelling need throughout the Study area for long term reliable water supplies.

Study Purpose

The Study is a regional effort intended to:

- Identify present population and water use within the Study area.
- Project future population and water demands to the year 2040.
- Determine if there is a need to supplement existing water resources to meet future needs.
- If additional water is needed, develop a comprehensive range of alternatives that will take full advantage of opportunities, as well as take into consideration any constraints, that are identified in the course of the Study.
- Evaluate the alternatives based on criteria developed by the Study stakeholders to determine if there is at least one alternative that can meet the identified water demands.
- If there is at least one alternative capable of meeting the identified water demands, determine whether there is a Federal interest in carrying that alternative forward to a feasibility study.

Study Team

The Study partners are the town of Payson, Gila County, and the Bureau of Reclamation. Gila County represents the unincorporated communities within the Study area. Other participating agencies include the Arizona Department of Water Resources, the U.S. Forest Service, the Salt River Project, the Tonto Apache Tribe, and Brooke Utilities (a private water company in the Study area).

Tasks Performed

A Demand Analysis was performed to establish present and future population and present and future water supply needs.

	Present (2002) Population	Present (2002) Demand (af/yr)	Future (2040) Population	Future (2040) Demand (af/yr)
Town of Payson	14,500	1,805	40,000	5,350
Pine and Strawberry	3,043	298	14,487	1,947
Town of Star Valley	1,774	105	3,785	509
Other Gila County Communities	3,062	401	11,320	1,524
Total	22,379	2,609	69,592	9,330

Projected demands were compared to available resources to estimate projected unmet demands. Because of the volatility of available supplies due to persistent drought conditions, extreme seasonal water use, and unreliability of developed groundwater sources, alternatives were developed to meet all of the projected future water supply needs. The two main sources of supply for the alternatives are groundwater and surface water.

Groundwater is the most relied up source of water in the Study area. And due to the unreliability of the fractured granite shallow aquifer currently used for water supply, the study partners recognized the need to collect more refined data pertaining to the location and movement of water throughout both the shallow and deep aquifer systems in the Study area. Therefore, a Hydrogeologic Framework was developed for the study. The Hydrogeologic Framework provides a conceptual groundwater model aimed at identifying areas of high potential development of reliable groundwater sources.

The passage of the 2004 Arizona Water Rights Settlement Act resulted in allocation of 3,500 ac/ft of annual surface water supply from C.C. Cragin reservoir to northern Gila County. The Act designates 3,000 ac/ft annually for the Town of Payson and 500 ac/ft annually for other northern Gila County communities. Additional C.C. Cragin water supply may be available to the Tonto Apache Tribe and the Pine Water Company by exchange with the Salt River Project for valid CAP allocations. The availability of this renewable surface water source to the communities within the Study area is a key component to solving the long term supply and reliability issues in the region.

Six groundwater alternatives, nine surface water alternatives, one effluent alternative, and three water resource and operational management alternatives were formulated, analyzed and evaluated in the study process. There is either one alternative or a combination of alternatives that can meet the water supply needs of each of the communities in the Study area.

There are many issues with respect to a Federal interest for any of the alternatives. These would include, but not be limited to the following:

- Recognition and respect for Federal landownership and management programs.
- Honoring of existing National Forest's plans.
- Existing Federal environmental programs.
- Contractual and other administrative relationships between Reclamation, and the two Arizona Federal water projects (CAP and SRP).
- Arizona Water Settlement Act of 2004 – Implementation of Indian water settlements
- Anticipated environmental disturbance to Federal lands caused by construction.
- Potential opportunities to improve public use of Federal lands for recreation and other reasonable public access purposes.
- Archeological and ecological locations to identify, protect, and mitigate on Federal lands.
- Potential for entry into Tonto National Forest for purposes of groundwater development.

Conclusions

- There is a need for up to 9,330 af/yr to supplement existing water resources in the Study area.
- There are groundwater (local and regional), surface water (regional, including CAP exchange options) and combinations of both alternatives that will meet the water demands for all of the communities in the Study area.
- Of the nineteen alternatives developed for this study two groundwater and four surface water alternatives were deemed to be viable and are, therefore, recommended for futher feasibility level study.

- Implementing a project which would beneficial use the 3,500 acre-feet of water from the C.C. Cragin Reservoir which was allocated to the Town of Payson and Northern Gila County by the 2004 Arizona Water Rights Settlement Act would be the most effective method of meeting the future water demands of the majority of the citizens living in the Study area.

- There are Federal interests that are vital to a regional plan that justify Reclamation's future involvement in a feasibility study of the viable alternatives.

I. Introduction

I.A Background

The Mogollon Rim Water Resources Management Study (Study) has been conducted to provide a regional assessment of current water supplies and identify potential alternatives for providing adequate water to Arizona communities located in the northwesterly corner of Gila County (see Figure I-1).

The geographic area of focus for this Study is located entirely within northern Gila County, about 100 miles north of the Phoenix metropolitan area, Arizona (see Figure I-2). Gila County is a relatively small county in terms of population (53,000) but quite large in terms of land mass (4,796 square miles). Approximately 96 percent of the County consists of national forests, state, Federal, and tribal lands, leaving only 3.7 percent private lands. One-half of the private land consists of mining properties. The historical county seat (Globe), a major copper producing area, was at one time the Capital of the Arizona Territory, prior to statehood. The Study area (see Figure I-1) is bordered to the west by the Gila County boundary and to the north again by the Gila County boundary along the Mogollon Rim, about 15 miles north of Payson, Arizona. The Mogollon Rim, an escarpment, extends over 100 miles and defines the southern edge of the Colorado Plateau. The eastern boundary of the Study area is Christopher Creek and Tonto Creek; and the southern boundary is about 4 miles south of Payson, at or near Latitude N 34°09. The Study area encompasses approximately 632 square miles, all of which are located within the Tonto National Forest. The main sources of surface water in the Study area are the East Verde River, a tributary to the Verde River, and Tonto Creek, a tributary to the Salt River.

The Study partners include the Bureau of Reclamation (Reclamation), Gila County (County), and the Town of Payson (Payson). The County represents the unincorporated communities within the Study area, including water improvement districts. Payson represents its citizens, which make up about 68 percent of the total population within the Study area; its town limits occupy about 1 percent of the land mass of the Study area.

Other agencies participating in the Study include: United States Forest Service (FS), both Coconino National Forest (CNF) and Tonto National Forest (TNF); Arizona Department of Water Resources (ADWR); Salt River Project (SRP) - a major supplier of water to the Phoenix metropolitan area; and regulated water utilities in the Study area (mainly Brooke Utilities, Inc.). The Tonto Apache Tribe, the only Native American community within the Study area, has formally requested not to be included as a participant in the Study.

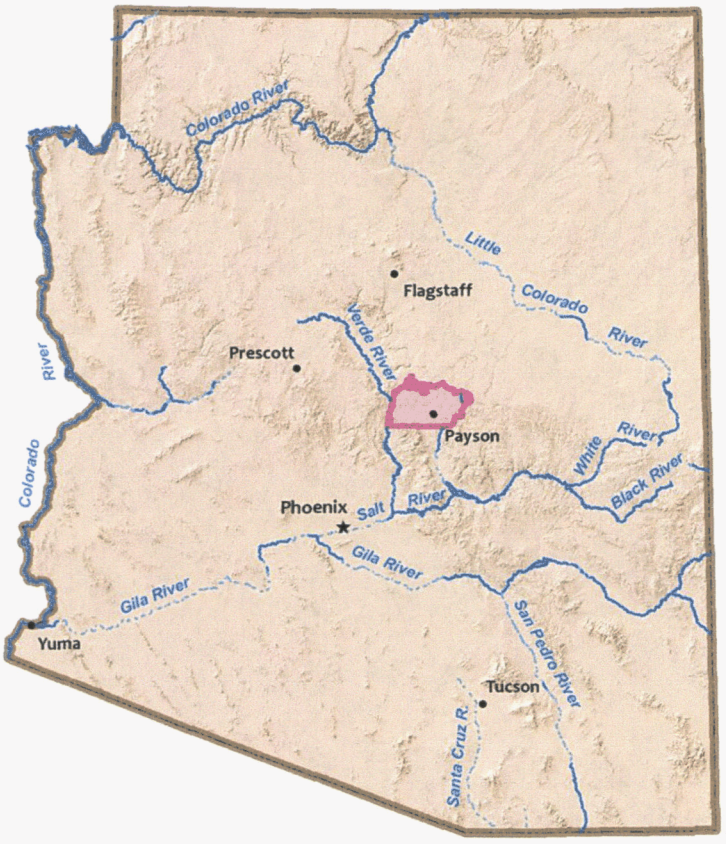

Figure I-1. – General Vicinity Map

I.B Need for and Purpose of the Study

I.B.1 Need for the Study

In the past, water providers and users within the Study area have sought to develop their own water supplies. While most area water resources have been managed with diligence within the Study area, especially in Payson, the ability to meet existing water demands with the available water supply has been seriously compromised by the current drought, in its 10th year as of 2007. The existing developed water resources are inadequate to reliably support future water supply needs of the Study partners.

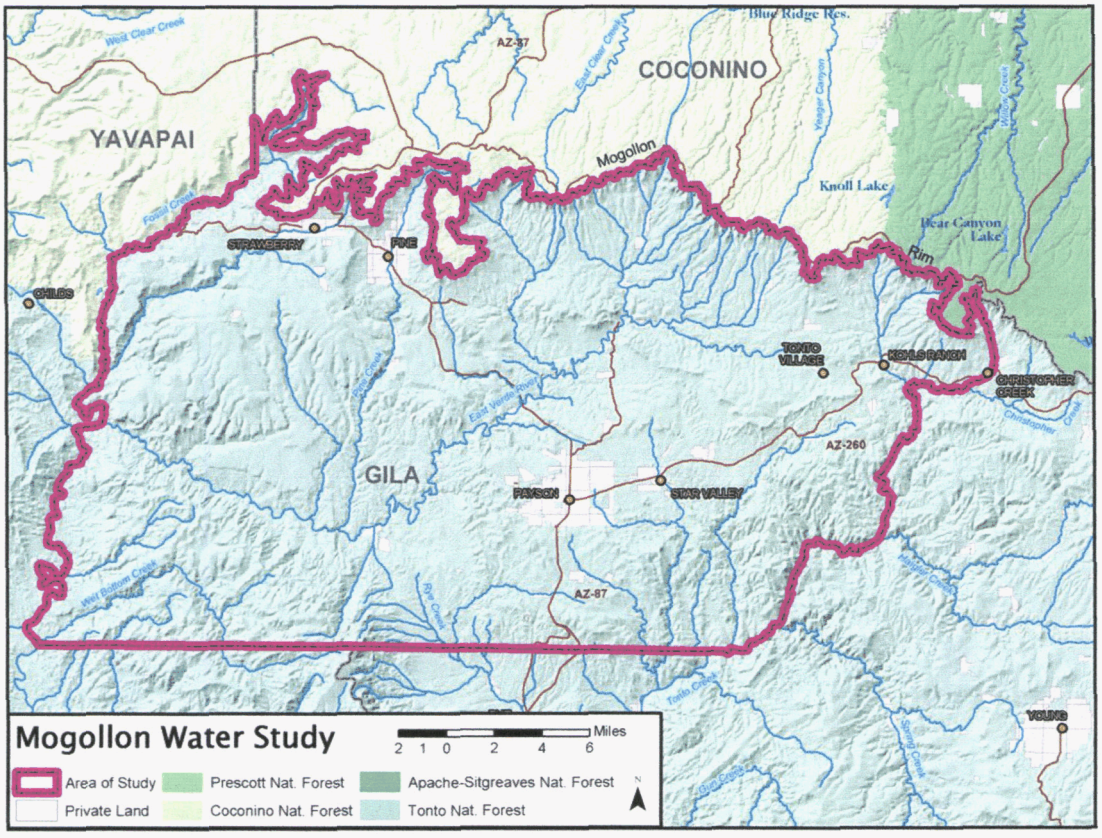

Figure I-2. – Map of the Study area

The Study area's conflict between its growing population and diminishing water supply availability and/or poor reliability has posed significant water resource management problems for the water service providers within the Study area. Almost all of the communities in the Study area are experiencing one or more of the following:

- Water shortages for daily needs;
- Exhausting existing supplies during periods of drought;
- Placing residents under severe water use restrictions; and
- Experiencing inadequate water supplies to sustain the increased growth in the area.

Over the last few years, the Study partners have found it neither possible nor practicable to develop water supply projects independent of each other, and they are concerned about developing and/or maintaining sustainable and renewable water supplies for their communities over the next 35 years. The Study partners are seeking to develop suitable regional alternatives that will allow each partner to contribute both its energies and resources in developing a regional solution to solve their individual water supply needs.

In addition to entities that are a formal part of the Study, there are numerous other water providers and users which could either be directly or indirectly impacted by any proposed regional solution. These entities are located throughout the Study area and include private water companies, rural subdivisions, home owner associations (HOAs), domestic water improvement districts (DWIDs), and private well owners (see section III.A, Types of Water Supply Providers).

As discussed in more detail later in this Study, the projected water demand for the growing population in the Study area is estimated to exceed 10,000 acre-feet per year (af/yr) by 2040, compared to an existing supply and conservation-driven demand of 2,600 af/yr. Nearly all the water currently provided in the Study area comes from shallow well fields that are either fully developed or annually exhausted, many of which may be at risk of contamination due to proximity to local septic systems.

I.B.2 Purpose of the Study

The purpose of the Study is to identify and describe the long-term water supply and demand issues for the communities within the Study area.

The Study expects to accomplish the following:

- Identify present population and water use within the Study area.
- Project future population and water demands to the year 2040.
- Determine if there is a need to supplement existing water resources to meet future needs.
- If additional water is needed, develop a comprehensive range of alternatives that will take full advantage of opportunities, as well as take into consideration any constraints, that are identified in the course of the Study.
- Evaluate the alternatives based on criteria developed by the Study stakeholders to determine if there is at least one alternative that can meet the identified water demands.
- If there is at least one alternative capable of meeting the identified water demands, determine whether there is a Federal interest in carrying that alternative forward to a feasibility study.

An overall objective of the Study is to supply sound technical information (including regional groundwater mapping) that can be used by all of the Study

participants and other Study area communities to assist in locating and developing water supplies.

The planning period for the Study is 2005 to 2040. The base data were collected as of the 2002 calendar period. For purposes of this Study it is assumed that "build-out" of all Study area communities will occur by the year 2040. Such build-out projections are anticipated because of the tremendous growth trends expected to occur in the Phoenix area, with many of its residents seeking summer or second homes in the Study area, and in-migration of retirees moving full-time to the Rim County from many states.

I.C Roles of the Study Participants

The Partners, participating agencies, and other water providers in the Study area (not represented by the County) each share a common goal in the development and use of adequate, reliable, renewable, and sustainable water resources for the Mogollon Rim area, and in the preservation and protection of historic water rights. Following is a brief description of the roles and responsibilities of each participant.

I.C.1 Study Partners

Bureau of Reclamation
Reclamation is a Federal agency within the United States Department of the Interior, and is charged with developing and assisting in the development of water resources in the western United States. Besides Reclamation's ownership of dams, canals, and other water resource assets, such as C.C. Cragin Dam and Reservoir (formerly known as Blue Ridge Dam and Reservoir), Reclamation's responsibilities in the Study include funding and coordinating the Study, supplying and analyzing data, and ensuring Federal interests in the Study area are protected and/or addressed.

Gila Country
Gila County represents the interests of the unincorporated communities in the Study area, including facilitating and coordinating their involvement in the Study. The County assisted in the collection of population and water use data from all communities outside of Payson. Additionally, it assisted in the development and analysis of alternative solutions that would help give unincorporated areas access to adequate, sustainable, and renewable supplies of water through the year of 2040 and beyond.

Town of Payson
Payson represents the interest of the town of Payson. Payson provided leadership and political support to locate new water resources for the region. It also provided extensive direction to the Study's Technical Committee; supplied contacts and vendors to assist with consulting and engineering support required

during the Study; and shared existing data and information related to prior regional groundwater mapping and modeling efforts.

I.C.2 Other Participating Agencies

FS, Tonto National Forest
All communities within the Study area are entirely surrounded by the TNF. The TNF has management responsibility over all lands within the TNF, and must ensure any proposed activity that would require a FS permit is consistent with the Forest Plan.

FS, Coconino National Forest
The CNF lies in north-central Arizona. The existing facilities associated with C. C. Cragin Dam[1] are located within the CNF, with the exception of the pipeline on the downslope face of the Mogollon Rim that pumps water from the reservoir to the Verde River, and the hydroelectric generation plant that supplies the primary energy to operate the C.C. Cragin pumping plant. Similar to the TNF, the CNF has management responsibility over all lands within the CNF, and must ensure any proposed activity that would require a FS permit is consistent with the Forest Plan.

Salt River Project
SRP holds most of the water rights to flows of the East Verde River and Tonto Creek, which are stored in reservoirs on both the Verde and Salt rivers. This includes nearly all of the surface water runoff from the Study area.[2] This water is ultimately delivered to and used in the Phoenix metropolitan area. SRP participated in data collection and alternatives development related to this Study.

Arizona Department of Water Resources
ADWR provided guidance to all parties involved in the Study related to Arizona water law, which basically provides for title to all natural groundwater to be vested in the state of Arizona, but makes it available to landowners under which the water lies, for reasonable use at no charge. ADWR also coordinated and shared statistics and technical data related to water development efforts and uses

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[1] Note: C.C. Cragin Dam and Reservoir, and much of its associated transmission system, are located outside the Study area, within the boundaries of the CNF. In addition, a portion of the large regional groundwater aquifer, C aquifer, underlies and is adjacent to the Reservoir. Typically, most of the water captured by the Reservoir is pumped south, over the Mogollon Rim into the East Verde River. In the future it is anticipated that a portion of the diversion may be diverted into a proposed water transmission pipeline to Payson and possibly to other communities. A majority of the water is expected to continue its flow down the river and enter the Salt River Project's reservoir system (subject to SRP requirements and operational needs). While the CNF was not created to protect the watershed for the SRP, it still is required to protect the watershed on behalf of all citizens of the United States.

[2] A limited amount of surface water is used by smaller communities in the Study area that have established water claims pursuant to Arizona's Surface Water Code (see Table II.6, Surface Water Claims on the East Verde River (1984)).

within the Study area. It also provided input related to alternative solutions that may solve water resource problems within the Mogollon Rim area of Arizona.

Water Service Providers and Domestic Water Improvement Districts
Many of the water service providers and domestic water improvement districts within the Study area provided statistical and technical data, as well as considerations and feedback regarding alternatives that may provide solutions to water supply issues they face on a day-to-day basis.

I.D. Development and Use of Technical Data

Hydrologic and geologic data and information are exceptionally lacking for the Study area. Conducting an appraisal-level study using only currently available data would have resulted in a report that provided little more than what is already known about the Study area. Therefore, several key investigations were identified and undertaken as preliminary steps in conducting this Study. These were considered to be essential to identify viable alternatives for meeting the Study area's future water supply needs. These investigations included the following:

- "Hydrogeologic Framework and Review of Alternative Water Solutions for the Mogollon Rim Water Resources Management Study area" by HydroSystems, Inc., April 2008 (Attachment 1);
- "Geology and Structural Controls of Groundwater, Mogollon Rim Water Resources Management Study" by Gaeaorama, Inc., July 2006 (Attachment 1A);
- "Evaluation of the Source Water Chemistry from the Major Springs and Select Wells in the Mogollon Rim Water Resources Management Study area" by HydroSystems, Inc., February 2006 (Attachment 1B); and
- "Report on an Isotope Study of Groundwater from the Mogollon Highlands Area and Adjacent Mogollon Rim, Gila County, Arizona" by Chris Eastoe, Ph.D., University of Arizona, October 2007 (Attachment 1C).

The results of these studies were extremely helpful in substantiating previously held assumptions and hypotheses regarding groundwater conditions within the Study area.

The Study does not evaluate (in depth) issues of local distribution system infrastructure, wastewater treatment systems, sewerage collection systems, or other operational management tools available to system operators, that are not part of the transmission system bringing water from water supply sources to the water service provider's service area. While these issues are mentioned in the discussion of alternatives, each of these elements require additional study, both technically and economically, so that each interested entity or group can evaluate

and assess the total cost of acquiring and using any water source described in this Study.

II. Current Conditions of the Study area

This section includes a brief discussion about the climate, topography, geology, surface water hydrology, and hydrogeology of the Study area, as background information for the discussion concerning the communities within the Study area, their current water supplies, projected water needs, and potential future water resources. Other areas such as environmental, socioeconomic, legal, and institutional considerations and constraints also are briefly addressed, as appropriate.

II.A Climate

Precipitation in the Study area is seasonal; during the winter, storms associated with frontal systems bringing moisture from the Pacific Ocean travel from west to east, generally from late October through April. Precipitation often occurs as rain at the lower elevations near Payson and as snow at higher elevations along the Mogollon Rim, and on the Plateau. Winter storms have been the cause of many of the major floods in this area, particularly when warm rain falls on snow. The highest runoff during the year commonly occurs in March and April as a result of snowmelt. High flows are less common in May and early June, between the winter and summer storm seasons, than during any other part of the year. The second precipitation season is during the summer when moist tropical air sweeps in from the south. Precipitation at this time of year often occurs as short-duration, locally intense thunderstorms that are common from late June through early October and often cause local flash flooding.

Annual precipitation ranges from 18 to 26 inches near the Rim and in the Plateau uplands, with the highest values occurring along the Rim. National Weather Service records indicate Payson receives approximately 22 inches of precipitation a year, at an elevation of 4,900 feet above mean sea level (amsl).

II.B Topography

The Study area is located within both the Verde River and Salt River watersheds, and contains mid-elevation mountain ranges and valleys. Areas of higher elevation exist along the north-central boundary of the Study area. Vegetation includes semi-desert grasslands, Sonoran desert scrub, chaparral, highland, and woodland conifer forests (ADWR 2007). Most of the Study area is comprised of scrub oak, juniper, and conifer forest-type cover.

The elevation within the Study area ranges from more than 7,500 feet amsl at the top of the Mogollon Rim, to about 4,500 feet amsl at Fossil Springs, and 3,400 feet amsl at the Study boundary intersecting Tonto Creek. In most portions of the Study area, the cliffs and hills are thickly forested. The most prominent topographic feature in the Study area is the Mogollon Rim, which forms the

boundary between the Colorado Plateau uplands province to the north and the Central Highlands province to the south. It is a steeply sloping cliff that rises from 1,000 to 2,000 feet above Payson to altitudes of 5,500 to 7,500 feet amsl at its upper edge. Topography along the Rim area is notably rugged, with steep cliffs and hills. The topography south of the Mogollon Rim also is rugged, but with less topographic relief. Slopes are generally north-to-south from the Rim, and range from flat in valley sections to nearly vertical at the Rim.

II.C Geology

The Study area is geologically and structurally complex, with a full range of sedimentary, igneous, and metamorphic rock formations, coupled with a high degree of structural discontinuity. Geological formations exposed at the surface range from Precambrian crystalline and metamorphic basement rocks in the south, to a suite of Paleozoic limestone, shale, and siltstones toward the north. The cross-section in Figure II-1, below, represents a generalized view of the geology and associated aquifers across the Study area, from top to bottom and north to south (as left to right).

Geologic structures, mainly faults, of three distinct ages are present in the Study area: Proterozoic, Laramide, and Tertiary structures. There are numerous Proterozoic and Tertiary faults; however, very few Laramide faults and monoclines are evident and are mentioned only incidentally in this Report.

The Proterozoic faults are about 1.65 million years old. They trend north to northeast, and tend to be located in the southerly parts of the Study area. Hydrothermal solutions moving along the faults in both Proterozoic and Tertiary times extensively cemented these faults, largely with silica; thus, to a large extent they are sealed. They have little porosity and permeability and generally do not provide much passageway for groundwater movement. There has been, however, re-activation on several Proterozoic faults, likely of the Tertiary age. This can result in creation of open space in fault breccia, which result in formation of fractured bedrock aquifers.

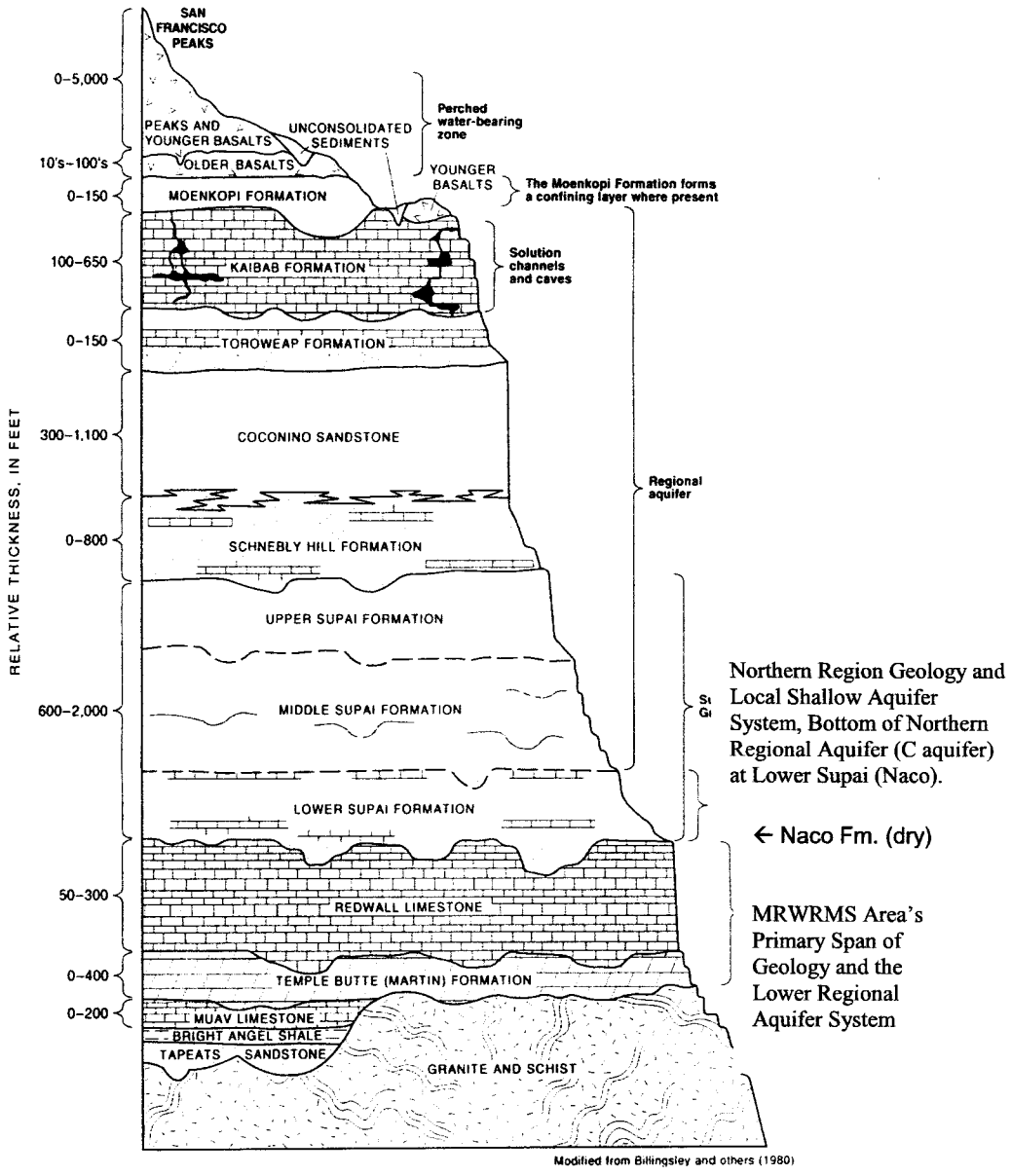

Figure 11. Generalized stratigraphic section of rock units, Flagstaff, Arizona.

24 Hydrogeology of the Regional Aquifer near Flagstaff, Arizona, 1994–97

Figure II-1. – Composite, Generalized Stratigraphic Section for the Study area.

Note: Modified from Figure 11 of USGS Doc. 00-4122, Bills and Others

There are three fundamental Tertiary fault systems: an east- to northeast-trending system; a north-trending system; and one that is generally northwest-trending but has locally north-trending faults. These systems likely developed under tensional tectonic conditions ("pull-apart faults") resulting, at least locally, in areas of broken ground and open spaces. Pull-apart faults are ideal for secondary porosity and secondary permeability, which means there is enhanced porosity and permeability beyond what is provided in normal pore space between grains in sandstones and between crystals in limestones. This is important for development of high production wells.

Not all Tertiary faults result in enhanced permeability and porosity, however. Some may have little or no permeability and porosity due to veins that have filled the fault, or the presence of soft rocks such as shales, shaly and silty sandstones. Some faults can have compressional characteristics that yield minimal open space, while chemical decomposition of fault wallrock may also result in impermeable fault zones. For example, basalt, which is common in the Study area, would readily form clay and calcite.

Overall, areas where younger fault systems intersect older faults systems are found to exhibit higher degrees of both weathering and fracturing, which relates to correspondingly higher well yields.

The Study area, being at the northern boundary of the basin and range province, is commonly referred to as the "Central Arizona Geologic Transition Zone." With minor exceptions, there is a noticeable lack of major young alluvial filled basins that form traditional aquifers in other locations within the basin and range province, such as Phoenix and Tucson. Because of the "broken" nature of the geology immediately south of the Mogollon Rim, there are no regionally extensive and hydrologically confining units present in the Study area. However, the complex relationship of faults and fracture systems and localized presence of isolated confining units do occasionally result in confined to semi-confined aquifer conditions. In addition, a wide range of fractured bedrock geologies in the region host both locally relevant and regionally extensive fractured aquifer systems.

Because of the diversity and complexity of the region's hydrogeology, the "Hydrogeologic Framework and Review of Alternative Water Solutions for the Mogollon Rim Water Resources Management Study area" (Attachment 1; HydroSystems 2008) divided the Study area into four Sub-Regions, based upon hydrogeologic characteristics and complexities. This Study has adopted this approach and utilizes the same sub-basin geographic boundaries in discussing the various communities and water providers within the Study area (Figure II-2).

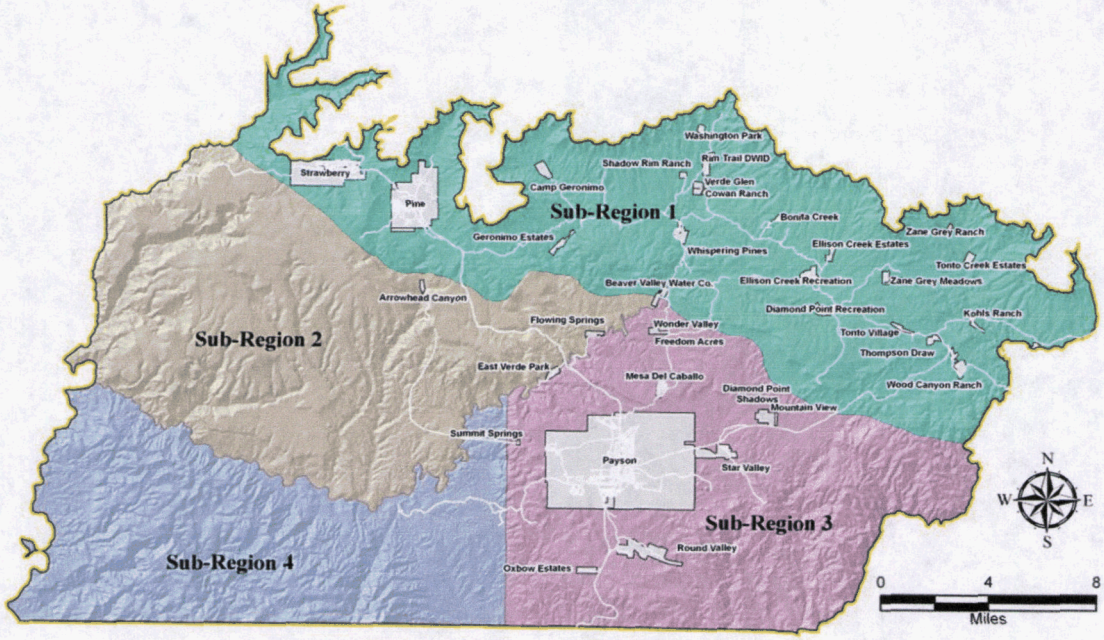

Figure II-2. – Four Sub-Regions within the Study area (HydroSystems 2008)

II.C.1 Geologic Sub-Region 1

- Geronimo Estates
- Whispering Pines
- Mead Ranch

Sub-Region 1 encompasses the area south of the Mogollon Rim (along the southern perimeter of the Colorado Plateau) and north of the Diamond Rim Fault. North of the Diamond Rim fault, the Study area consists of increasingly thicker deposits of Paleozoic strata, and it is ultimately dominated in the north by the Permian formations of the Upper Supai and Coconino Sandstone, which cap the Mogollon Rim. At the base of the Supai group, the Naco Formation is considered to be a locally confining sequence of alternating shale and limestone layers, which eventually pinches out a number of miles north of the Study area, beneath the Colorado Plateau. Faults in this Sub-Region are small but numerous enough to locally create aquifers. They ultimately circumvent the confining ability of the Naco Formation, and result in groundwater draining from the C aquifer down into the limestone, dolomite, sandstone, and eventually the Precambrian basement aquifer below.

Characteristic of this Sub-Region is the exposure of substantial portions of Paleozoic sedimentary rock units of the Colorado Plateau. Although not in the Study area, the Colorado Plateau is very influential because it is the primary recharge zone for the regional groundwater systems that exist both north and south of the Mogollon Rim. The gradient of groundwater moving south of the Mogollon Rim's crest is steep and groundwater flow is generally southward from the Rim. This groundwater makes up the primary groundwater inflow into the Study area, coming from precipitation events that infiltrate along the southern

fringe of the C aquifer system through the Coconino Sandstone and layers of the Upper Supai Formation down to the Lower Supai Formation. The fractures and faults through these units appear to act as sub-vertical drains for local recharge. This facilitates leakage from the C aquifer, transmitting groundwater from along and beneath the Colorado Plateau into the lower section of Paleozoic strata through this Sub-Region, and ultimately into the Precambrian rocks below.

II.C.2 Geologic Sub-Region 2

Sub-Region 2, which is sparsely population, is located south of the Diamond Rim fault, and north/west of the East Verde River. Much of this Sub-Region is covered by Tertiary basalt units which can have a thickness of more than 1,500 feet. The basalt and other Tertiary units overlay some of the same Paleozoic units exposed along the Mogollon Rim, which have been vertically offset by the Diamond Rim Fault.

The Diamond Rim fault represents the physical break that defines the structural edge of the Colorado Plateau, resulting in the "Little Diamond Rim," a prominent ridge just a few miles south of the edge of the much larger Mogollon Rim. The Diamond Rim fault system has resulted in the displacement of large blocks of Paleozoic strata down towards the south in the areas of Fossil Springs, Hardscrabble Mesa, Tonto Natural Bridge, and south of Beaver Valley. This regionally extensive fault system literally cuts across most of central Arizona with normal (southerly side down) displacements locally greater than 1,000 feet. This regionally significant structural feature has a major influence on the region's hydrogeology, particularly with regard to Fossil Springs at the extreme northwest boundary of the Study area. The offset along the Diamond Rim fault in the vicinity of Fossil Springs is estimated to be 2,000 feet down to the south. The fault is likely acting locally as a boundary to groundwater flow across it, but acting as a conduit along the northern side of its strike. Interaction of the Diamond Rim fault with the Fossil Springs fault likely resulted in the formation and evolution of Fossil Springs.

There are only 53 registered wells within Sub-Region 2, most of which are located along its periphery. The direction and magnitude of groundwater flow through the Sub-Region is uncertain. Springs discharging along the outside edge of the basalt indicate groundwater recharge in the area; however, the basalt may conceal faults and fractures in the underlying sedimentary units that could be transmitting unknown quantities of groundwater elsewhere in the Study area.

II.C.3 Geologic Sub-Region 3

Sub-Region 3 falls within the southeast portion of the Study area, within which the majority of the Study area's population is located, including the communities of Payson and Star Valley. Most of the studies to date, which have been

• East Verde Park
• Flowing Springs
• Mesa del Caballo

conducted related to geology and hydrogeology of the region, cover this portion of the Study area.

The geology of this Sub-Region consists predominately of Proterozoic rock units, which are exposed at the surface in most populated areas; however, in the northwestern portion, the Proterozoic rocks are covered by remnants of the lower Paleozoic sedimentary units. Around Payson, a thin veneer of Cambrian Tapeats sandstone commonly caps some of the granite hills around Payson. The contact between the Tapeats and the Precambrian basement is commonly referred to as "The Great Unconformity" where there is a gap in the geologic record of about 1.2 billion years between the time the granites were weathered at the surface, and the deposition of the sandstone approximately 530 million years ago. Because the Precambrian basement has been exposed to surface weathering and faulting repeatedly in its geologic history, the result is a deeply chemically weathered surface, rather than physical erosion. This chemically weathered surface can, however, vary greatly in thickness. The uppermost sections of the Payson granite, in particular, can have as much as 200 feet or more of this weathered-in-place rock or "decomposed granite" immediately adjacent to "hard ribs" of solid granite. The presence of this decomposed horizon is one reason for the Precambrian basement's unexpected performance as a reliable aquifer in the area and points to the likelihood of such aquifers being present in Precambrian host rocks to the north both beneath and adjacent to the Mogollon Rim. The remnants of Tapeats sandstone and their obvious displacements across the south-central portion of the Study area indicate the high degree of faulting in the region, as well as the role the faults played to fracture and further weather the Precambrian basement rocks, thereby forming the fractured bedrock aquifers which support many community water needs.

The nature of the fracturing in the crystalline basement rocks was found to be variable both laterally and with depth, and in concert with the host rocks' mineralogy, the age and interaction of the faults, and degree of weathering in a given area of consideration. Storage is inherently low thus making the aquifers vulnerable to over-pumping and drought. Wells installed within tens of feet of each other can have highly different yields, as is typical for fracture aquifer systems. Overall, where younger fault systems intersect older fault systems, these areas are found to exhibit higher degrees of both weathering and fracturing and relate to correspondingly higher well yields. Within the context of fractured crystalline bedrock, high groundwater yields (200 to 1,000 gpm) in the Payson area have been identified at depths approaching 1,000 feet into Precambrian basement rocks where faults intersect and deep weathering is present. This lower canvas of broken and displaced basement rock geology, with its localized high yield groundwater potential and both regionally and locally sourced aquifers, continues towards the north and constitutes the base of the regional aquifer system of the entire Study area.

Because the Paleozoic sequence was not deposited and/or was previously eroded in areas further south and east of Payson and Star Valley (due in part to a Precambrian - Cambrian bedrock high in this area), there are few if any locations in eastern portions of the Study area with Paleozoic strata preserved south of the Diamond Rim fault. This major fault is entirely within Precambrian basement rocks as it bifurcates and exits the east side of the Study area into the Hells Gate Wilderness.

Aquifers within this region constitute potential "mixing zones" of groundwater flowing southerly through the deep Precambrian fractured aquifer and locally recharged or perched aquifers within structurally bound blocks of dropped down Paleozoic and Tertiary strata. A few communities that lie within this extremely complicated hydrogeologic region are Mesa Dell, Wonder Valley, Freedom Acres, Beaver Valley, and northern Diamond Point Shadows.

II.C.4 Geologic Sub-Region 4

Sub-Region 4 is located in the southwest corner of the Study area, south of the East Verde River. It includes a portion of the Mazatzal Wilderness in the western portion of the Sub-Region, and a portion of Rye Creek Valley along Cypress Thicket. The portion of the Mazatzal Wilderness within the Study area comprises the northernmost end of the Mazatzal Mountains, for which there is very limited hydrogeologic information. The rugged terrain and its classification as a Wilderness Area greatly restrict efforts to obtain any data for this area. Only two registered wells exist in the Mazatzal Wilderness, one of which is abandoned. Both wells were drilled into Proterozoic rock units; groundwater movement is likely restricted to fractures and faults. Due to the area's higher elevation, it likely is a source of recharge to surrounding alluvial valleys. There also may be some groundwater contribution to streamflow of the East Verde River to the north.

Groundwater from Sub-Region 3 flows west into the eastern portion of this Sub-Region, separating near the Verde River and Tonto Creek watershed divide. A portion of the flow continues moving west along the East Verde River, while the other portion moves southward through the Rye Creek Valley, primarily through the Tertiary sedimentary deposits of the Valley. Springs discharging along the eastern edge of Sub-Region 4 all appear to be associated with mapped faults; their discharge is likely derived from recharge occurring in Sub-Region 3 as well as more distant sources.

II.D Water Resources

II.D.1 Surface Water Hydrology

The hydrologic system of the Study area is characterized by a surface network of short, steep stream channels that drain the upland regions and flow southerly into

the Salt and Verde River watersheds. The Study area encompasses about 632 square miles, all of which is located within the TNF; only 2.4 percent of the land within the Study area is privately owned. The primary rivers or creeks flowing from the area include Fossil Creek, East Verde River, and Tonto Creek. All of these originate on the face of the Mogollon Rim and then flow southwestward in the Verde River into Horseshoe and Bartlett Reservoirs, or southeastward in Tonto Creek and into Theodore Roosevelt Lake and the remaining Salt River reservoirs.

Records for major streams that flow out of the Mogollon Rim indicate that base flow discharge increases downstream under most conditions although that flow may not continue without loss all the way to the mouth of the stream. During most flow conditions, the East Verde River and Tonto Creek are gaining in their downstream reaches. In the uppermost reaches above major springs, flow typically occurs only during periods of runoff; flashy runoff in the generally bedrock stream channels is typical. Below these springs, base flow may be maintained year-round for variable stretches. Of the streams originating in the Study area, the U.S. Geological Survey (USGS) has operated continuous-recording streamflow gaging stations on Tonto Creek, Fossil Creek, and the lowermost segment of the East Verde River. Peak flows within the largest perennial streams occur most often in winter or spring as a result of regional frontal storms. Runoff during such storms is augmented by snowmelt. Winter storms account for most of the annual floods above the median peak discharge on all gaged perennial streams draining the Mogollon Rim.

Fossil Creek

Fossil Creek is a major perennial tributary of the Verde River, draining southwest off the Mogollon Rim between the major sub-basins of East Verde River to the south and West Clear Creek to the north. Virtually the entire Fossil Creek drainage area is on land administered by the FS. Rainfall and snowmelt contribute to intermittent streamflow between the upper basin and Fossil Springs. Average annual precipitation is approximately 18 to 20 inches as recorded by Arizona Public Service (APS) at the Childs and Irving hydroelectric power plants, respectively. Precipitation varies considerably on a monthly and yearly basis. Generally, precipitation is distributed bi-modally over the year, occurring during the winter months as a result of storms originating in the north Pacific Ocean, and during the summer monsoon season as a result of convective thunderstorms which form from moisture drawn into the region from the Gulf of Mexico and Gulf of California.

Perennial flow occurs from Fossil Springs at an elevation of 4,280 feet amsl, approximately 14.3 miles upstream from the Verde River. There are several small springs above and below the Irving hydroelectric plant that produce minor additional flows. Fossil Springs represents the largest concentration of spring water discharge in the Mogollon Rim region. Spring flows emerge over an estimated 1,000-foot reach of Fossil Creek and are relatively constant at nearly 46 cubic feet per second (cfs). The Springs provide approximately 74 percent of the

average annual basin yield above the Fossil Springs Diversion Dam. Various flow measurements taken during the past 50 years indicate that these springs maintain a flow of about 20,000 gallons per minute (gpm) that has varied little with respect to time.

In general the only flow measurements on Fossil Creek have been taken at the point of diversion for power plant use at the APS hydroelectric plant near Childs, Arizona. Since there is a general lack of data for Fossil Creek, it has been modeled to estimate its annual flows. Based upon a 2-year recurrence interval, the flow has been estimated to be about 32,230 af/yr. Years in which a 5-year flood occurred would result in flows of about 68,510 af/yr.

Generally, Fossil Creek is gaining flow in its downstream reaches. In the uppermost reaches, above major springs, flow typically occurs only during periods of runoff, but below Fossil Springs a base-flow is maintained year round.

Storm runoff and snowmelt from surrounding mountains contribute to flows in excess of base flow. Intense but brief and localized monsoonal storms produce large volumes of runoff within the watershed that generates flashy flows and flooding. Significant flows that overflow the low flow channel and transport substantial quantities of sediment occur about every other year. Floods in excess of a 5-year recurrence interval have high peak flow velocities capable of transporting cobbles, small boulders, and considerable debris. Under current watershed conditions, the estimated peak flow of the 100-year flood event is approximately 13,530 cfs.

For over 100 years, the surface water in Fossil Creek had been subject to power generation permits (issued by the Federal Energy Regulation Commission [FERC] to APS), which allowed for diversion from the Creek for power generation at Childs and Irving power generation facilities. No water consumption was allowed. In 1992, APS filed an application for a new license for the powerplants. APS then entered into discussions with the FS, U.S. Fish and Wildlife Service (FWS), environmental interveners (American Rivers, Arizona Riparian Council, Center for Biological Diversity, Northern Arizona Audubon Society, Arizona Chapter of the Nature Conservancy, and Yavapai-Apache Tribe). In 2000, APS and the other parties filed an Offer of Settlement (Settlement Agreement) requesting that FERC approve the surrender of the license to operate the hydroelectric facility and proposed to remove facilities and restore the area. The Settlement Agreement stated that APS would cease power generation and restore full flows to Fossil Creek no later than December 31, 2004, and complete site restoration by December 31, 2009.

As part of the agreement, APS submitted a surrender application to FERC in April 2003. FERC permits were surrendered in October 2004, and on June 18, 2005, APS restored full flow to 14 miles of the Fossil Creek wetland ecosystem, returning the area to a "natural and scenic" waterway.

II.D.1.1 Tonto Creek

Long-term records of flow from Tonto Spring show little fluctuation in base flow over a 20-year period. Stability of flow in Tonto Spring results from its location about 300 feet below the crest of the groundwater mound. A two-year record of flow in Pine Creek below Tonto Natural Bridge Spring shows little change in base flow, most of which is supplied by the spring.

The FS has measured the flow of Tonto Creek below the Mogollon Rim, and the amount of base flow was nearly equivalent to the combined discharge of springs in upper Tonto Creek and its tributaries, indicating there is no significant groundwater contribution to the channel from either the C or limestone aquifer other than spring flow. This base flow is approximately 24 percent of the Creek's total flow volume. Stream base flow, spring discharge, evapotranspiration, and runoff account for the greatest components of outflow

II.D.1.2 East Verde River

The base flow for the East Verde River is approximately 36 percent of the River's total flow volume. There are no data to determine the extent to which flow of the East Verde River is maintained by the C aquifer beyond spring discharge, and all base flow in excess of spring discharge is assumed to come from the limestone aquifer. Based upon data developed by USGS, the C aquifer is considered to be the source of most flow that discharges from the underlying limestone aquifer.

Since 1964, a significant additional source of flow into the headwaters of the East Verde River has been water diverted by pipeline from C.C. Cragin Reservoir. This is explained in more detail below.

II.D.1.3 C.C. Cragin Dam and Reservoir

Although they are not located within the Study area, C.C. Cragin Dam and Reservoir have historically impounded water that flowed in the upper portions of Clear Creek, a tributary to the Little Colorado River, which was then diverted into the East Verde River headwaters within the Study area through an exchange agreement between Phelps Dodge Corporation (Phelps Dodge) and SRP. Under this agreement, Phelps Dodge, former owner and operator of C.C. Cragin Dam and Reservoir, stored water from the Little Colorado River watershed at the reservoir and transferred it by diverting the water into the East Verde River for delivery by SRP to the metropolitan Phoenix area. In return, SRP water from the Salt River watershed was used at Phelps Dodge's Morenci mine facility. C.C. Cragin Reservoir has a storage capacity of 15,000 af. From 1964 until January 2002, Phelps Dodge diverted an average of 9,680 af/yr to the East Verde River, to satisfy the requirements of the exchange agreement.

With implementation of the Black River/Central Arizona Project Exchange Agreement in 2002 and passage of the Arizona Water Settlements Act in 2004, Phelps Dodge gave up ownership and ceased its operations of the C. C. Cragin

Dam and Reservoir system. The facilities were transferred to the U.S. Government with Reclamation as the primary Federal agency having direct oversight. SRP became responsible for the operation and maintenance of this system. At the time of this report, SRP, in collaboration with Reclamation, is performing studies and other efforts to determine operational plans for the newly acquired facilities. Pursuant to agreements with Reclamation, SRP may divert up to an average of 11,000 af/yr into the East Verde River, a portion of which may be acquired for use by entities in northern Gila County.

The drainage area above the C.C. Cragin Dam is 71.1 square miles. The watershed is divided into two sub-areas. The longer less steeply sloping sub-area is drained by East Clear Creek. The shorter more steeply sloping sub-area is drained by Miller and Bear Canyons. The major drainages into the reservoir are East Clear Creek, Miller Canyon, and Bear Canyon. Elevations in the watershed range from about 6,720 feet amsl at the Dam to about 7,800 feet amsl along the north ridge of the watershed, to 8,077 feet amsl at Baker Butte. The average elevation of the watershed is about 7,200 feet amsl. The watershed consists almost entirely of dense conifer and pine forest. Soils in the watershed are described as deep cobbly and gravelly fines, sandy loam, and deep cobbly loam.

C.C. Cragin Reservoir has experienced many cycles of deep drawdown (up to 80 feet) and refilling during its 40-year history. The reservoir normally fills during spring run-off and typically is at the full supply level (El. 6,720 feet amsl) in late spring. Withdrawals have typically been made in the summer and fall with the reservoir reaching minimum pool level (El. 6,640 feet amsl) in late fall. Since January 2002, withdrawals by Phelps Dodge are no longer being made and, as a result, reservoir drawdown is limited and occurs as a result of spillway discharges, seepage, and evaporation. Annual losses due to seepage and evaporation at C.C. Cragin Reservoir have been estimated to be 843 af/yr.

The system has eight pumps that are available to lift water from the Reservoir to a 2-million gallon priming reservoir. The water then drains by gravity through a pipeline south over the Mogollon Rim (and into the TNF, Gila County) to a hydropower plant. Up to 6 of the pumps can operate simultaneously to produce a maximum flow of about 33 cfs. The power generated at the plant adjacent to the East Verde River is only used to pump water associated with the project.

II.D.1.4 Other Springs

Other springs in the Study area that produce annual volumes of discharge are detailed below, and are summarized in Table II.1. They include the following:

- Tonto Natural Bridge Spring
- Webber Springs
- Cold Springs
- Tonto Spring
- Horton Spring

- R-C Spring

Table II.1. – Springs Producing Annual Volumes of Discharge Greater than 1,000 af/yr

East Verde River Drainage System (> 1,000 af/yr)	Discharge (gpm)	Annual Volumetric Discharge (af/yr)
Tonto Natural Bridge Spring	841	1,357
Webber Springs	996	1,608
Cold Springs	1,060	1,711
Total	**11,797**	**19,025**
Tonto Creek Drainage System (> 1,000 af/yr)		
Tonto Spring	1,291	2,084
Horton Spring	1,100	1,776
R-C Spring	800	1,291
See Springs	1,088	1,757
Total	**4,279**	**6,908**

These springs, as well as the lesser springs (those under 1,000 af/yr flow volume), contribute to the streamflow (base flow) of their respective drainage system. [***Note: many springs are subject to a high degree of seasonal flow variability and may not be adequately gaged.***]

II.D.2 Hydrogeology

Groundwater flow in the Study area is generally from northeast to southwest. Although recharge to groundwater occurs throughout the Study area, it occurs predominantly along the Colorado Plateau and Mogollon Rim. Recharge contributions are from both regional precipitation and snow melt during the winter, and more localized precipitation events in the summer, which is typical throughout most of Arizona. As precipitation is a function of elevation, so also is recharge. The higher elevations in the Study area along the Mogollon Rim and northward along the Colorado Plateau tend to have greater rainfall and snow totals. This, in turn, provides greater volumes of recharge to the regional groundwater systems both north and south of the Mogollon Rim.

As recharge water moves through the more permeable sedimentary units of the C aquifer and reaches saturated portions, it begins to move with the groundwater gradient. The groundwater gradient north of the Mogollon Rim tends to be shallow through the more conductive Coconino Sandstone and upper Supai Sandstone units. Moving south of the Mogollon Rim, the groundwater encounters the fine-grained units of the Lower Supai and Naco Formations. The gradient becomes very steep as a result of the typically low hydraulic conductivities associated with fine-grained shale and limestone and the nature of topographic relief near the Rim. Near vertical flow through these less permeable units is facilitated by abundant faults and fractures, which provide conduits for groundwater flow.

The locations and discharge rates of springs are affected by both lithologic and structural controls. Faults and fractures intercepting the groundwater provide conduits to the land surface and result in the formation of seeps and springs along the Mogollon Rim. Also, as permeable layers (typically coarse grained intervals bounded by shale rich layers) intercept the land surface, these too may result in the formation of springs and seeps. Many of the monitored and sampled springs in the area indicate highly variable discharge rates individually, and reflect contributions from both local and far removed sources (based on the water's isotopic and ionic composition; see Attachments 1A and 1C). In some locations, spring discharge increases substantially after precipitation events, while in other locations, springs show a more tempered response depending upon local hydrogeologic constraints. The increase in discharge may be the result of recharging precipitation increasing head pressures. As recharge occurs from an even greater distance, newly recharged groundwater will "push" older groundwater out of the system ahead of the recharge front.

As groundwater moves down through the Naco Formation (where breached) and into the limestone units of the Redwall and Martin Formation, fractures and solution channels become the dominant mechanism for flow. The surface exposures of these units north of the Diamond Rim Fault are recharged by precipitation events as well as by the capture of stream flow, which is often fed from above by spring discharge along the Mogollon Rim.

The Diamond Rim Fault zone potentially represents the most influential structural feature with regard to groundwater flow in the Study area; however, due to the limited amount of data available for this area, the true relationship between the fault and groundwater flow is uncertain. Nevertheless, some reasonable inferences can be made. The location and discharge rate of Fossil Springs appear to be controlled to a great degree by the Diamond Rim Fault. Other springs in the Study area appear to be both directly and indirectly related to the presence of this fault. Locally, this fault may act as a barrier or a conduit to groundwater flow--likely both as a conduit along its strike and barrier across it in the case of Fossil Springs.

South of the Diamond Rim Fault zone, groundwater exits the Paleozoic sedimentary units and flows down into the Proterozoic igneous and metamorphic units below. The area beneath Hardscrabble Mesa may be an exception to this general statement in that there may be a saturated sequence of Paleozoic sedimentary units (primarily the Redwall Limestone and Martin Formation) preserved below the Tertiary basalt and conglomerate cover.

Groundwater flow through the Proterozoic units (like much of the Paleozoic units) relies primarily upon the secondary porosity and permeability of faults and fractures. As mentioned above, the faults and fractures provide avenues for localized precipitation to recharge the aquifer in addition to providing pathways

for regional groundwater through flow. The uppermost portions of the Proterozoic units tend to have greater hydraulic connections relative to deeper fractured areas. Water levels observed in wells penetrating these units exhibit strong variability associated with localized recharge events. The presence of springs and gaining reaches in the East Verde River and Tonto Creek along the periphery of the Sub-Region 3 appears indicative of groundwater discharging from the regional aquifer system.

II.D.3 Groundwater Budget Estimates

Understanding the groundwater systems within the Study area is complicated by significant variability in the host aquifers, which makes consideration of aquifer storage extremely difficult. In addition, variables such as highly variable slope, vegetation, and soil types make surface water calculations an approximation at best. Nevertheless, in a simplified way, a regional water budget can be roughly estimated by assuming the aquifer systems are collectively recharged by both local and regional sources and adjusting for generally accepted surface water runoff and evapotranspiration rates. In the case of groundwater (a primary focus of the investigation), utilizing two primary assumptions and a suite of other simplifying assumptions (see Attachment 1), it is possible to estimate the flow of groundwater through the system. First, it is conservatively estimated that 31,800 af/yr enters the system by direct leakage through the Mogollon Rim from the C aquifer into the lower regional aquifer strata (USGS 2005). Additionally it is considered that direct recharge from local precipitation can be estimated at 4 to 5 percent overall (although locally it can be as much as 10 to 16 percent). This low range of values is utilized to account for highly variable slopes, soil types, and vegetative cover observed throughout the region. The annual groundwater recharge from precipitation is then estimated to be 30,700 to 38,300 af/yr. In combining these estimates, the total regional groundwater in-flow to the system is assumed to be 62,500 to 70,100 af/yr.

Groundwater inflow manifests itself as outflow in the form of spring discharges, stream base-flow, and groundwater underflow. As a matter of balance, it is then assumed that approximately 42,700 af/yr discharges as spring flow (the majority of C aquifer input discharges at Fossil Springs) and 18,000 af/yr discharges in the form of stream base-flow. The remaining 1,800 to 9,400 af/yr is groundwater underflow or "flux" through the system. The above values are rough estimates.

Ultimately, the groundwater within the Study area is an interconnected aquifer system flowing through several different geologic units. Locally, a groundwater system may behave as an isolated component to the regional system, but ultimately plays a role in a much larger long-term regional perspective. Continuity of groundwater flow is disrupted by recharge zones, faults, fractures, and by the lithologic variability of the sedimentary units in the area. However, connection between and through these various units is facilitated by the broken and fractured nature of the Study area's geology. Viewing the Study area as a

regional groundwater system appears to be supported by water levels observed in wells, spring elevations, and by water chemistry data. This regional aquifer system provides a large canvas that communities and water resource managers can draw upon to plan and develop water resources for the area.

II.D.4 Water Quality

Water quality within the Study area is variable. A limited sampling of water quality data is represented in Table II.2, which provides values for selected water chemistry properties in the Mogollon Highlands. (Source - USGS). A number of springs and wells throughout the Study area also were sampled in support of this Study, to develop basic data for water chemistry and isotope analyses. Theses data generally indicate comparable water chemistry throughout the Study area to that shown in Table II.2; however some differences are observed in key constituents that relate to source waters, recharge mechanism, and age. These concepts were considered in depth for the development of the conceptual hydrogeologic framework of the region. Please see Attachments 1, 1B, and 1C for full details.

Table II.2. – Selected Water Chemistry Property Values of Surface Water Sources Located in the Mogollon Highlands, Arizona

Water\Source	pH		Dissolved Solids (mg/L)	
	Range	Mean/Median	Range	Mean/Median
Stream-flow - Tonto Creek above Gun Creek	7.2-8.9	8.2/8.2	0.23--620	58/19
Stream-flow - East Verde River near Childs	7.8-8.6	8.4/8.4	.05--250	23/11
Spring Flow - East Verde River Drainage	6.9-7.5	7.3/7.4	158 – 350	253/267
Spring Flow - Tonto Creek Drainage	7.1-7.7	7.3/7.3	90 – 319	185/169
Groundwater*	6.5-7.5	6.5	170 – 400	250

*Representative of Payson groundwater sources only.[3]

ADEQ, in compliance with the Clean Water Act of 1977 and supplements thereto, established designated uses for various surface waters within the state of Arizona, including those within the Study area. ADEQ also has performed assessments to determine whether or not the designated uses are being met. Table II.3 presents a

[3] Payson performs an annual Water Quality Survey of it drinking water sources – groundwater, as required by ADEQ. Payson's drinking water is in full compliance with all drinking water standards established by EPA and ADEQ, i.e., primary and secondary drinking water quality standards. Similarly, other water service providers in the Study area are required to provide their customers with an annual Consumer Confidence Report that provides similar water quality information as found in Payson's Annual Water Quality Survey. It is assumed the water quality of Payson's groundwater is similar to the groundwater quality throughout the Study area since most groundwater sources are taken from the same geologic formations. (See also Attachments 1, 1B, and 1C.)

summarization of ADEQ's determinations regarding its assessment of the Designated Uses for the listed rivers and creeks within the Study area.

Table II.3. – Designated Uses for Surface Water Quality Standards at Specific Locations - the East Verde River and Tonto Creek

Location	A&Ww	FBC	DWS	FC	AgI	AgL
East Verde River--Below confluence with Ellison Creek	Y	Y	Y	Y	Y	Y
Fossil Springs	Y	Y	Y	Y	N	N
Tonto Creek—Headwaters below confluence with an unnamed tributary	Y	Y	N	Y	Y	Y

Note: Numeric water quality criteria to maintain and protect water quality for designated uses are prescribed in Arizona Administrative Code: Appendix A, R18-11-109, R18-11-110, and R18-11-112. Narrative water quality standards to protect all surface waters is prescribed in R18-11-108. The terms used in this table are as follows: "AgI" -- agricultural irrigation; "AgL" – agricultural & livestock watering; "A&Ww" -- aquatic & wildlife (warm water); "DWS" – domestic water source; "FBC" – full-body contact; and "FC" – fish consumption.

Additionally, ADEQ, acting on the behalf of EPA, has prepared a Source Water Assessment for all public and private water service providers within the Study area. ADEQ has determined that, in general, all groundwater supplies are at a high to moderate risk for being impaired by another water source of unacceptable water quality with respect to the Safe Drinking Water Act of 1974 due to source aquifer types (fractured bedrock formations). The Tonto Village, Christopher Creek, and Kohl's Ranch communities are under evaluation by ADEQ to determine the extent of mitigation effort that should occur.

A potential water quality issue may exist for smaller communities whose wastewater is processed by septic systems, or which use a similar type of wastewater treatment and disposal system. This is especially true for communities that utilized wastewater treatment system specifications under pre-1974 ADEQ rules (Bulletin 12). These rules related to small lot subdivisions that were not required to reserve space for adequate septic/water system separation. There also could be a potential for water supply impairment from human waste entering the local water supply as a result of installation procedure requirements in place prior to 1990. These procedures were replaced by more rigorous requirements in 2001 when the aquifer protection permit rules were adopted as part of the Arizona Administrative code.

Additionally, there is some concern about arsenic contamination (20 to 30 times the maximum contaminant limit) on the lower portions of the East Verde River from its American Gulch confluence to its confluence with the Verde River.

Table II.7. – Surface Water Claims on the East Verde River (1984)

Owner's Name/Location	Claim Priority Date	Diversion Claim (af/y)	Cumulative Claims to Water (af/y)
Ewbank Rim Trail	1885	1.5	1.5
Gray Rim Trail	1885	3.0	4.5
Tanner Rim Trail	1875	5.0	9.5
Mueller Rim Trail	1885	1.0	10.5
Carroll Rim Trail	1875	15.0	25.5
Johns Rim Trail	1875	15.0	40.5
Buchanan Rim Trail	1885	2.0	42.5
Barker Trail	1875	50.0	92.5
Johns Rim Trail	1885	1.5	94.0
Knoell, Jr. RimTrail	1909	0.2	94.2
Knoell, Jr. RimTrail	1909	0.1	94.3
Eldean	1900	6.0	100.3
Brintlinger	1909	1.4	101.7
Copen	1909	3.0	104.7
Roper Verde Glen	1909	0.5	105.2
Roper Verde Glen	1909	1.8	107.0
Mayberry Verde Glen	1909	0.9	107.9
Jasper	1909	0.8	108.7
Kerr Verde Glen	1909	3.0	111.7
West Verde Glen	1909	0.6	112.3
Beaver Valley Water	1890	0.0	112.3
Bellows	1906	10.0	122.3
Goodwin	1880	1.5	123.8
Roush Flowing Springs	1915	10.0	133.8
Hudson Flowing Springs	1917	15.0	148.8
Randall Flowing Springs	1890	0.61	149.4
Jones	1880	0.2	149.6
Doll Baby Ranch	1870	310.0	459.6
Jones	1880	0.2	459.8
Tonto National Forest	1879	22.8	482.6
Tonto National Forest	1879	58.0	540.6
Tonto National Forest	1879	7.9	548.5
Tonto National Forest	1879	31.6	580.1

Note: This table is thought to be complete but is subject to as yet unidentified claims and/or water rights adjudication.

C.C. Cragin Dam and Reservoir

A major consideration related to surface water in the Study area involves the rights to surface water impounded behind C.C Cragin Dam, located in Coconino County north of the Study area. Pursuant to the AWSA, Reclamation was given ownership of, and SRP now operates, C.C. Cragin Dam and Reservoir. Also pursuant to the AWSA, the communities in northern Gila County, including the town of Payson, were provided the opportunity to access up to 3,500 af/yr of surface water from the C.C. Cragin Reservoir per calendar year on average, upon agreement with SRP and transfer of water rights in accordance with state law. In May 2008, Payson reached agreement with SRP for the delivery of up to 3,000

acre feet (af) of water from the CC Cragin Reservoir, and subsequently filed for the severance and transfer of water rights on February 17, 2009.

II.F.2.3 Groundwater Laws, Rights, and Policies

ADWR administers the groundwater program throughout Arizona. Generally, within Arizona, groundwater is owned by the public and regulated by ADWR, but is available to property owners who can extract water under their property and put it to a reasonable and beneficial use. There are special rules for AMAs (where overdraft of groundwater has been most severe) and for Irrigation Non-Expansion Areas (INAs). The Study area is located outside any AMA or INA, and groundwater may be withdrawn and used for reasonable and beneficial use. ADWR requires a permit be obtained for a "Notice of Intent" to drill a well. Additionally, well drillers must report initial results of drillings.

Entities other than the FS cannot construct and/or test wells on National Forest lands without FS authorization. The FS must issue a special use permit before water resources exploration or research on Forest land is allowed. Issuance of a special use permit is considered to be a Federal action, for which an assessment of project impacts to the natural and human environment is required under National Environmental Policy Act (NEPA). The FS groundwater policy states that finding groundwater does not ensure its availability for use. If an exploration project is approved, a second, separate NEPA analysis and special use permit would be necessary to address future water production. In the past, TNF has been reluctant to issue special use permits for exploratory drilling and other land-disturbing activities associated with research of groundwater sub-flows. In 2008, the town of Payson and SRP reached an agreement which restricts Payson from installing wells on public lands.

II.F.2.4 Institutional Considerations

Various powers and authorities that affect water in northern Gila County are vested in various Federal and state agencies, county divisions, town departments, and Native American tribes. These are described in more detail in Attachment 4, Legal and Institutional Considerations.

Federal Institutions:

- The Department of Agriculture, Tonto National Forest, Payson Ranger District
- Department of Interior, U.S. Fish and Wildlife Service
- Department of the Interior, Bureau of Indian Affairs
- Department of the Interior, Bureau of Reclamation
- Environmental Protection Agency

State Institutions:

- Arizona Department of Water Resources
- Arizona Department of Environmental Quality
- Arizona Corporation Commission
- Arizona Department of Real Estate
- Arizona Game and Fish Department

County, Municipality, Improvement Districts:

- Gila County Health Department
- Gila County Planning and Zoning
- Northern Gila County Sanitary District
- Payson - Water Department
- Star Valley
- Salt River Project
- Domestic Water Improvement Districts

III. Study Participants' Current Conditions

III.A Types of Water Supply Providers

Within the Study area, potable water is supplied to water users by any of the following five basic provider types: Municipal water system; regulated private water utility or company; DWID; Cooperative/HOA, or private well.

Municipal Water System
Payson is the only community with a municipal water system. The Town of Payson Water Department supplies potable water to the town of Payson. It also delivers potable water to the Tonto Apache Tribe pursuant to a Municipal Services Agreement between the Tribe and Payson. The population served by the Town of Payson Water Department makes up about 68 percent of the Study area's total population.

Domestic Water Improvement Districts
DWIDs are formed by petition at the request of local property owners or developers that receive formal approval from the Gila County Board of Supervisors. The Board of Supervisors has no authority under state law to deny formation of districts because of a lack of adequate water resources. The purposes of DWIDs are to secure long-term water supplies and provide water service directly to consumers within their respective communities. All DWIDs within the Study area have been formed by real estate developers or district residents.

Regulated Private Water Utilities
Eight regulated private water utilities operate within the Study area. Three of these utility companies--Payson Water Company, Pine Water Company, and Strawberry Water Company--are subsidiaries of Brooke Utilities. Brooke Utilities is a California-based unregulated utility holding company. These three regulated subsidiaries together serve nine of the communities within the Study area.

All eight private water utilities fall under jurisdiction of and are regulated by the Utilities Division of the Arizona Corporation Commission (ACC). The ACC's role regarding water utilities is to regulate the pricing and service performance of the private companies that have exclusive rights to distribute water in a given "certificated" geographical service area, designated by a Certificate of Convenience and Necessity (CC&N). The ACC has no authority over municipal water systems (incorporated towns and cities) or over water improvement districts that are formed by property owners and approved by county governments (e.g. DWIDs).

Cooperatives/Home Owners Associations

Approximately half of the communities in the Study area obtain water resources from cooperatives, HOAs, old ranches, community wells, and other loose-knit entities. While these entities are not considered to be towns, DWIDs, or private water companies, they do qualify as water service providers as defined under Arizona State law. In most cases, these smaller, more remote, communities are located on parcels homesteaded in the late 1800s that were ranch or small agricultural properties or land exchange parcels traded with the FS.

Populations for these smaller communities range from none to 300 people, for a total of about 1,300 residents (6 percent of the Study area total population). Thus, while individual community populations are not significant, the total population served is relevant when considering current and potential future water use in the Study area.

Private Wells

Numerous private wells serve many homes and a few commercial businesses in the smaller communities, and even within Payson. Due to incomplete ADWR well records and reluctance of well owners to discuss specifics of their wells, the actual number of wells and exact volumes of water produced cannot be verified. The water produced from the private wells is estimated based upon the calculated number of gallons per capita per day (gpcd). The gcpd rate is derived by actual water system records, discussions with operators, observance of life styles in the community (amount of landscape, horse privileges, etc.), and from ACC annual reports. The total water usage for the population is then estimated by multiplying the number of full-time residents by the gpcd water usage rate.

It is commonly understood that most private wells installed in the hard rock aquifer of the Study area are typically less than 200 feet deep and have low yields, from less than 1 gallon per minute (gpm) to as much as 25 gpm. Only in the areas of Star Valley and Diamond Point are there consistently higher yields from relatively shallow private wells (less than 200 feet deep), with yields observed to range from 35 gpm to over 100 gpm. Correspondingly, these areas consume more groundwater due to the size of properties and higher demand land uses including equestrian, lawns, orchards, and gardens. Private wells in the region have reportedly been subject to loss and/or gains in yield relative to precipitation and variable use. In addition, some loss of well productivity may result from over-pumping of wells and/or from a general lack of conservation during dry spells.

III.B Communities' Existing Conditions and Current Water Use

For each community or entity included in this Study, the existing conditions related to its water supply and use are described (as of 2002), including the estimated 2002 population, current source(s) of water, and estimated water use. The current water use rates for the communities in this Study are quite variable, ranging between 68 and 657 gpcd, with an average water use rate of 168 gpcd for the 41 communities that delivered water in 2002. Any known past and/or present water supply problems associated with each water provider also are noted.

The communities are organized according to the Sub-Regions used in evaluating the hydrologic framework (see Section II.C and Attachment 1).

III.B.1 Sub-Region 1

III.B.1.1 Sub-Region 1, Cluster 1

Cluster 1 includes the water providers for the unincorporated communities of Pine and Strawberry. The area surrounding both Pine and Strawberry has four seasons, but none are severe. Although snow falls in the winter, it usually melts quickly producing little or no runoff and results in limited groundwater recharge. Wells in the area typically are shallow wells that do not have adequate production in early summer months prior to the monsoon rains, which typically arrive in July and August. In addition to limited groundwater recharge, water shortages occur as a result of demand spikes associated with the influx of summer time residents, and visitors on summer holiday weekends, when daily maximum water demand may be two to four times greater than that of a typical summer day. The increase in water demand appears to be exacerbated by a tendency for these same weekenders to engage in discretionary water use activities while visiting, such as washing decks and irrigating lawns, landscaping, and native vegetation. This added demand exhausts the minimum standard water storage and production capabilities within a 2-day period.

A study commissioned by Pine/Strawberry Water Improvement District (PSWID) in 2003 concluded production of groundwater from the relatively shallow Schnebly Hill and Supai Strata is inherently limited by the hydraulic characteristics of groundwater flow through fractures to the pumped wells in the area. The fractures highly constrain the flow to pumped wells such that initial good yields progressively decrease as pumping duration increases and associated non-pumping time for recovery of groundwater levels decreases. Moreover, the potential for competition and hydraulic interference between wells completed in this type of aquifer is high; suggesting that the ability to overcome the problem of constrained well yields by simply drilling more wells into the system is limited due to the potential for interference between wells (Morrison Maierle, Inc. 2003).

To further evaluate the effect of climate on Pine and Strawberry's groundwater supply, Morrison Maierle performed a comparative study of groundwater level hydrograph data and long-term precipitation trends. The study indicated seasonal declines in well yields, caused by inherent hydraulic properties of the aquifer system, are amplified by below-average precipitation conditions; however, historic shortages of water have occurred during extended periods of above-average precipitation trends. The historic water shortages were not the product of drought conditions but, instead, resulted from the demand for water exceeding the production capacity of the wells, as limited by the aquifer hydraulic characteristics. This is particularly true in the Pine area, which offers less favorable aquifer characteristics than the Strawberry area.

Pine
Pine is located about 16 miles northwest of Payson along State Route 260. The community is located at an altitude of 5,448 feet amsl, and in 2002 had approximately 2,000 full-time residents. The community is served by five water providers.

Pine Water Company, Inc., (Brooke Utilities)
The Pine Water Company was established when Brooke Utilities acquired and consolidated several water operations in the late 1990s. It delivers about 87 percent of the potable water used in the community of Pine. The service area is nearly built out; 2,111 out of 2,798 parcels have been developed. Population in the service area in 2002 was 1,889 and the associated water demand supplied by Pine Water Company (Brooke) was estimated to be 159 af/yr. The water use rate is estimated to be 75 gpcd. Pine Water Company's (Brooke) water system consists of 21 production wells that tap into shallow aquifers. There are also 105 private wells which provide water to community residents that are not tied into the system. Currently, existing capacity (all from the shallow aquifers) is estimated to be equal to the current demand of 159 af/yr.

Over many years, Pine Water Company (Brooke) has suffered numerous water outages, water use restrictions, and service complaints. The company has utilized numerous methods to attempt to improve service, including:

- Upgrading the infrastructure of the production and delivery systems;
- Developing water sharing agreements with private well owners;
- Drilling five new wells in Pine and deepening two existing wells where increased water supplies were available;
- Developing a 1.8-mile pipeline from Strawberry Water Company (Brooke) well facilities to deliver water to Pine;[4]
- Adding 100,000 gallons of storage in Pine; and
- Hauling water by truck.

Pine Creek Canyon/Portals IV Domestic Water Improvement District
This District, formed in about 1995, is the newest DWID in the Study area and currently serves about 83 homes in a subdivision of 173 lots. Population in 2002

[4] Until 2007, the water supply for the community of Strawberry consistently provided adequate water to its residents during the same periods of seasonal stressing that occurs in Pine. Brooke Utility determined it could relieve a portion of the water shortages in the Pine community by connecting the Strawberry water supply into Pine's distribution system. To connect the systems between Pine and Strawberry, Brooke Utilities built the Magnolia pipeline that carries water either from Strawberry to Pine or Pine to Strawberry. In 2007, Strawberry suffered shortages and the pipeline was used to take water from Pine up to Strawberry.

was estimated at 20; the associated water demand was estimated to be 8 af/yr. The current water use rate is estimated to be 342 gpcd. Water is supplied by a single 48-gpm production well. The capacity of this well was estimated in a recent study to be about 39 af/yr. The developers of this District were the developers of Portals I, II, and III, all in the Pine Canyon area and all having successful wells that were ultimately developed and later acquired by Pine Water Company (Brooke), or its predecessor firms.

Pine Water Association DWID

Pine Water Association DWID serves 47 out of an estimated 55 parcels in central Pine that have existed over the past 100 years. The population served in 2002 was estimated to be 50; the associated water demand is estimated to be 11 af/yr. The water use rate is estimated to be 192 gpcd. This DWID holds claims to most of the normal surface water in Pine Creek, and has not had conservation restrictions or meter moratoriums in recent years. The DWID has a concern for the viability of long term surface water supply during extended drought periods. Total production capacity from the surface water and well is unknown.

Solitude Trails DWID

This District, formed about 1994, developed two wells in Pine to supply its 78-lot subdivision, of which 34 parcels are developed. The 2002 estimated population was 22 and water demand supplied by this provider was about 4 af/yr. The water use rate is 149 gpcd. The two wells that serve this District are actually located in the Pine Water Company (Brooke) certificated area (CC&N); water is wheeled to the subdivision by water mains belonging to Pine Water Company (Brooke). Today, Solitude Trails DWID sells its excess water, normally about 25 to 37 af/yr, to Pine Water Company (Brooke). This annual volume is generally equal to 14 to 23 percent of the total water served by Pine Water Company.

The subdivision operates its own wastewater treatment plant (WWTP) to help protect the water quality in the relatively shallow aquifers that generally exist in Pine. Long term, this DWID's existing capacity will probably meet future water demand at full build-out; however, establishing back-up alternative water sources would be desirable.

Strawberry Hollow DWID

This District formed in 2000, and has two wells in northwest Pine to supply its 72-lot subdivision, of which 12 parcels have been developed. In 2002 the population was zero but by 2005, this DWID was serving 14 constructed homes with less than 400,000 gallons of water per year. The DWID has completed development of its second well and has been issued a 100-year adequacy certificate by ADWR. The new well is publicly documented to be 1,320 feet deep (three to six times the depth of typical wells in Pine) and penetrates into a different aquifer than the one currently being utilized by many other wells in Pine. Strawberry Hollow DWID has a high quality "alternative" WWTP in operation to

help avoid groundwater quality problems in future years. Water production potential available from this provider is estimated to be 25 af/yr.

Strawberry

The unincorporated community of Strawberry is located approximately 2 miles northwest of Pine along State Route 260. The 2002 population of Strawberry was 1,062. Until 2007, the water supply for the community of Strawberry consistently provided adequate water to its residents during the same periods of seasonal stressing experienced in Pine. Strawberry currently has two water providers: Strawberry Water Company, Inc. (Brooke) and the similarly named but separate private water company, Strawberry Water Co. (Hunt Water).

Strawberry Water Company, Inc. (Brooke)

Strawberry Water Company, Inc. (Brooke) was formed around 1996 after acquisition of several water operations within Strawberry. In 2002, it served 1,002 customers, with an associated water demand of about 100 af/yr. The water use rate is 90 gpcd. Strawberry Water Company, Inc. (Brooke) operates nine wells. About 25 private wells that are not tied into this system also provide water to residents. Production capacity is estimated to equal the annual demand, about 100 af/yr.

As noted above in the discussion for Pine Water Company, a 1.8-mile-pipeline (known as the Magnolia pipeline) was constructed to connect the distribution systems of the Pine Water Company (Brooke) and Strawberry Water Company, Inc. (Brooke), initially to relieve water shortages in the Pine community; however, more recently this same pipeline has been used to deliver water from the Pine Water Company (Brooke) to Strawberry Water Company (Brooke) during water shortages in the Strawberry CC&N.

Strawberry Water Company (Hunt Water)

The Strawberry Water Company (Hunt Water) is located in north-central Strawberry. In 2002, the population served was 60, supplying about 14 af/yr using a single well. The water use rate is 200 gpcd. Estimated production capacity of this system is approximately equal to the projected demand of 14 af/yr. This water company has adequate water resources and, while the groundwater quality is good, the quality of the delivered water is reported to have deteriorated due to distribution system problems.

Pine/Strawberry Water Improvement District

The Pine/Strawberry Water Improvement District (PSWID) was formed by property owners of the Pine and Strawberry communities that are not represented by the four existing DWIDs in Pine, or served by the regulated private utility companies in the middle of the Strawberry service area. Under state law, the PSWID is authorized to "wholesale" to water suppliers within the two communities (assuming it can develop water resources to market) and raise capital for asset purchases, or to even condemn the existing water operations if

desired (currently underway). The by-laws of PSWID state its purpose is to represent the interests of the communities in securing long-term and reliable sources of water by:

- investigating current and potential sources of water;
- investigating the costs associated with maintaining or expanding present and potential sources of water;
- formulating plans and possible funding for improving present water sources; and
- consulting with county, state, and Federal agencies concerning development of water sources for the communities.

The PSWID commissioned a 2003 study by Morrison and Maierle, which concluded that the groundwater resource in the shallow Schnebly Hill and upper Supai aquifer system has been demonstrably inadequate to support the historic and existing residential water supply demands. This same study further noted the shallow aquifer system does not offer any reasonable potential to support continued population growth in the Pine and Strawberry area. Over the last 5 years, newly developed deep wells in the area have yielded substantial volumes of "new" water that could become available to the communities should agreement on the water's use be reached.

This water provider did not deliver water to any customers in 2002; data on water use since that time have not been included in this Study.

III.B.1.2 Sub-Region 1, Cluster 2

The six communities in this cluster of Sub-Region 1 are located in the central northernmost portion of the Study area, just south of the Mogollon Rim escarpment roughly from the headwaters of the East Verde River southward.

The East Verde River originates from several natural springs about a mile above the northern end of Rim Trail Estates. The water supplies for these six communities consist of both surface water and groundwater; several landowners and/or water suppliers hold surface water claims (see Table II.6 above).

Generally, water supply and quality have not been concerns for these communities; however, a couple entities have experienced some periodic shortage and pressure issues related to the fluctuating number of summer visitors. In addition, the recent extended drought and depletion of East Verde River flows have led to some concerns regarding the adequacy of water supplies in the future. The majority of the six communities are located along Houston Mesa Road (Forest Road (FR) 199), extending from Washington Park south to Whispering Pines. The communities are discussed going south from the Rim.

Washington Park

Washington Park is the northernmost community within the Study area. It is located approximately 11 miles north of Payson and about ½ mile west of where the C. C. Cragin pipeline discharges into the East Verde River. The community consists of 14 small privately-owned cabins on previously leased FS land; these lots were recently removed from the FS' land inventory. All parcels have been developed, but virtually no residence is occupied full time. The 2002 population of Washington Park was estimated to be the equivalent of one full-time resident; the water demand was less than 0.5 af/yr. The water use rate is 100 gpcd.

Washington Park's water source is a capped natural spring that has a volume of about 2-4 gpm. The water is piped into a small storage tank. The spring is estimated to be able to supply about 3 to 4 af/yr.

Rim Trail Estates

Rim Trail Estates is located approximately 10 miles north of Payson, just below Washington Park, and about 150 yards downstream from where the C. C. Cragin pipeline discharges into the East Verde River. This subdivision, which is about 55 years old, is located on the Bulluzzi homestead (old Rim Trail Ranch). The community has 108 parcels developed out of a total of 140. The community extends about a mile downstream along the East Verde River. The population in 2002 was about 44, with an associated water demand of about 11 af/yr. Current water use rate is 218 gpcd.

The Rim Trail DWID is the Estates' water provider. The DWID operates one well; there is another private well which also is used within the Estates that is not connected to the system. The DWID also uses about 7 af/yr of surface water, drawing it from the East Verde River through a pickup station (for potable water). In addition, District residents draw irrigation water from an 1880s-era ditch that was originally established for both domestic use and irrigation of apple and grain crops. The DWID system has an estimated well-water supply of 15 af/yr and a surface water claim by the District of 52 af/yr. The East Verde River has flowed year-round through the neighborhood over Rim Trail Estates' 120+ year history; however, during recent drought years, the river flow appears to be gradually declining. This has created anxiety among the residents. The area also relies on two somewhat adequate wells in the winter months; however, the wells' production is intermittent during summer months.

Shadow Rim Ranch Girl Scout Camp

The Shadow Rim Ranch Girl Scout Camp is located approximately 10 miles north of Payson and a mile west of Houston Mesa Road (FR 199). The camp is operated seasonally and has a population of 300 during the summer months. This is the equivalent of an average full-time population of 48, based upon 300 people occupying the camp for 8 weeks per year, and 2 people occupying the camp for an additional 44 weeks per year. The associated water demand is about 5 af/yr. The water use rate is 96 gpcd. Water is supplied from one well, which is estimated to

be able to produce 8 af/yr. In addition, it is estimated about 7 af/yr of surface water is diverted from Chase Creek; however, surface water flow is intermittent. There are no known major water source or quality problems, but inadequate storage may become a problem.

Whispering Pines

Whispering Pines is located approximately 7 miles north of Payson. Out of a total 228 parcels, 171 have been developed. In 2002, the community had a population of 80, with an estimated water demand of 17 af/yr. The water use rate is 195 gpcd. Water is supplied to the community by the Payson Water Company (Brooke) through two wells. The two system wells yield a total of about 26 gpm for an estimated water supply of 32 af/yr. Numerous residents also have their own wells. Storage capacity seems to be an issue during high demand periods. There have been periodic water shortage and pressure issues in Whispering Pines, and water hauling was required in the summers of 2005 and 2006.

Cowan Ranch

Cowan Ranch is an unincorporated community located approximately 9 miles north of Payson off FR 199. Cowan Ranch is essentially built out, with 19 out of 21 parcels having been developed. The estimated population in 2002 for Cowan Ranch was 5; the associated water demand was about 1 af/yr. The water use rate for Cowan Ranch is 164 gpcd. It has a two-well system that is operated by an HOA; the estimated water supply available from this system is 12 af/yr.

Verde Glen

Verde Glen is located adjacent to Cowan Ranch and also is unincorporated. For Verde Glen, the estimated population in 2002 was 16. Water demand met by the Verde Glen Property Owners Association (POA) is about 2 af/yr. The water use rate for Verde Glen is 137 gpcd. Out of 108 total parcels, 66 have been developed. Part of Verde Glen has been adequately served by one well for over 50 years; Verde Glen I-III POA operates a distribution system from the well. The remainder of Verde Glen area is served by five private wells; water demand supplied by the private wells is estimated to be less than 1 af/yr. Total supply for Verde Glen is estimated to be 12 af/yr.

There presently are no problems meeting current demand in this community. Although the Verde Glen POA well has been reliable in the past, it may not be dependable in the future if drought conditions continue. Within Verde Glen, surface water claims between certain land owners and the POA are currently being litigated. Having an alternative water supply would enhance the reliability and sustainability of each community's systems.

III.B.1.3 Sub-Region 1, Cluster 3

Three small communities are included in this cluster; they are located adjacent to each other about 9 miles northeast of Payson. The cluster falls along the dividing line between the Verde River and Salt River watersheds. Secondary

permeability may be encountered in faults and fractures within this portion of the Sub-Region. The communities are discussed from their location, west to east.

Zane Grey Meadows
This small community is located approximately 11 miles northeast of Payson, north of FR 64 and just south of Roberts Mesa Road. Five of 20 parcels have been developed. The 2002 population was 4, and the current water demand is about 1 af/yr. The water use rate is 180 gpcd. Water is supplied by five private wells. The existing production capacities of the wells have not been determined.

Collins Ranch
Collins Ranch is located about 11 to 12 miles northeast of Payson, adjacent to and immediately southeast of Zane Grey Meadows. Most lots within this community have been developed (35 out of 38 parcels); however, very few are occupied full time. In 2002, the population of the community was estimated to be 11, with an associated water demand of about 2 af/yr. The water use rate is 199 gpcd. This community is supplied by two system-owned wells, and about six additional wells that are not tied into the system. The available capacity is unknown. The community currently has no major water supply issues.

Mead Ranch
This small community is located adjacent to and directly east of Collins Ranch. Out of 126 parcels, 85 have been developed. In 2002, the population of Mead Ranch was estimated to be 25; the associated water demand was about 3 af/yr. The water use rate of Mead Ranch is 99 gpcd. Payson Water Company (Brooke) supplies potable water to Mead Ranch from a single well yielding 4.1 gpm. Current production capacity of the well has not been verified.

III.B.1.4 Sub-Region 1, Cluster 4

The two small communities that are included in this cluster are located about 10.5 to 11.5 miles northeast of Payson, about a mile apart from each other along Ellison Creek.

Ellison Creek Recreation
This community is located approximately 10.5 miles northeast of Payson, in the northwest corner of the intersection of FR 64 and Ellison Creek. It is so named because it used to be FS leased property that could only be occupied during the summer months; however, about 10 years ago it was sold to the residents for full-time residential use. The area is fully built-out, with 60 developed parcels. In 2002, it had an estimated population of 10, with an associated water demand of about 2 af/yr. The water use rate is 137 gpcd. Two community-owned wells supply potable water. One of these wells is a high yield source, which was the first of its kind to be completely installed through the regional aquifer system. It is 760 feet deep and penetrates into the Precambrian basement aquifer. Together, the total capacity of the wells is greater than 100 gpm (over 160 af/yr). No major

issues in terms of water availability or quality were identified during the Study period.

Ellison Creek Estates
Ellison Creek Estates is located about a mile north of Ellison Creek Recreation on FR 430, which runs along Ellison Creek. This community consists of several large parcels on an old homestead off Ellison Creek. Fifty parcels have been developed out of 80 total parcels. Potable water is provided by an unknown number of private wells. In 2002, the estimated population was 30, with an estimated water demand of 4 af/yr. The water use rate is 130 gpcd. Output of the wells is not known.

III.B.1.5 Sub-Region 1, Cluster 5

Cluster 5 in Sub-Region 1 includes four small communities. They are located generally along State Route (SR) 260, about 13 to 15 miles east of Payson.

Thompson Draw I and II
Thompson Draw I and II are two separate areas which make up this one community. One area is located on the east side of SR 260 about 13 miles east of Payson. The other is located about 1 mile north of the first area, on the west side of SR 260. The land was originally leased from the FS, but is now in private ownership. Altogether, the community has 85 parcels and is totally built out. In 2002, the full-time equivalent population of the community was estimated to be 5 people, with an associated water demand of about 4 af/yr. The water use rate is 657 gpcd. Substantial volumes of water apparently are being used by non-permanent residents. Thompson Draw has two community-owned wells that are assumed to meet current needs. Water production capacity is unknown.

Tonto Village
Tonto Village is located approximately ten miles northeast of Payson, about a mile west of the western section of Thompson Draw along FR 64. The Village is almost built out, with 303 developed parcels out of a total of 353. In 2002, the population of Tonto Village was estimated to be 350, with a water demand of about 27 af/yr. The water use rate is 68 gpcd. Tonto Village Water Company, a private regulated water supply utility, provides water to the community using one well. Water production capacity is likely about equal to the demand of 27 af/yr.

Quite a few small lots with septic systems are located near the well within this community. It is surmised that leaky distribution lines have created what may be a long-term water quality issue. Complete nighttime shutdowns of the water system have occurred in recent years due to a reported lack of available resources. The ACC has ordered a new well be drilled every year since 2005. These quantity and quality issues are suspected to be due to the shallow, drought-sensitive wells within the community that have been, on occasion, impacted by septic systems installed in a non-compatible geologic environment (fractured limestone and shales).

Wood Canyon Ranch (previously known as Pine Meadows)
Wood Canyon Ranch is located approximately 13 miles east of Payson, immediately south of the eastern section of Thompson Draw I and II. It is located just north of Little Green Valley Road. Wood Canyon Ranch is completely undeveloped at this time, but 260 subdivision lots are approved. The Ranch reportedly has five adequate wells owned by the developer. Water production capacity is unknown.

III.B.1.6 Sub-Region 1, Cluster 6

There are 10 communities within Cluster 6. These communities are scattered across the entire northeastern quadrant of the Study area, and are interspersed among or adjacent to other communities from Clusters 2, 3, 4, and 5.

Camp Geronimo Boy Scout Camp
This camp is located about 11.5 miles north and just west of Payson, along Webber Creek. The camp is a major facility that serves the Boy Scouts of America Roosevelt Council troops in the greater Phoenix area. It is located on an old ranch site. The camp houses between 600 to 1,000 scouts, leaders, and staff during the summer months but is used year-round for leadership retreats (averaging 5 to 8 people). The water use rate is 96 gpcd. Water is currently supplied by two contained natural springs located on the TNF at the base of the Mogollon Rim (Poison Springs at 80 gpm and Herron Springs at 50 gpm, which together produce about 210 af/yr). The water is piped to storage tanks; substantial overflow goes underground into Webber Creek at the south end of the camp. The camp has a new wastewater treatment facility to help protect the groundwater.

Geronimo Estates
Geronimo Estates is located about 8.5 miles north and just west of Payson. It is about 3 miles downstream of Camp Geronimo along Webber Creek. The 2002 estimated population was 35, with a corresponding water demand of about 6 af/yr. The water use rate is 141 gpcd. There are 109 developed parcels out of a total of 252.

Water is supplied by Payson Water Company (Brooke); the system consists of two wells. There also are 13 private wells that are not connected to the Payson Water Company's (Brooke) system. Because of the apparent low volume of groundwater available and ongoing system operational problems, a full moratorium on new meters and line extensions within the Payson Water Company CC&N has been in effect for 28 years. In 2007, much of the community was completely out of water numerous times, with claims of dry holes, non-working pumps, etc. The lack of adequate storage capacity adds to the water supply problems; only 15,000 gallons of storage capacity are available. The problem of continued inadequate service by Payson Water Company (Brooke) has been brought before the ACC Hearing Division (as of mid-2008).

Bonita Creek
Bonita Creek is in an isolated portion of the Study area approximately 11 miles north and east of Payson. The community is less than a mile north of FR 64. Bonita Creek itself is a perennial stream (reportedly producing a constant 500 gpm for decades); the community straddles the creek for about 1 mile. The community originally consisted of apple orchards and a ranch. In 1990, 55 of 59 homes in this area were burned during the Dude fire, but since then about 30 homes out of a total of 84 lots available have been built within this community. In 2002, the population of the community was estimated at 30, with an associated water demand of just under 4 af/yr. The water use rate is 110 gpcd. Water is supplied from the creek (based on claims dating from 1880s) and groundwater which is distributed by the Bonita Creek Land and HOA Water Company. The number of wells and capacities of both the wells and surface water diversion are unknown. There is some concern related to water claims and availability of surface water diversions. The creek disappears underground about half way through the community.

Diamond Point Recreation
This community is approximately 10 miles northeast of Payson, located just southwest of FR 64. It is so named because it formerly was FS leased property that could only be occupied during the summer months; over the past 10 years or more, the land has been sold for full time residential use. All 45 lots have been developed. In 2002 the population of the community was estimated at 4, with a corresponding water demand estimated to be just under 1 af/yr. The water use rate is 137 gpcd. The capacity of the one well is not known.

Bear Flat
This community is located almost 15 miles east of Payson, about 4 miles south of SR 260 via a relatively rough unpaved road. The 2002 estimated population was 12 full-time residents. The current water demand is estimated to be 3 af/yr. The water use rate is 250 gpcd. There are 61 parcels developed out of a total of 144 parcels in this community. Water is supplied by 20 private wells. Existing total water capacity is unknown.

Kohl's Ranch
Kohl's Ranch is located approximately 12 miles northeast of Payson just south of SR 260 along Tonto Creek. In 2002, the population of Kohl's Ranch was estimated to be 270, with a corresponding water demand of about 22 af/yr. The water use rate is 70 gpcd. The primary development in the community is a time-share residential property, although there are many small weekend cabins on relatively small lots on both sides of Tonto Creek. There are 134 developed parcels out of a total of 192 designated parcels within this community.

Tonto Creek Estates
This community is located just over 2 miles north of Kohl's Ranch, upstream along the Tonto Creek. In 2002, the community had an estimated population of

30, with an estimated water demand of 5 af/yr. The water use rate is 137 gpcd. All 65 lots of the Estates have been developed. Water is supplied to the community by the Tonto Creek Estates Water Company, a private regulated water utility which operates three wells. They apparently have adequate long-term water resources and good water quality. Production capacity information has not been shared.

Christopher Creek
The community of Christopher Creek is approximately 18 miles northeast of Payson and is located just north of SR 260, along Christopher Creek. In 2002, the population of the community was estimated to be 150, with an associated water demand of about 12 af/yr. The water use rate is 73 gpcd. Out of a total of 528 parcels, 342 have been developed. Water is supplied by Christopher Creek Haven Water Company, a private regulated utility, which operates a water system consisting of 4 wells. Total production capacity of the four wells is unknown. No major water production issues are known to exist. Currently this community has a surface water remediation plan in place to mitigate water quality issues within its community and possibly downstream at the R Bar C Boy Scout Camp.

Hunter Creek
Hunter Creek is located approximately 1.5 miles downstream and south of the community of Christopher Creek. Out of a total of 166 lots in this community, 75 have been developed. In 2002, the population of the community was estimated to be 35, with an associated water demand of 22 af/yr. The water use rate is 571 gpcd, which is the second highest water use rate per person in the Study area. A possible reason for this high usage rate is heavy water use for landscaping by part-time residents who are not counted in the population totals. There are two community-owned wells; output capacities of the wells are unknown. The community also operates a wastewater treatment facility. Both the wells and the wastewater treatment facility are located near the edge of the creek.

R-Bar-C Boy Scout Camp
This Boy Scout camp is a smaller seasonal camp than Camp Geronimo. It is located about 16 miles east of Payson, just south of SR 260 along Christopher Creek. The equivalent full-time population in 2002 was estimated to be 20, with a water demand of 2 af/yr. The water use rate is 96 gpcd. There are two wells that serve the camp. Assuming the camp continues to be operated like it has been in the past, the water supply is assumed to be sufficient into the future. Current production capacity of the wells is unknown. County wastewater management personnel and others have expressed a major concern regarding water quality problems in the creek, apparently resulting from upstream septic systems.

III.B.2 Sub-Region 2, Arrowhead Canyon

There is only one community located within this Sub-Region—Arrowhead Canyon. It is a small, unincorporated community located at the northern edge of Sub-Region 2, just below the Diamond Rim fault, approximately 2.5 miles south

of Pine. The 2002 population of the community was about 10, with a corresponding water demand of about 1 af/yr. The water use rate is 100 gpcd. There are five private wells that are used; their existing capacities are unknown.

III.B.3 Sub-Region 3

This Sub-Region is located in the southeastern quadrant of the Study area. Twelve communities, mostly located in the western portion, are included within this Sub-Region. This area also approximates the central portion of the entire Study area. It is the most populated of all Sub-Regions, as well as having the single-most populated community in the Study area—the town of Payson, with a 2002 population of 14,500.

Beaver Valley
The Beaver Valley community is the northernmost community within this Sub-Region. It is almost 7 miles north of Payson, along Houston Mesa Road (FR 199). The community is about 66 percent built out, with 231 lots developed out of 351 total available lots. In 2002, an estimated 240 people lived in Beaver Valley, with an associated water demand of 22 af/yr. The water use rate is 82 gpcd. Water is supplied by a one-well system operated by the Beaver Valley Water Company, an ACC regulated private utility. There also are two private wells that are not part of the system. The utility also claims a water right of about 23.75 af/yr on the East Verde River, of which about 22 af/yr are used. Total water supplies available are currently estimated to be 23 af/yr.

Over the last few years, the water system operator has had to move the system's point of diversion intake several hundred yards upstream on the East Verde River. This is because an insufficient volume of water flows down the East Verde River past the community during periods of drought or when the C. C. Cragin pumps are not operating. In the past, water quality has been a concern in this community due to high density septic systems in the service area, and a heavily used FS campground located less than a mile upstream (Water Wheel) which has no sanitation facilities. An old low volume shallow well is now in operation, but without increased flow in the river, the community is in jeopardy of having insufficient potable water during drought periods or if the streamflow is polluted by the upstream campground. These situations all contribute to reliability issues with the existing water delivery system.

Freedom Acres and Wonder Valley
Freedom Acres is about 5.5 miles north of Payson, located along and just west of Houston Mesa Road (FR 199). Freedom Acres is completely built out, with all 21 lots developed. In 2002, Freedom Acres had an estimated population of 29, with an associated water demand of 9 af/yr; the water use rate is 283 gpcd. This community consists mostly of full-time residents living on fully developed large lots; many have horses. Wonder Valley is located just east of Freedom Acres, and is almost completely built out, with 20 lots out of 23 lots developed. In 2002,

Wonder Valley had an estimated population of 40, with an associated water demand of about 3 af/yr; the water use rate is 69 gpcd. Similar to Freedom Acres, this community consists mostly of full-time residents.

Freedom Acres owns one well, and Wonder Valley owns two well, which together are operated as one system. In addition, there are 10 privately-owned wells in Freedom Acres and 12 privately-owned wells in Wonder Valley that appear to be meeting current demands; however, these wells are located in shallow aquifers and are subject to reduced output under severe drought conditions. The groundwater supply currently available to Freedom Acres appears to be limited, particularly in extended dry periods. The Wonder Valley community had a well collapse in 2002 during which time Gila County had to haul water to the community. An initial replacement well did not yield significant water; a second replacement well producing nearly 30 gpm was developed to meet current demands. The current water supply in Wonder Valley is estimated to be just under 17 af/yr.

Mesa del Caballo

This community is just over 3 miles north of Payson, and has one of the highest densities within the Study area. It is almost completely built-out, with 409 lots developed out of 455. In 2002 the estimated population of Mesa del Caballo was 640, with an associated water demand of 66 af/yr. The water use rate is 92 gpcd. Water to the community is supplied by Payson Water Company (Brooke). The utility operates a system that consists of seven low volume wells. The 7 wells yield a total of 45to 50 gpm, enough capacity to supply 70 to 80 af/yr. The wells have apparently been operationally stable over the past 6 to 8 years, with only periodic water supply shortages. During 2006-2007, there were short periods of time during which there were inadequate supplies.

Flowing Springs

Flowing Springs is about 5 miles north of Payson, along both sides of the East Verde River. In 2002, the population of Flowing Springs was estimated to be 40, with an associated water demand of about 6 af/yr. The water use rate is 137 gpcd. The community is almost 60 percent built-out, with 42 lots developed out of 73.

Water is provided to Flowing Springs by Payson Water Company (Brooke) using a single low volume well. Some members of this community have surface water claims and they apparently use surface water from the East Verde River for irrigation purposes. Total potable supply available to the community is currently estimated to be 7 af/yr.

East Verde Estates (also known as East Verde Park)

This community is about 4.5 miles north of Payson, just west off SR 87 along the East Verde River. It is about 2 miles downstream of Flowing Springs. In the past it was also referred to as East Verde Park. Out of 246 total lots, 164 have been developed. In 2002 the population of East Verde Estates was estimated to be 180,

with a corresponding water demand of 16 af/yr. The water use rate is 79 gpcd. Payson Water Company (Brooke), the water provider, has three low volume wells that make up the water supply system. There are also 11 private wells within the community that are not connected to Payson Water Company's system. This community has experienced significant outages over the years. Large demand spikes sometimes exceed short-term storage capacity, indicating a need for additional storage capacity. Without a new water supply (and likely new storage), the community would be expected to continue to experience significant water shortages.

The three low volume wells total 13 gpm. The system is estimated to have a current supply of 16 af/yr.

Summit Springs

This is a new community that has 27 approved lots, but does not yet have any residences. It is located approximately 3 or 4 miles west of Payson. Summit Springs may have adequate water for full build-out through the use of an existing well; however no information is known about the well's capacity.

Town of Payson

Payson is centrally located in the Study area. It is the largest community in the Study area with an estimated population of 14,500 in 2002. This represents approximately 68 percent of the total Study area population. It also has the highest proportion of full-time residents compared to the rest of the Study area. Out of a total possible 9,747 parcels, 7,254 parcels have been developed, which is about 74 percent of Payson's total planned build-out. The estimated water demand in 2002 was 1,805 af/yr; this represents about 70 percent of the total water used within the Study area. The water use rate is 111 gpcd.

Payson's water supply has historically been produced entirely from groundwater wells within the town limits. From early settlement of Payson in 1882 to the advent of a privately-owned water company in 1950, residents of Payson depended on shallow hand dug wells and cable tool wells. Public water mains were installed in the early 1950s and water was distributed to the original town site area and subsequent subdivisions in central Payson. Water, supplied from several drilled shallow wells, was pressurized in hydro-pneumatic tanks for delivery to area homes. The 1950s and 1960s saw the development of three additional wells within the current Payson town limits, and creation of separate public service water systems to serve new Payson subdivisions. Payson's first large mountaintop water storage tank (500,000-gallon capacity) was constructed in 1967. The four separate water systems serving the Payson community were interconnected in 1976. The town of Payson incorporated in 1980 and founded the Payson Water Department which acquired the four private water companies. The Payson Water Department currently operates 37 water production wells, 11 water storage tanks, and over 200 miles of pipeline to supply water to 7,800 public water system connections. Most of Payson's wells are relatively shallow

(300 to 500 feet below land surface) with some deeper wells approaching 1,000 feet. There also are about 300 private wells that are operated within the town but are not connected to the Payson Water Department system.

Payson originally was allocated 4,995 af/yr of Central Arizona Project (CAP) water. Payson commissioned multiple studies to determine if and how it could receive its CAP allocation; however, the use of a CAP exchange mechanism for local surface water supply could not be developed due to insufficient quantities of local water rights available for exchange, and FWS concerns regarding federally protected species, as well as a general lack of interest by local surface water rights holders. The allocation was sold and the funds from the sale were subsequently used by Payson to help maximize its groundwater resources through exploration programs, safe yield studies, conservation, and also partially fund studies for the construction of a wastewater reclamation and recycling project now known as the Green Valley Park recharge/reuse water reclamation project (1996). In addition to this recharge/reuse project, Payson has created multiple programs to enhance water efficiency and conservation.

Payson manages its groundwater resources, voluntarily by the concept of Safe Yield (Payson is not in a state AMA). Payson's safe yield is currently estimated (2008) at 2,681acre-ft/yr of groundwater, based upon an available water supply of this same amount from a combination of in- and out-of-Town well fields. Water demand is expected to remain below safe yield until a new surface water source comes on line. C.C. Cragin water was made available through the 2004 Arizona Water Settlements Act (AWSA) and the 2008 SRP/Payson water rights agreement. It is anticipated that between 2015 and 2020, facilities may be in place to deliver surface water. At that time Payson intends to manage both surface and groundwater sources conjunctively with a preference for surface water, thereby allowing the groundwater aquifers to recover.

Tonto Apache Tribe

The Tonto Apache Tribe is the only Native American community within the Study area. The Tonto Apache Reservation is located on Arizona SR 87, just south of Payson. The Tonto Apaches were recognized by a Congressional act in October 1972 giving them 85 acres. The Tribe had a population of 132 in 2002; however some members live off the reservation. For Study purposes, the Tribal population living on the reservation is included in the Payson population estimate above.

Tribal membership is increasing and the Tribe recently succeeded at expanding its reservation by acquiring 278 acres from TNF in February 2008. At present, housing on the Reservation can accommodate only about half the residential needs of current tribal members due to the Reservation's limited size. Many houses on the Reservation contain two families and some contain three. The Tribal Chairperson estimates a need for 25 additional houses to accommodate the present need.

EXHIBIT KMR-L

When recorded,
return to:
Marian Shepard, BOS
(9/9/08 #4)

2008-012380 RESL Page: 1 of 2
09/19/2008 04:49:39 PM Receipt #: 08-5691
Rec Fee: $0 Gila Co Board Of Supervisors
Gila County, Az, Sadie Tomerlin Dalton, Recorder

RESOLUTION NO. 08-09-01

A RESOLUTION OF THE BOARD OF SUPERVISORS OF GILA COUNTY, ARIZONA, SUPPORTING THE TOWN OF PAYSON'S AND NORTHERN GILA COUNTY COMMUNITIES' ACCESS TO AND USE OF THE WATER ALLOCATION IDENTIFIED IN THE ARIZONA WATER SETTLEMENT ACT OF 2004, P.L. 108-451 AND PROPOSING A FINANCIAL PARTNERSHIP WITH THE TOWN OF PAYSON TO CONSTRUCT A PIPELINE FOR THAT PURPOSE

WHEREAS, the Arizona Congressional delegation expended considerable effort on the Arizona Water Settlement Act of 2004, P.L. 108-451; and

WHEREAS, a key component of the Act is the availability of 3500 acre feet (Town of Payson 3,000 and northern Gila County communities 500 acre feet) annually of surface water from C.C. Cragin Reservoir (formerly Blue Ridge Reservoir) for use in northern Gila County; and

WHEREAS, the Town of Payson expects to construct and operate a 14.5 mile long pipeline along E. Houston Mesa Road to deliver C.C. Cragin Reservoir water to Payson and northern Gila County; and

WHEREAS, the Town of Payson has indicated an interest in assisting northern Gila County communities with the joint use of the Town of Payson's pipeline for the benefit of communities where it is economically feasible and prudent to distribute C.C. Cragin water; and

WHEREAS, it is desirable to construct only one pipeline for the benefit of all final participating Payson area communities in order to lessen the costs of construction and the environmental impacts of construction on the Tonto National Forest; and

WHEREAS, potential participating rural communities or water purveyors are not yet legally organized to make commitments for use of the water or for sharing costs of the engineering, design, permit, or construction costs to upsize the pipeline, and the Town of Payson must immediately move forward with its Special Use Permit and engineering processes; and

WHEREAS, Gila County wishes to insure the availability of an adequate main-line distribution system for the 500 acre feet of available water to rural northern Gila County communities by forming a financial partnership with the Town of Payson to upsize the pipeline and to provide the proportionate costs incurred to upsize the pipeline to adequately distribute Gila County's allocation of water; such costs not to exceed 4 million dollars; and

WHEREAS, Gila County wishes to ultimately recover costs of the upsized pipeline from the communities and water purveyors that will use the pipeline.

09/19/2008 04:49:39 PM Receipt #: 08-5691
Rec Fee: $0 Gila Co Board Of Supervisors
Gila County, Az, Sadie Tomerlin Dalton, Recorder

NOW, THEREFORE, BE IT RESOLVED that the Gila County Board of Supervisors supports the Town of Payson's Tonto National Forest Special Use Permit application and the associated plans to construct one pipeline in the Tonto National Forest to provide C.C. Cragin Reservoir water to the Town of Payson and northern Gila County communities, as intended in the Arizona Water Settlement Act of 2004, P.L. 108-451.

PASSED AND ADOPTED this 9th day of September 2008, at Globe, Gila County, Arizona.

Attest:

Steven L. Besich, Clerk of the Board

GILA COUNTY BOARD OF SUPERVISORS

José M. Sanchez, Chairman

Tommie Martin, Vice-Chairman

Shirley Dawson, Member

Approved As to Form:

Gila County Attorney
Bryan Chambers, Chief Deputy