

April 19, 2017

Bureau of Reclamation Attention: Ms. Amanda Erath Mail Code: 84-52000 P.O. Box 25007 Denver, CO 80225

RE: Eloy and Maricopa-Stanfield Basin Study Proposal Bureau of Reclamation FY2017 Basin Study

Dear Ms. Erath

Pinal Partnership is a non-profit organization whose mission is to improve research, planning and coordination of private and public efforts related to infrastructure, natural resources, and community development in Pinal County. Pinal Partnership membership consists of a wide range of stakeholders including private companies, governmental entities, and Native American communities.

As a sub-committee of Pinal Partnership – the Water Resources Committee (PP-WRC) has a goal to develop and implement plans and recommendations that promote reliable and sustainable water supplies and efficient practices pertaining to groundwater use, surface water use, and water reuse in Pinal County.

Due in part to having limited renewable water supplies, Pinal County faces numerous challenges regarding water management. Located at the center of the "Sun Corridor" between the metropolitan areas of Phoenix and Tucson, it has faced a history of rapid development and this is expected to continue. Additionally, it is a region with significant agricultural activity. These dynamics make Pinal County very susceptible to impacts from drought and climate change, and specifically the potential near-term shortage declaration on the Colorado River has immediate and notable implications on Pinal County.

The stakeholders **must act now** to develop a greater understanding of future water supply and demand imbalances, and begin to advance strategies that can allow the area to mitigate the impending impacts. Many of the stakeholders are committed to conducting studies that overlap the scope of our Basin Study proposal. However, all stakeholders would benefit greatly from a partnership with the Bureau of Reclamation in this regard, as we appreciate the technical expertise and experience that you can provide, and focusing the stakeholders' resources on a single study with Reclamation as the lead would be more



efficient and produce more comprehensive results. It is worth noting that the proposed study area is directly between the two most recent basin studies implemented in Arizona (a Basin Study for the West Salt River Valley basin was issued to WESTCAPS in 2014, and a Basin Study for the Lower Santa Cruz basin was issued to Southern Arizona Water Users Association in 2015), thus there is a natural continuity and existing synergy that all parties, including the Bureau of Reclamation, can build upon and benefit from.

We thank you for your time and consideration of our Basin Proposal, and look forward to the opportunity to work with Reclamation in this endeavor. Please feel free to contact me at 480-999-5290 with any questions.

Sincerely,

Ron Fleming

President & CEO, Global Water Resources Pinal Partnership - Board of Directors, Co-Chair Water Resource Committee

Cc: Mary J. Reece, P.E., Manager, Program Development Division U.S. Bureau of Reclamation Deborah Tosline, R.G. Hydrogeologist/Program Manager U.S. Bureau of Reclamation

Eloy and Maricopa-Stanfield Basin Study

Proposal Submitted by Pinal Partnership Water Resource Committee

Bureau of Reclamation 2017 Basin Study

April 19, 2017

Table of Contents

Proje	ect Information	2
Stud	ly Abstract	4
Evalı	uation Criteria	5
1.	Extent and Consequences of imbalances	5
2.	Extent of support for the study proponent's ability to address elements of Basin Study	10
3.	Strength of any Nexus between Basin Study and a Reclamation project or activity	13
4.	Availability and quality of existing data and models applicable to proposed study	14
5.	Level of support for the Basin Study, and diversity of stakeholders	18
6.	Extent to which the proposed study will employ an integrated watershed approach	19
Stud	ly Outline and Schedule	20
Арре	endix A Letters of Support	22

A. Project Information

The Eloy and Maricopa-Stanfield Basin Study Proposal, submitted by Pinal Partnership Water Resources Committee (PP-WRC), will enable the stakeholders to evaluate future water supply and demand imbalances in a changing climate and develop potential mitigation and adaptation strategies to meet future demands. Pinal Partnership is a non-profit organization whose mission is to improve research, planning and coordination of private and public efforts related to infrastructure, natural resources, and community development in Pinal County. Pinal Partnership membership consists of a wide range of Pinal County stakeholders including approximately 94 organizations, governmental entities to include the Cities of Apache Junction, Coolidge, Casa Grande, Eloy, Maricopa, and Mesa, the Towns of Florence and Marana, Pinal County, and several Native American communities including Gila River and Ak-Chin Indian Communities. As a sub-committee of Pinal Partnership – the Water Resources Committee is focused exclusively on water resources. The PP-WRC's goal is to help Pinal County develop and implement plans and recommendations that promote reliable and sustainable water supplies and efficient practices pertaining to groundwater use, surface water use, and water reuse in Pinal County. Several of the sub-committee participants have water delivery and/or management authority within the proposed basins of study including Central Arizona Project, Global Water Resources, Arizona Water Company, several municipalities, and Maricopa-Stanfield Irrigation & Drainage District. The participants of the PP-WRC make it an eligible non-federal cost share partner.

Location of Study Area: The study will focus primarily on the Eloy and Maricopa-Stanfield (EMS) Basins in Pinal County, Arizona, as these basins capture the majority of available groundwater and existing surface water usage in Pinal County. As also noted in **Figure 1**, numerous cities, tribal communities, key transportation corridors, and surface water systems are located throughout the EMS Basins.

The Study Area for this basin study will use the same boundary as the Pinal AMA, which includes the subbasins as indicated in **Figure 1**. As part of the 1980 Arizona Groundwater Code, Arizona recognized the need to aggressively manage the state's finite groundwater resources to support the growing economy, thus areas with



FIGURE 1. AMA STUDY AREA

heavy reliance on groundwater were identified and designated as an Active Management Area (AMA). Arizona Department of Water Resources (ADWR) manages groundwater resources within five AMAs (Pinal, Prescott, Phoenix, Tucson and Santa Cruz) which are subject to regulation pursuant to the Groundwater Code. Each AMA carries out its programs in a manner consistent with these goals, while considering and incorporating the unique character of each AMA and its water users. The Pinal AMA's management goal, where the economy is primarily agricultural, is to preserve that economy for as long as feasible, while considering the need to preserve groundwater for future non-irrigation.

As indicated in **Figure 2**, it is important to note that the proposed Study Area abuts and connects the West Salt River Valley Basin Study funded in 2014, and the Lower Santa Cruz River Basin Study funded in 2015, providing continuity and existing synergy that all parties, including Reclamation, can build upon and benefit from.

Total Study Cost: Based on the known level of work and evaluation of other similar basin studies, an estimate for this study is \$1.36 million which consists of approximately \$680,000 from non-federal participants. The non-federal cost share of 50% will consist of time, staff resources, participant-funded studies that may contribute to the basin study, and other like-kind costs from the participants and other regional non-federal agencies with expertise.

Cost Share Partners: Cost-share partners include the following agencies, water and wastewater service providers, irrigation districts, and cities. The PP-WRC welcomes additional stakeholders and cost share



FIGURE 2. LOCATION OF ARIZONA STUDY AREAS

partners within the Study Area. Numerous additional partners have already been identified and have expressed an interest, and additional partners will also be identified in the stakeholder outreach process.

Cost Share Partner	Primary Contact	Address	Email Address
		PO Box 43020	
Central Arizona Project	Mitch Basefsky	Phoenix, AZ 85080	mbasefsky@cap-az.com
		3550 N. Central Ave.	
Arizona Department of Water Resources	Jeff Tannler	Phoenix, AZ 85012	jmtannler@azwater.gov
		135 N. Pinal St. PO Box 827	
Pinal County	Greg Stanley	Florence, AZ 85132	gregory.stanley@pinalcountyaz.gov
		PO Box 12684	
Pinal County Water Augmentation Authority	Joe Singleton	Casa Grande, AZ 85310	jsingleton@pcwaa-az.org
		21410 N. 19th Ave. Suite	
Global Water Resources, Inc.	Ron Fleming	220. Phoenix, AZ 85027	ron.fleming@gwresources.com
		3805 N. Black Canyon HWY	
Arizona Water Company	Fred Schneider	Phoenix, AZ 85015	fred.schneider@azwater.com
		510 E. Florence Blvd.	
City of Casa Grande	Kevin Louis	Casa Grande, AZ 85122	Klouis@casagrandeaz.gov
		628 N. Main St.	
City of Eloy	Harvey Krauss	Eloy, AZ 85131	hkrauss@eloyaz.gov
		41630 W. Louis Johnson Dr.	
Maricopa Stanfield Irrigation and Drainage District	Brian Betcher	Maricopa, AZ 85138	brian@msidd.com

Reclamation Regional Contacts:

Dr. Mary Reese, P.E., Ph.D. Manager, Program Development Phoenix Area Office Email: <u>mreece@usbr.gov</u>

Deborah J. Tosline, R.G. Hydrogeologist/Program Manager Phoenix Area Office Email: <u>dtosline@usbr.gov</u>

Supporting Stakeholders: The following key stakeholders have expressed an interest in participating in the Basin Study, and most have provided Letters of Support (attached in Appendix A):

- Arizona Department of Water Resources
- Central Arizona Water Conservation District/Central Arizona Project
- Pinal County
- Pinal County Water Augmentation Authority
- Global Water Resources, Inc.
- Arizona Water Company
- City of Casa Grande
- City of Maricopa
- City of Coolidge
- City of Eloy
- Maricopa Stanfield Irrigation and Drainage District
- Central Arizona Irrigation and Drainage District

- Environmental Defense Fund
- Farm Sources International Holdings
- Hilgart Wilson
- Sunrise Engineering
- EPS Group
- Strand & Associates
- El Dorado Holdings
- Walton Development & Management
- CRA
- Pinal Land Holdings
- Saint Holdings
- LeSueur Investments
- Langley Properties
- ARCUS

B. Study Abstract

A convergence of factors has necessitated the need for a Basin Study within the Pinal AMA. These factors range from imminent reductions in renewable surface water availability, significant population growth, and a thriving agricultural economy. The summation of these issues creates the potential for water demand to outpace water supply and the need to pump non-renewable groundwater supplies which subsequently may cause aquifer drawdown and which would have negative implications on numerous industries and stakeholders in the Study Area from degraded groundwater quality, increased costs, potential loss of business, and environmental impacts.

The Colorado River is a critical source of water for the state of Arizona and particularly the Study Area. In 2012, Reclamation published the Colorado River Basin Water Supply and Demand Study (CRBS) which well documented the challenge that the river, and the Lower Colorado Basin, is facing now and into the future. Currently, approximately one-third of the entire Colorado River supply delivered through the Central Arizona Project (CAP) is being used in the Study Area; however, Colorado River shortages and planned reductions in agricultural supplies are likely to dramatically alter that proportion. The river accounts for nearly 40% of Arizona's water usage. Per the CAP's 2015 Annual Report, "there is a significant probability of shortage in 2018 and beyond."¹ If a shortage is declared, Arizona's reduction in Colorado River water would be 320,000 acre-feet (AF). Of the 320,000 AF of water that Arizona would no longer receive, 145,000 AF would come from and reduce the agricultural pool. According to ADWR, in Pinal County from 2001-2005 "approximately 96% of the average annual demand was agricultural" of which only 45% of the agricultural demand is met with groundwater, meaning 55% is supplied by the agricultural pool.²

In addition to the high probability of a reduction to renewable water resources, Pinal County is also facing significant population growth. Located at the center of what's known as the "Sun Corridor" between the

¹ <u>http://www.cap-az.com/documents/departments/finance/CAP_2015-YIR-OFA.pdf</u>

² http://www.azwater.gov/AzDWR/StatewidePlanning/WaterAtlas/ActiveManagementAreas/documents/Volume_8_PIN_final.pdf

metropolitan areas of Phoenix and Tucson, Pinal County has seen a convergence of rapid development. Since 2000, the population within Pinal County has increased over 120%.³

Even with the significant population growth within Pinal County, agriculture has remained a prominent industry. Per the United States Department of Agriculture Census of Agriculture Data, there were 223,626 acres irrigated in 2012.⁴ Due to many reasons including changing economic factors, irrigated lands have been slightly declining since that time. As the County with the largest area of irrigated land in the State of Arizona and strong population growth, demand for water in Pinal County will outpace recharge rates and long term availability, thus punctuating the need to develop strategies for managing the imbalance of water supply and demand.

With the high probability of imminent Colorado River shortages and the subsequent reductions in water allocations, the need for accurate projections of future groundwater availability and quality is essential. Modeling completed by the ADWR indicates that under a scenario in which CAP water is replaced by groundwater pumping, the depth to water could change from a range of 500-600 feet to a range of 1,101 – 1,533 feet by the year 2059.⁵ While it is not realistic to expect groundwater pumping to match the CAP reductions one-to-one, the modeling projections highlight the need to understand the depth to water in the Pinal AMA and long term availability of this resource. Depth to groundwater supplies can have implications on equipment needed to pump the water, damage or changes to infrastructure, and water quality.

Additionally, there are two subsidence areas within the proposed Basin Study area. These subsidence areas are known as the Maricopa-Stanfield Land Subsidence Feature and the Picacho-Eloy Land Subsidence Feature. If the depth to water increases, land subsidence could be magnified in these areas resulting in damage to infrastructure and cause other structural and environmental issues within these regions.

These factors make it clear that Pinal County is facing a long-term structural imbalance and that the proposed Study Area faces numerous challenges. The study will evaluate current and future water supplies within the context of climate change realities in the southwestern United States. The performance of existing water and power infrastructure will be analyzed to evaluate how it will perform given potential future realities. Additionally, adaption and mitigation strategies will be developed and evaluated to assess their effectiveness in addressing the imbalance between supply and demand within the basin Study Area. Finally, an analysis of all proposed alternatives will be completed evaluating cost, environmental impact, risk, and response from stakeholders.

C. Evaluation Criteria

1. The extent and consequences of existing or anticipated imbalances in water supply and demand.

<u>Magnitude and Frequency of Known or Anticipated Shortages:</u> The Pinal AMA has historically been in a state of water shortage or overdraft. The Arizona Department of Water Resources (ADWR) published a Water Use and Demand Assessment in 2011 detailing demand water availability in the Pinal AMA. The assessment evaluated the period from 1985 – 2009, and determined the Pinal AMA had over drafted water supplies in 19 of the 25 years that had been evaluated. From 1996 - 2009, the average water demand from all water users in the region was 1.79 million AF per year. The report also detailed the average overdraft was 239,088 AF per year. This equates to using on average 22.2% more water than was available during those years. **Figure 3** below illustrates the historical magnitude and frequency of imbalances to water supply and demand.

https://www.agcensus.usda.gov/Publications/2002/Volume 1, Chapter 2 County Level/Arizona/sto4 2 010 010.pdf (2002)

 ³ <u>http://factfinder.census.gov/faces/tableservices/jsf/pages/productview.xhtml?src=bkmk</u>; <u>http://www.census.gov/quickfacts/table/PST045215/04021</u>
⁴ <u>https://www.agcensus.usda.gov/Publications/2012/Full Report/Volume 1, Chapter 2 County Level/Arizona/st04 2 010 010.pdf</u>

⁵ Results of the Pinal AMA Groundwater Model Projections out to 2115 Based on Pinal AMA Assessment Scenario II - Increased Pumping Replacing CAP Water Use on Agricultural Lands". - ADWR Memo dated 1/27/14

Figure 3



The looming shortages on the Colorado River have the potential to increase the magnitude and frequency of water supply and demand imbalance in the Study Area. The Colorado River currently provides approximately 40 percent of the water supply of the State of Arizona. Nearly 60 percent of that water (1.5 MAF) is delivered to central and southern Arizona through the CAP canal system.

In order to successfully negotiate congressional

passage of the 1968 Colorado River Basin Project Act that authorized the construction of CAP, Arizona accepted the stipulation that CAP would hold a junior priority to Colorado River water. The Basin Act and subsequent court rulings require that during a shortage, when river supplies are reduced to users below Lake Mead and the Hoover Dam, CAP would be the first to experience those reductions. CAP's junior status also applies to Arizona entities situated along the river.

Similarly, within the CAP system, water is distributed to customers based on the priority of their delivery contracts with CAP and the Bureau of Reclamation (Reclamation). Federal/Tribal, and Municipal and Industrial customers share the highest delivery priority among CAP customers. Agriculture originally held an equally high priority; however, when the irrigation districts relinquished their long-term contracts for CAP water (as part of the 2004 Arizona Water Settlements Act), they also yielded their delivery priority.

Since 2000, the climate of the Colorado River Basin has been dominated by drought, with above average flows in the river occurring in only three of the last 16 years. The drought and accompanying declines in Lake Mead and Lake Powell, the two primary reservoirs on the Colorado River, have increased the risk of shortage being declared on the river by the Secretary of the Interior Department.

Exacerbating the decline is the continued over use of water from Lake Mead by the three Lower Basin States (Arizona, Nevada and California) and the Republic of Mexico. Approximately 600,000 AF more water is released from Lake Mead than enters the lake in a normal year. Combined with evaporation of a more or less equivalent amount, the annual "Structural Deficit" at Lake Mead is nearly 1.2 MAF and results in a continuous decline in lake levels of 10-12 feet per annum assuming normal deliveries from Lake Powell.

In 2007, recognizing a growing risk to the Colorado River supplies, the seven Colorado River Basin States and the U.S. government agreed to a change in the operation of the Colorado River, focusing primarily on balancing water storage in Lakes Mead and Powell and setting 'trigger' levels in Lake Mead which, if reached, would



require a shortage declaration and impose water supply reductions to Arizona and Nevada. The restrictions would grow in volume if water levels in Lake Mead continued to fall. Because Arizona holds junior priority rights to Colorado River water, a shortage declaration would fall most heavily on Arizona, and particularly on the CAP (In 2012, Mexico agreed to participate in shortage cut backs).

Under shortage conditions, Arizona would lose access to increasing amounts of river water. **Table 1** specifies the shortage impacts at each 'trigger' elevation.

Under the agreement, the declaration of a shortage was tied to the projected elevation of the surface of Lake Mead on January 1 of any calendar year. A shortage will be declared when the water level in Lake Mead is projected to fall below 1,075 feet in elevation.

Elevation in Lake Mead	Shortage	Arizona Share	Nevada Share	Mexico Share
< 1,075'	383,000 AF	320,000 AF	13,000 AF	50,000 AF
< 1,050'	487,000 AF	400,000 AF	17,000 AF	70,000 AF
< 1,025'	625,000 AF	480,000 AF	20,000 AF	125,000 AF

Should that occur, Arizona would lose access to at least 320,000 AF of its annual allocation of river water (2.8 million AF). CAP would take all of that reduction, equivalent to about 20% of CAP's annual deliveries. Nevada and Mexico would also experience cuts to their Colorado River supplies, although these would be significantly smaller than CAP's share.



Shortage reductions in CAP deliveries would be assigned by priority pool, with the lowest priority water, for the Agricultural (Ag) Pool and other excess, being cut first. If the elevation of Lake Mead continued to fall, additional cuts would be imposed at 1,050' and 1,025'.

It's important to note that in order to delay/prevent this shortage declaration, many Lower Colorado River Basin stakeholders, several of whom are included in our proposed Basin Study (GRIC and MSIDD, amongst others) began to voluntarily leave some of their allocations "on the river" in Lake Mead.

In 2015, more than 50 percent of CAP deliveries were used to grow crops by Tribal and non-tribal agricultural entities. The majority of this usage

occurs in Pinal County, and primarily within the Basin Study boundary. In the event of a shortage declaration, CAP reductions would apply first to excess usage (primarily recharge activities) and to agricultural customers. Under shortage, agricultural entities who now irrigate with CAP water would face the choice of fallowing crop land or pumping groundwater to supply their irrigation shortfall.

Currently, the Lower Basin states of Arizona, Nevada and California and the U.S. government are negotiating a new set of actions to further reduce overdraft of Lake Mead. The impetus for these negotiations is the increasing risk that drought and the structural deficit will cause the decline in Lake Mead to continue until the water levels will seriously threaten water supplies and power generation at Hoover Dam.

The "Drought Contingency Plan" (DCP) calls for all three states and the Federal government to take larger and more accelerated steps to reduce demand for water from Lake Mead. As in the 2007 agreement, the earliest and heaviest reductions would apply to Arizona. Importantly, the additional reductions would be applied in conjunction with the 2007 guidelines (i.e., the reductions are additive). The reductions to Arizona's Colorado River supplies have already begun and total 192,000 AF per year. Ultimately, at the lowest trigger, the supplies can be reduced by 720,000 AF per year, which is 240,000 greater than the 2007 agreement.

<u>Known and Projected Demands for all Types of Water Uses:</u> The aforementioned 2011 ADWR Demand and Supply Assessment study identified a total of 1.03 million AF of water was used in the Pinal AMA in 2006.

Nearly 80% of the water used in 2006 was for agricultural purposes, equivalent to 819,894 AF. Of the 819,894 AF of water used by the agricultural sector, 327,700 AF came from groundwater and the remaining 492,194 AF were supplied from other sources, primarily the CAP. A breakdown of the sources used to meet demand is summarized in **Table 3**.

TABLE 3

Water Source	Water Used (AF)
Groundwater	435,453
In-lieu Groundwater	139,616
Surface	102,615
CAP	346,741
Reclaimed	4,805
TOTAL	1,029,230

Additionally, the same study projected water demand for the Pinal

AMA based on three potential demand scenarios provided in **Table 4**. The primary variable in the three scenarios was the volume of water used for agricultural purposes. Two of the three scenarios indicate water demand will remain equal to 2006 levels or increase as much as 22% by the year 2025. While ADWR is working to update current and projected water usage in the Pinal AMA, this is the most current and comprehensive demand information available for the Pinal AMA.

It is important to emphasize again that there are limited M&I CAP allocations in the EMS Basins, totaling only 17,679 AF. And today there are not any CAP M&I customers directly using their full allocations. Their water is being recharged either through underground storage facilities or more predominately through groundwater savings facilities partnering with MSIDD and using their infrastructure.

Nature of Imbalances: Water quantity due to the limited availability of long-term renewable water supplies and physical limitations of local groundwater aquifers is currently the most significant source of imbalance in the Basin Area. As

TABLE 4	2006	2025	2025	2025
	(Historical)	Scenario 1	Scenario 2	Scenario 3
Indian	156,125	154,234	195,401	239,479
Industrial	20,243	25,189	31,042	43,676
Agricultural	819,894	588,157	689,180	877,896
Municipal	32,968	112,809	121,175	160,273
TOTAL	1,029,230	880,389	1,036,797	1,321,324

Figure 3 illustrated, there is more water demand than availability in the Pinal AMA. **Table 2** highlights that Arizona is already reducing its Colorado River allocation by 192,000 AF per year, and there is a likely probability that an additional 320,000 AF will be lost in the coming years should Lake Mead drop below the 1,075 elevation threshold. The loss of CAP's allocation of Colorado River water paired with the potential for as much as 22% more demand for water (scenario 3 from **Table 4**), combined with a historical average annual overdraft of 22% (**Figure 3**), presents a significant challenge to the long-term balance of water resources in the basin study area.

ADWR indicates the annual average groundwater availability in Pinal County is roughly 444,000 AF per year, based on the annual withdrawal limits under the Assured and Adequate Water Supply Program (which restricts groundwater pumping as to not cause the depth to water of the aquifer within the AMA to decline to a depth more than 1100 feet below land surface). Thus, on existing agricultural demand alone, the County is exceeding the annual withdrawal limit. Further, ADWR states that 275,000 AF per year is already committed for future economic development under the AMA's assured and adequate water supply program. Thus, continued population growth, assuming no new resources are identified, potentially contributes to the water quantity shortage. According to the 2011 study conducted by a task force appointed by the Pinal County Board of Supervisors, an additional 500,000 lots were in the planning process within Pinal County.

FIGURE 4

Figure 4 captures the severity of the potential long-term structural imbalance, based on municipal growth and agricultural replacing their CAP supply with groundwater pumping (which is unlikely to occur on a one-for-one basis). Again, irrigation districts in Pinal County that rely on Colorado River water delivered through the CAP for all or a portion of their water supply will be significantly affected by imbalances in supply and demand, whether those imbalances are driven by drought related shortage or by increased competition for existing supplies driven by population growth.



Pinal County Groundwater Deficit

<u>Severity of Potential Consequences for Not Addressing Imbalances:</u> Since 1990 these irrigation districts have used Colorado River supplies to replace groundwater pumping in an effort to preserve groundwater supplies for future uses. There has been success in Pinal County in achieving this goal. In many areas groundwater levels have recovered effectively. Irrigation districts in Pinal County have partnered with many entities to store excess supplies underground to mitigate future shortages. Regardless, irrigated agriculture in Arizona and especially in Pinal County holds a very low priority for Colorado River supplies. The impacts of increased growth and/or drought will cause an ever-increasing shift back to pumping groundwater, thus reversing the aquifer storage gains experienced over the last thirty years. Depending on the degree of imbalance this shift may occur quickly.

The impacts of reduced Colorado River supplies to irrigated agriculture can be grouped into several main categories: increased costs for groundwater well infrastructure, increased energy consumption and related costs for more and deeper pumping, the risk of degraded water quality, land subsidence and earth fissure formation, reduction in farmed acreage to the degree reduced Colorado River supplies cannot be replaced by groundwater, reduced efficiency of farming operations as districts lose flexibility to effectively serve the irrigation systems employed by growers. All of these collectively or separately increase costs passed along to not only agriculture customers, but other stakeholders such as municipalities and domestic water providers in the Basins.

Substantial capital is needed to rehabilitate old wells and extend pipelines from well sites to canals. Connecting wells to canal systems increases annual production capability by increasing the area served by each well. Should a district pursue drilling new high capacity service area wells, the price tag for each runs significantly higher. Funding for this is collected from growers either through assessments or water charges over and above the costs to operate and maintain existing well infrastructure. If sufficient additional well capacity cannot be connected to these canal systems to offset surface water losses, the districts will be hard pressed to continue effectively meeting the demand needs of these efficient on-farm systems. Reduced overall water delivery capacity to growers would likely lead to a reduction in agriculture in order to efficiently irrigate with reduce supplies.

These factors would likely create a point where growers can no longer afford the costs of additional pumping to replace a reduction in surface water supplies – leading to reduced cropping. The fallout from reduced acreage in cultivation is reduced lease income to landowners, reduced margins, increased overhead, loss of revenue to farm support services in the local communities, and eventually, growers going out of business. Finding higher value – lower water use crops is not an easy proposition and can take a long time to develop the correct production and marketing infrastructure to support those crops. The bottom line is without a vibrant agribusiness economy these cost increases cannot be absorbed.

With respect to M&I, Pinal County currently has a population of just over four-hundred thousand, and the Arizona Department of Administration projects this will grow to over one million by 2050. Domestic water providers, which are primarily private water providers and not major municipalities, and their customers would experience similar hardships driven by increased costs for water supply related infrastructure, increased expenses related to energy and treatment, and the risk of degraded water quality with declining groundwater levels. A study completed by the Arizona Department of Environmental Quality (ADEQ) in 2005 – 2006 revealed that 70 percent of the sites sampled within the Pinal AMA had groundwater that exceeded the Environmental Protection Agency's Safe Drinking Water standards Primary Maximum Contaminant Level concentration for at least one constituent.⁶ With the potential for declining groundwater levels there is also the potential for increased concentrations of unwanted constituents within groundwater which would require new or additional treatment for potable water supplies. In the end, these costs which can be significant, are all passed on to consumers. The degree of water quality degradation as groundwater levels decline is unknown at this time due to a lack of data. The Basin Study will address this lack of data.

Further, residential, commercial, and industrial growth within the Pinal AMA can be restricted by the lack of longterm water supplies. Specifically, developers may not be able to obtain Assured Water Supplies from ADWR in accordance with the Assured Water Supply Program, stopping related development activities. The limitation, or out-right prohibition on growth, will have serious consequences on the State, region and all stakeholders who have an interest in economic development in Pinal County.

Increased groundwater production puts pressure on electrical utilities as well to increase their available power supplies creating upward pressure on energy costs for pumping as a greater percentage of costly supplemental power would be needed to support the increased demand. As pumping increases and water levels decline, more energy will be required to produce the same amount of groundwater. There are no major power plants within Pinal County, so this additional power must be sourced through the open market at unknown costs.

Groundwater overdrafts may result in land subsidence and earth fissure formation which would threaten infrastructure and development throughout the region. As mentioned in the abstract, there were historic periods of groundwater decline and land subsidence, and this has created earth fissures. There could also be additional environmental consequences based on groundwater overdraft.

2. The extent to which the proposal describes and provides support for the study proponent's ability to address the following elements of a Basin Study within the timeframe required.

The Basin Study partners have developed a plan to utilize available tools and expertise to efficiently address the Basin Study elements. The detailed Task list and Schedule provided in section D of the proposal indicates how we will accomplish these elements.

<u>Projections of water supply and demand</u>: Projections of water supply and demand, and the potential imbalances, are highlighted in Criteria 1 above. In addition, as discussed in detail in Criteria 4 below, there is ample data and

⁶ <u>http://legacy.azdeq.gov/environ/water/assessment/download/pinal_fact.pdf</u>

available tools on water supply and demand in the Pinal AMA to provide an adequate foundation to support the Basin Study in an efficient manner. This study will improve water supply and demand projections for the proposed basin planning horizon of 2060. Projections will include a near-term, mid-term and long-term (2060) horizon, and will be centered around agricultural demands and subsequent loss of CAP water, growing municipal and industrial demands, and recovery of stored ("banked") water by water rights holders outside of the basin.

Risks to the water supply relating to climate change will be assessed by implementing climate change scenarios developed by Reclamation's Technical Service Center (TSC) and the Central Arizona Project (CAP) Service Area Model (CAP:SAM). With a proposed planning horizon of 2060 represented using a 30-year time window centered on 2060, (2045-2074) for the Study, and using the reference historical period of 1950-1999, a set of climate projections can be derived using an approach referred to as the ensemble informed hybrid delta method (HDe). The HDe method to develop climate change scenarios has been used in several Reclamation studies⁷, including locally in the adjacent West Salt River Valley Basin Study and on the Lower Santa Cruz River Basin Study.

The CAP:SAM model will be used to develop an array of potential supply and demand scenarios including scenarios to evaluate the effects of climate change. CAP:SAM was developed specifically for evaluating supply and demand for water users in the CAP service area which includes the Basin Study area. It accounts for the complex legal and physical constraints of users' water portfolios and allows for rapidly developing scenarios of varying levels and patterns of urbanization. CAP:SAM links to the Colorado River Simulation System (CRSS) allowing implementation of the effects of Colorado River shortages under climate change scenarios. That model will be used in conjunction with the ADWR Pinal Groundwater Model (currently being updated by ADWR) to evaluate the groundwater resources available for development based on multiple demand (growth) and climate change scenarios. The HDe method to develop climate change scenarios will generate a set of five projections commonly referred to as hotwet (HW), hot-dry (HD), warm-wet (WW), warm-dry (WD), and central tendency (CT).

Given other Study components, specifically Reclamation's Colorado River Basin Water Supply and Demand Study (CRBS)⁸ which was published in 2012 and provides results for CMIP3 projections, it is anticipated that the HDe climate scenarios based on the CMIP3 models will be used in the analysis. This approach is also being used on the West Salt River Valley Basin Study and on the Lower Santa Cruz River Basin Study, both of which are adjacent to the proposed Basin Study and in the same physiographic province in Arizona.

Analysis of how existing water and power infrastructure and operations will perform in the face of changing water realities: Existing regional water plans including the CRBS for the Basin provide a common technical foundation that frames the range of potential imbalances that may be faced in the future and the range of solutions that could be considered to resolve those imbalances. The water delivery infrastructure for irrigated agriculture has adapted to the advent of CAP water deliveries resulting in some cases the abandonment of the older production wells and associated delivery infrastructure. Projected imbalances due to the reduction in CAP water deliveries will need to be analyzed to confirm if the older infrastructure and the wells themselves associated with well production are capable of meeting current agricultural water demands. The infrastructure of the M&I water providers will also be analyzed to determine whether additional groundwater wells need to be drilled, existing wells deepened, and distribution systems upgraded to meet potential changes in water demand due to future curtailments in CAP water due to river shortages, distribution problems, and/or other potential disruptions in the current delivery systems via extreme events (e.g. droughts and floods).

Water use is also imbedded in power production. The Basins are primarily served by two electrical utility districts; Electrical District No. 2 and 3. The electricity produced for use in the Basins is purchased by the Districts at market

⁷ For examples, refer to, Milk-St Marys Rivers Basin Study; West-Wide Climate Risk Assessment Irrigation Demand and Reservoir Evaporation Projections, among other studies from the Reclamation WaterSMART website, http://www.usbr.gov/watersmart/index.html

⁸ Reclamation, 2012, Colorado River Basin Water Supply and Demand Study; http://www.usbr.gov/lc/region/programs/crbstudy.html.

prices and terms from a mix of coal-fired power plants throughout Arizona and the Palo Verde Nuclear Generating Station located just outside of the Phoenix metropolitan area. Although the EMS Basins have no hydroelectric power production facilities within its boundaries, CAP water and power are interrelated. More than 90% of the power requirement to deliver Colorado River water to Central Arizona is generated at the Navajo Generating Station (NGS). The probable decommissioning of the NGS associated with power costs and environmental regulations could increase the power costs to deliver CAP water resulting in negative financial impacts to CAP water users.

Imbalances between water supply and demand may require a return to groundwater pumping for the local agriculture and municipal sectors. Power costs for water and wastewater utilities are also one of the largest budget expenses. Reductions in CAP water deliveries to the lower Colorado Basin States may require recovery of CAP water previously recharged and currently stored in Pinal AMA aquifers. Increased power costs may be incurred to recover this stored water, as well as costs related to dealing with changes in water quality. The recovery of this "banked" water will probably not be used in the Basin Study area (Pinal AMA) but delivered for M&I uses outside of the Basins (for example, Tucson). The impact of recovery of banked water is an important part of the future water resources planning in the Basin Study area and will be addressed as part of the overall water supply and demand analyses, and groundwater modeling.

In addition, projected temperature increases from climate change are expected to increase groundwater use which will result in increased power demands and costs throughout all sectors. Exploring these factors and the water-power nexus in detail as part of the Basin Study will provide far reaching benefits to all stakeholders.

Development of Appropriate Adaptation and Mitigation Strategies to Meet Future Water Demands: The proposed study will develop strategies to address water supply and demand imbalances. The Arizona Water Banking Authority (AWBA), Central Arizona Water Conservation District, and local water providers are recharging CAP water and effluent in underground storage facilities throughout the EMS Basins. Much of this stored water may be pumped and delivered outside of the Pinal AMA to meet M&I needs elsewhere. To date, 440,000 AF have been stored in the Pinal AMA for Southern Nevada Water Authority. The Pinal AMA will be one of the first recovery locations for "banked" water and will need to account for this additional pumping on groundwater levels and available resources. The Basin Study will evaluate USBR and AWBA recovery planning documents and the implications on the regional groundwater resources especially since this recovery of Water Stored by the Arizona Water Banking Authority (AWBA), a joint plan by AWBA, ADWR and CAP, which can be leveraged to address these criteria.

The timing, location, and access to recover this water to meet future water demands, particularly if persistent drought and long term CAP shortages become a reality, will be key mitigation strategies to ensure the Basin's viability since a large percentage of the water may be delivered to users outside of the Basin. Areas in the Basin that have no access to infrastructure for renewable water supplies will be especially vulnerable. The impacts of climate change on natural recharge and its impact to stream flows and groundwater levels could also influence mitigation strategies such as groundwater pumping and its impacts to rural well owners and groundwater dependent ecosystems.

The coordinated management approaches developed during the proposed Basin Study, including guidance from Reclamation and AWBA recovery planning, will provide tangible, usable, current data that will enable water resource managers to produce more accurate projections of water supply and demand, and facilitate better assessment of existing imbalances in water quality and water quantity in the region, including the impacts of climate change. Climate information provided by Reclamation and CAP will be invaluable in reducing risks associated with shortages in Colorado River supplies. From there, the study will provide resource managers with information vital to develop and implement Colorado River adaptation mitigation plans and strategies, including approaches to deal with the event of any shortage declarations.

<u>Trade-off Analysis of the Strategies Identified and Findings:</u> This study proposes to use scenario planning, coupled with modeling, to evaluate water supply and demand imbalances and their impacts. A reference to evaluate scenario planning is the Bureau of Reclamation's Colorado River Basin Study which used both scenario planning and quantitative analyses and/or modeling. The results of the scenario planning and modeling will be used to identify approaches for mitigating the supply and demand imbalances. A trade-off analysis will be used to evaluate the risks, costs, and benefits of each approach. The Basin Study partners will work collaboratively with stakeholders to develop the trade-off analysis so that the results will include inputs from various points of view. The results of the trade-off analysis will be presented in the final Basin Study report.

3. The strength of any nexus between the Basin Study and a Reclamation project or activity, and the extent to which Federal involvement is needed due to the nature and complexity of the issues involved.

Reclamation is custodian of the waters of the Colorado River in the lower basin on behalf of the Secretary of Interior who functions as the "water master" and is involved in providing more than 500,000 AF of surface water to the Basin Study area of Pinal County through the Central Arizona Project ("CAP"). Historically, the Pinal AMA relied on groundwater for agricultural use and this resulted in groundwater declines and land subsidence. Central Arizona Water Conservation District ("CAWCD") began delivering Colorado River water to the AMA through CAP in 1990 to reduce groundwater pumping and restore aquifer levels. Through the Arizona Water Banking Authority, CAWCD has stored up to 1.4 million AF of water in the Study Area which may be called upon for utilization by parties outside the AMA during future periods of drought and supply demand imbalances elsewhere (including the State of Nevada that has stored 440,000 AF of water). CAWCD holds an additional 318,695 AF of credits for water stored on its behalf, and those credits are currently dedicated to support one of CAWCD's further responsibilities, the Central Arizona Groundwater Replenishment District. The implications of how and when these resources will be called upon remains undetermined, and thus the Basin Study will offer an opportunity to refine the regional understanding of CAWCD's role in both groundwater replenishment and credit recovery.

Reclamation's technical expertise is needed because of the nature and complexity of the issues in the Pinal AMA. Additionally, Reclamation's experience in previous basin studies and with climate change modeling provides guidance in the development of adaptation and mitigation strategies and analysis of these strategies. Reclamation's involvement in implementation of Indian water rights settlements, including the 2004 Arizona Water Settlement Act, enhances the planning process for water infrastructure and operations that benefit stakeholders in the Pinal AMA, Arizona and the U.S.

Through Federal Distribution System Loans, Reclamation partially funded significant infrastructure modifications to enable Pinal agricultural entities to make use of Colorado River water delivered through the Central Arizona Project. The irrigation districts had entered contracts with the United States pursuant to §9(d) of the Reclamation Project Act of 1939 under which the United States constructed the districts' CAP distribution systems and the districts committed to repay certain costs of that construction. Irrigation districts that relinquished their long-term CAP entitlements under the terms of the 2004 Arizona Water Settlement Act were relieved of their federal distribution system debt—often referred to as 9(d) debt. At that time, CAWCD agreed to provide a pool of excess CAP water, subject to availability, to the relinquishing subcontractors at energy-only rates through 2030. This pool, referred to as the Agricultural Settlement Pool, was sized at 400,000 AF initially, declining to 300,000 AF in 2017 and then to 225,000 AF in 2024.

Through CAP, Reclamation has made significant progress in implementing Tribal Water Rights settlements in Arizona. Two of the largest Tribal recipients of Colorado River water through the CAP system (the Gila River Indian Community (GRIC) and Ak-Chin Tribe) are located within the proposed Basin Study area. Following enactment of the Arizona Water Settlements Act of 2004, a total forty-six percent of the CAP supply now is designated for Indian water rights settlements. This makes CAP the largest single provider of Colorado River water to tribal water users in the Colorado River system. Specific to GRIC, Reclamation has been building facilities for GRIC to utilize their Colorado River allocation, supplied by CAP. The plan is to develop a distribution system, agricultural lands, and riparian habitat areas for the beneficial use of all allocated water resources. The irrigation system will provide water to just over 146,000 acres.

Reclamation's role in managing the Lower Colorado River and water resource projects and programs in the Southwest makes it a key partner for this study. Reclamation's responsibility in declaring shortage on the Lower Colorado River is of regional and national significance. The Secretary of the Interior, the "Water Master" of the Colorado River, has the authority to declare a shortage on the Lower Basin of the Colorado River based upon projected water levels in Lake Mead on January 1st of any calendar year (the decision is made in conjunction with the BOR's August 24-month water level projection). Because Arizona has junior priority rights on the Colorado River, Arizona is expected to bear the brunt of any shortage declared by the Secretary of the Interior. Initial shortages on the Colorado River will impact water deliveries to agriculture in the Pinal AMA. In addition, all CAP customers will be impacted financially by a reduction in CAP deliveries, as fixed costs will be paid by fewer customers. Continued shortages and/or the implementation of the Drought Contingency Plan could result in curtailments to municipal and Indian water supplies. Specifically of note, Reclamation and GRIC passed an element of the DCP on January 19, 2017, called the "DCP+ Principles Agreement", which relates to, amongst other things, their voluntary agreement to leave a portion of their allocation in Lake Mead.

Reclamation has a strong presence in the Pinal AMA. The CAP, one of the latest and most elaborate of Reclamation's projects, is the primary supplier of renewable water resources to Pinal AMA and the Basins. The largest Tribal customer of CAP (GRIC) and at least a portion of other Tribal CAP water users (Ak-Chin, Tohono O'odham) are in Pinal County. Increased groundwater pumping stemming from reductions in CAP deliveries could impact water supplies for all sectors, and for these Tribal entities as well.

Finally, the proposed Basin Study will provide a connection between the two-adjacent on-going Reclamation basin studies to the north and south (West Salt River Valley Basin Study and Lower Santa Cruz Basin Study). The Basin Study management team plans to consult with the management teams for the adjacent basin studies to implement lessons learned in the planning and management frameworks already in place for those studies. The adjacent studies will benefit the Basin Study in many additionally ways, including utilizing the CAP-SAM modeling that was completed for both. Development of a refined groundwater model for the Study Area combined with the results on the adjacent Basin Studies will further improve understanding of water resources from the northern boundary of the West Salt River Valley basin to the lower boundary of the Lower Santa Cruz basin, a continuous area of thousands of square miles ultimately encompassing numerous major metropolitan and agricultural regions.

4. The availability and quality of existing data and models applicable to the proposed study, and the ability of the Basin Study partners to assess future imbalances in water supply and demand.

<u>Data or Models to be Developed:</u> The Arizona Department of Water Resources (ADWR) prepares a Management Plan approximately every ten years for the Pinal AMA in order to:

- summarize the water resources conditions and water use characteristics,
- review the regulatory programs administered by ADWR for the agricultural, municipal, and industrial sectors including aquifer recharge and water quality programs, and water management assistant programs, and
- provide projections regarding future conditions in the AMA.

As part of Plan development, ADWR prepared a water supply and demand assessment for the Pinal AMA in 2011. The assessment provides a review of water uses and supplies from 1985 through 2006, and an array of future demand and supply projections including three scenarios to consider the potential effects of future CAP water shortages. Available data and models to be used in this study are listed in **Table 5**; however, this list is not

exhaustive as several cost-share partners and stakeholders have conducted studies tangential to the basin study work that will provide valuable information to the various components of the basin study.

TABLE 5 – Available Data and Wodels	TABLE	5 –	Available	Data	and	Models
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Data / Model	Significance / Importance	Source
Maps showing Groundwater Conditions in the Pinal AMA, and Maricopa, Pinal, and Pima Counties, Arizona, Nov. 2002 – Feb. 2003	Regional Water level data and trends to support modeling efforts	Rascona, S.J., 2006. Arizona Department of Water Resources Hydrologic Map Series Report No. 36.
Report, maps, basic data of hydrogeologic conditions, historic water levels, stratigraphy of the basin sediments.	Hydrogeologic characterization of the Pinal AMA and Basin Study area	Bureau of Reclamation. 1977. Geology and Ground-water Resources Report, Maricopa and Pinal Counties, Arizona. U.S. Department of the Interior. Volumes 1 and 2.
Update of the depth to bedrock in the Basin Study area	Description of the Depth to Bedrock – Bottom of the regional aquifer and subsequent aquifer saturated thickness	Richard, S.M., Shipman, T.C., Greene, L., and Harris, R.C., 2007. Estimated Depth to Bedrock in Arizona. Arizona Geological Survey Digital Geologic Map 52 (DGM-52), version 1.0. April, 2007.
Regional Groundwater Flow Model for the Pinal Active Management Area, Arizona, Model Update and Calibration, Modeling Report No. 26, February 2014	Comprehensive update to the groundwater flow model for the primary aquifers in the Pinal AMA.	Liu et. al., 2014 (ADWR) <u>http://www.azwater.gov/azdwr/Hydro</u> <u>logy/Modeling/FINAL_PINAL_MODEL</u> <u>REPORT_ALL_02_24_2014.pdf</u>
DRAFT Demand and Supply Assessment 1985-2025 Pinal Active Management Area, May 2011	Historical water demand and supply characteristics for 1985 - 2006 and projections to 2025. Evaluates possible scenarios for future groundwater overdraft using low, medium and high reasonable water demand.	ADWR, 2011 <u>http://www.azwater.gov/AzDWR/Wat</u> <u>erManagement/Assessments/default.</u> <u>htm#Pinal</u>
Recovery of Water Stored by the Arizona Water Banking Authority	The analysis relies on two models, the CRSS and creates a custom recovery model that was developed to calculate the probability of specific recovery volumes, based on a range of conditions.	AWBA, ADWR, CAP <u>http://www.azwaterbank.gov/Plans_a</u> <u>nd_Reports_Documents/documents/J</u> <u>oint_RecoveryPlan04-14-</u> <u>14withsignedpreface.pdf</u>
Central Arizona Project Service Area Model (CAP:SAM)	Model developed using GoldSim software to simulate water demands and supplies for major water users in the CAP Service Area, including the Pinal AMA.	CAP, 2015 http://www.goldsim.com/Web/Solutio ns/Showcase/EnvironmentalExamples /CAPSAM/
West-Wide Climate Risk Assessments: Bias-Corrected and Spatially	Analysis of changes in hydroclimate variables and documentation for new hydrologic projections datasets.	Reclamation, 2011 http://www.usbr.gov/watersmart/wcr a/

Data / Model	Significance / Importance	Source
Downscaled Surface Water Projections, March 2011		
Downscaled CMIP3 and CMIP5 Climate and Hydrology Projections, May 2013	Climate and hydrologic projections for analysis of potential hydrologic effects to climate change.	Reclamation, 2013 <u>http://gdo-</u> <u>dcp.ucllnl.org/downscaled_cmip_proje</u> <u>ctions/</u>
Colorado River Basin Water Supply and Demand Study, December 2012	Examination of water supply and demands for States that receive Colorado River Water including projections under varying climatic conditions using the Colorado River Simulation System (CRSS).	Reclamation, 2012 http://www.usbr.gov/lc/region/progra ms/crbstudy/finalreport/index.html
ADWR well data, groundwater levels, and pumpage history	Well registry, groundwater Site Inventory (GWSI) database of measured water level data, reported annual pumping volumes by well.	https://gisweb.azwater.gov/waterreso urcedata/WellRegistry.aspx https://gisweb.azwater.gov/waterreso urcedata/GWSI.aspx
ADWR subsidence data	Maps showing magnitude of land subsidence in response to past groundwater pumping	http://www.azwater.gov/AzDWR/Hydr ology/Geophysics/PicachoEloySubside nce.htm http://www.azwater.gov/AzDWR/Hydr ology/Geophysics/MaricopaStanfieldS ubsidence.htm
Earth Fissure Map of Pinal County, Arizona, March 2011	Map of fissures throughout Pinal County including the Basin Study Area.	AZGS, 2011 http://repository.azgs.az.gov/sites/def ault/files/dlio/files/nid996/pinal_coun ty_03_11.pdf
ADWR Underground Storage Facility (USF) and Groundwater Savings Facility (GSF) permit data	Permit documents and annual reports of artificial recharge and in-lieu	http://www.azwater.gov/azdwr/Wate rManagement/Recharge/documents/ ALLAMAUSFList5.25.16.pdf http://www.azwater.gov/azdwr/Wate rManagement/Recharge/documents/ ALLGSFList05.25.16.pdf et al
ADWR Assured Water Supply data	Estimated water demands for planned development of specific lands.	https://gisweb.azwater.gov/waterreso urcedata/AAWS.aspx
Availability of Renewable Water Resources in Pinal County, December 2010	Investigation of renewable supplies and opportunities to acquire additional supplies in Pinal County.	Westland Resources and Montgomery & Associates, 2010
Pinal Active Management Area Groundwater Quality Survey, June 2014	Water quality database used to evaluate regional patterns in water quality and pinpoint localized areas where constituents may exceed drinking water standards or be unacceptable for certain uses without treatment.	Montgomery and Associates, 2014

List of Data and Models to be Included: Water supply and demand projections from the ADWR assessment and CAP:SAM will provide the baseline for this study. The two projections will be compared to identify any major differences, and CAP:SAM will be modified, if warranted, to rectify any differences. CAP:SAM will be extended to project through 2060. The major water users in the Study Area will be provided an opportunity to review inputs specific to their water portfolios to refine model input data and parameters. The Basin Study stakeholders will collectively decide which CAP:SAM variations to run to provide an array of predictive scenarios. These variations will include climate change scenarios based on analysis of Reclamation's West-wide Climate Risk Assessment (WWCRA) projections.

The Pinal AMA Groundwater Model will be examined, particularly to assess its use for the objectives of the Basin Study. The model will be modified as necessary and used to construct predictive scenarios to evaluate ground water resources in the Basin Study area. An array of predictive scenarios will be constructed to identify potential areas of concern under uncertain future aquifer stresses, land subsidence and climatic conditions. Climate change impacts based on analysis of the WWCRA projections will be considered among these predictive model scenarios as it may influence CAP water availability and groundwater demands. It may also affect natural recharge within the Study Area.

The quantity and quality of existing water resources data and demand projections for the municipal, industrial, and agricultural water sectors in the Pinal AMA Basin is extensive and will meet the needs of the Basin Study. To that end, three existing and currently available models will be used to project supply and demand imbalances, and the impacts of climate change on the available water resources. Those models are:

 Reclamation's BCSD (Bias Corrected and Spatially Downscaled), CMIP3 (Couple Model Inter-comparison Project Phase 3), and CMIP5 (Coupled Model Inter-comparison Project Phase 5) Models will be used to develop climate change impacts.

Assessing the risks to the water supply relating to climate change will be a collaborative effort between Reclamation's Technical Service Center (TSC) and their climate change scenarios using BCSD, CMIP3, and CMIP5 projections, and the Central Arizona Project (CAP) CAP:SAM model. With a proposed planning horizon of 2060 represented using a 30-year time window centered on 2060, i.e., 2045-2074, for the Study and using the reference historical period of 1950-1999, a set of climate projections can be derived using an approach referred to as the ensemble informed hybrid delta method (HDe). The HDe method to develop climate change scenarios has been used in several Reclamation studies¹.

The Bureau of Reclamation's West-wide Climate Risk Assessment (WWCRA), and updates to these projections will be employed to assess projected impacts to stream flows, water supplies and demands, and other relevant factors. This assessment will form the foundation for detailed analysis and development of adaptation options for the Pinal AMA Basin Study Area.

• CAP:SAM model will be used to project future demands based on various growth scenarios and evaluate the effects of climate change on the Basins under a series of climate and growth scenarios.

CAP:SAM is a model constructed by Central Arizona Project (CAP) using GoldSim software which brings together a wealth of information regarding water supplies and demands throughout CAP's service area including the Pinal AMA Basin Study Area. CAP:SAM provides a framework to test a wide range of potential water demand scenarios including those based on Central Arizona Government's (CAG) population growth scenarios. CAP:SAM uses data regarding the potential availability of different water supplies to project how each major water user will satisfy their future water demands. CAP:SAM integrates Colorado River Simulation System (CRSS) outputs, allowing projections of water supply portfolios under hundreds of future CAP water supply scenarios including runs that simulate potential CAP shortages due to climate change. • ADWR Regional Groundwater Flow Model of the Pinal Active Management Area (currently being updated by ADWR) to evaluate the groundwater resources available or shortfalls under various growth projections and climate change impacts.

ADWR released a comprehensive update to the Pinal AMA groundwater flow model in 2014 (Liu et. al., 2014). The model simulates aquifer conditions in the Eloy and Maricopa-Stanfield Basins of the Pinal AMA, which includes the primary available groundwater resources in the Basin Study Area. The model uses MODFLOW-2005 software developed by the U.S. Geological Survey, and incorporates a package to simulate the effects of land subsidence. The model simulates predevelopment conditions (circa 1922) and transient conditions from 1923 through 2009, a period which included significant varying aquifer stresses including the pumping of up to approximately 1.1 million AF per year of groundwater primarily for agricultural uses in the model area. The Pinal AMA model provides a tool for assessing groundwater resources under varying future aquifer stresses including production well pumping and artificial recharge scenarios. The effects that potential future climate variations will have on the hydrologic inputs (e.g. natural recharge) can also be evaluated.

As a result of these hydrogeologic data sources and models from well-established and documented sources being readily available, the models can be applied effectively within the 3-year study period. Areas of concerns relating to the models are:

- analyzing potential climate change on the Pinal AMA Basin Study Area to address the inherent uncertainty of water supply availability when projecting potential solutions for informed decisions,
- developing a GIS siting analysis which will be used to assess potential mitigation strategies, and
- determining the amount of incidental and natural recharge in the Basin.

Ability of the basin study cost-share partners to assess future imbalances in water supply and demand: The Pinal Partnership recognizes the importance of working together to identify the best strategies to meet the future demands in the Pinal AMA Basin Study Area. The existing data and modeling tools provide a solid basis for implementing this collaborative effort. Predictive modeling based on the Pinal AMA groundwater flow model will provide essential data to identify potential shortfalls in groundwater supply. Uncertainty of predicted model results will be assessed by varying sensitive model inputs. Of importance, we will be evaluating the effects of potential climate change on the model predictions. The stakeholders of the Pinal Partnership include recognized experts in not only water resource management, but also hydrogeology and modeling. The modeling tools will provide a framework for testing the potential efficacy of water resource management strategies.

5. The level of support for the Basin Study and diversity of stakeholders that will be involved.

The Supporting Stakeholders are listed in the Project Information section of this proposal. As indicated, there is a significant amount of support from Pinal County stakeholders. Beyond Pinal Partnership as a whole, which represents approximately 94 organizations (including governmental entities such as the Cities of Apache Junction, Coolidge, Casa Grande, Eloy, Maricopa, and Mesa, the Towns of Florence and Marana, Pinal County, and several Native American communities including the Gila River and Ak-Chin Indian Communities), we received a total of 20 direct letters of support. These letters of support include a wide array of stakeholders including regulatory and government agencies, water management organizations (both private and public, domestic and irrigation), consulting firms within the water industry, environmental organizations, and numerous firms focused on economic development within the Basin Study area. Generally, all the stakeholders within Pinal County understand the critical nature of water resources to the long-term sustainability of Pinal County, and are excited about the prospect of undertaking a Basin Study, the results of which will aid in initiating more proactive, region wide collaboration, with the involvement of Reclamation. Pinal Partnership members will provide water supply and demand data, infrastructure data and long term planning information for the study.

With respect to stakeholder engagement and informational meetings, it is important to highlight that Pinal Partnership and Pinal County already have an existing and sophisticated communications network to

communicate with virtually everyone within Pinal County, stakeholders to the study or otherwise. PP-WRC will utilize this network to facilitate a robust program that will frequently provide updates and solicit input at the proper stages throughout the study process.

At minimum, monthly stakeholder meetings will take place to discuss the technical aspects of the basin study, so that partners can remain engaged and the basin study schedule stay on track. In addition, an annual meeting, or at key milestones during the study process, will be coordinated wherein all stakeholders, including tribes, districts, municipalities, water providers, and citizens themselves, can learn about the study progress and provide input. And so that decision and policy makers can make informed decisions related to water resources in Pinal County, a targeted campaign will be developed for management and elected officials in Pinal County, to include County Supervisors, State Representatives, City Managers, Mayors and City Councils, Tribal Councils and Boards of Directors. Basin Study meetings will be advertised through the regular media channels, as well as email and social media to ensure a high level of participation for meetings. Utilizing the County's vast capabilities and resources, and developing additional support and relationships with key governing bodies in Pinal County such as the Central Arizona Association of Governments, we are certain that we can garner the appropriate support and involvement from the necessary stakeholders and the public.

6. The extent to which the proposed study will employ an integrated watershed planning and management approach.

Pinal Partnership's diverse base of stakeholders has been working together for over a decade in a collaborative manner to positively impact the future of Pinal County. The Basin Study would provide needed information to broaden the discussion related to water resources and planning the future of the County and the watersheds.

Water supply in the Study Area is influenced by several significant watersheds including not only the Upper Santa Cruz and Middle Gila watersheds where it is located, but also the Upper and Lower Colorado River watersheds. The Basin study will evaluate how demands on the watersheds affect groundwater levels, availability, and the impact on water quality. The Pinal Partnership would benefit greatly from a coordinated and integrated approach to watershed planning and management that would be one result of the proposed Basin Study.

As evidence of this point, Pinal Partnership has directly and financially supported the Santa Cruz River Alliance for years, an existing organization focused on the flood control elements of the Santa Cruz River floodplain that cuts through much of the Study Area. Working with this group, and many others the Pinal Partnership already has a relationship with, on the natural interrelation of activities within the watershed will benefit all. Further, because the Pinal AMA has limited surface water supplies, there is great interest in addressing localized areas experiencing groundwater level declines through implementation of adaptation and management strategies including water resource management, conservation, reuse, replenishment and recovery infrastructure. Because of the arid nature of the Sonoran Desert, the interconnectedness and need for balance of water resources for municipal, industrial, agriculture, and the environment are valued highly.

The organizational structure proposed for the basin study provides an ideal framework to facilitate greater stakeholder collaboration regarding water issues in the Study Area than exists currently, including in the areas of rain water harvesting, storm water catchment, and environmental matters such as stream flow protection. Any such coordinated management approaches can be incorporated into scenario planning as there is growing policy support for enhanced water management in the region.

D. Study Outline and Schedule

The proposed Basin Study is estimated to cost \$1,360,000 with fifty percent contributed by the study partners and the remainder by Reclamation. A detailed summary of the study costs and percentages by task is shown in **Table 6**.

TABLE 6

Teels	Tack Decerintion	Cost	Pinal Partners	ship	Reclamation		
Task	Task Description	Cost	Cost-Share	%	Cost-Share	%	
1.	Project Management / Administration	200,000	100,000	50%	100,000	50%	
	Plan of Study and MOA Development						
	Communication and Outreach Plan						
	Technical (Partner) Meetings						
	Stakeholder Coordination / Meetings						
	Task Management						
2.	Basin Study Demand Study	100,000	80,000	80%	20,000	20%	
	Literature Review of Demand						
	Identify Existing and Future Demands						
	Create CAP:SAM Inputs						
	Develop CAP:SAM Scenarios						
	Report Preparation						
3.	Basin Study Supply Study	80,000	70,000	88%	10,000	12%	
	Literature Review of Supply						
	Identify Existing and Future Supplies						
-	Report Preparation						
4.	Basin Study Groundwater Model	340,000	90,000	26%	250,000	74%	
	Review Existing ADWR Model Info						
	Assess Model Supply/Demand Figures						
	CAP:SAM Demand Information						
	Incorporate Subsidence Package						
	Run Mitigation Scenarios						
	Groundwater Well-Depth Assessment						
-	Prepare Report	70.000		0.001	40.000		
5.	Infrastructure Analysis	70,000	60,000	86%	10,000	14%	
	Existing Infrastructure Inventory						
0	Address Model Impacts (i.e. well depths)	400.000	00.000	000/	70.000	770/	
6.	Climate Change Analysis	100,000	30,000	30%	70,000	11%	
	Develop Climate Change Projections						
	Incorporate in Groundwater modeling						
	Gap Analysis Branara Banart						
7	Adaptation and Mitigation Strategies	100.000	00.000	070/	40.000	220/	
1.	Adaptation and Mitigation Strategies	120,000	80,000	67%	40,000	33%	
	Analyze Alternatives and Trade offe						
	Analyze Alternatives and Trade-ons						
	Branara Banart						
8	Mitigation Strategies Siting Analysis	160,000	60,000	13%	100.000	57%	
0.	Data Gathering and Review	100,000	00,000	4370	100,000	5170	
	GIS Siting Analysis Model						
	Prenare Report						
9	Fconomics Analysis	90.000	50,000	55%	40 000	45%	
5.	Review existing population	30,000	50,000	0070	40,000	+070	
	Evaluate economic benefits of new water						
	supplies and infrastructure						
	Evaluate affordability of alternatives						
	Assess regional impacts of alternatives						
10.	Reporting	100,000	60,000	67%	40,000	33%	
	Interim Reporting		,		-,		
	Draft Final Report						
	USBR Technical Sufficiency Review						
	Final Report						
	STUDY TOTAL	\$1,360,000	\$680,000	50%	\$680,000	50%	

Responsibility Assignment

PP-WRC is the lead partner for this study and has the support and participation of several cost share partners as noted above in section A, who have all committed to participate in the Basin Study. The Basin Study will include participation from ADWR, CAP, and Pinal County as well. As you can see from the number of letters of support and the stakeholder list already developed, there is a good opportunity to expand the cost share partners. Additional cost-share partners may include private water companies, municipal water providers, water districts, wastewater providers, Tribes, cities, and private industry consultants. A study management committee will oversee coordination, stakeholder outreach and overall management of the study. A technical committee will provide input on data collection, scenario planning, groundwater modeling and infrastructure and alternative analysis. It will include water and wastewater providers, agricultural interests, ADWR and CAP.

Additionally, to demonstrate our commitment and desire to engage in a Basin Study, PP-WRC proactively contracted with MakPro Services to assist with the development of this proposal. Teresa Makinen of MakPro Services also oversees the West Salt River Valley Basin Study for the WESTCAPS' organization, and PP-WRC felt that this direct experience in a current basin study would strengthen our efforts on the proposal, and ultimately throughout the Basin Study process itself.

An evaluation of the partners' responsibility toward each task is summary of the partners' primary responsibility is provided in **Table 6** above.

Study Milestone Schedule

Pinal Partnership anticipates completing the proposed Basin Study within 33 months after initiation. A schedule of milestone tasks is included in **Table 7** below.

TACK	DESCRIPTION	YEAR 1			YEAR 2				YEAR 3				
TASK		Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
1	Project Management / Admin	Х	Х	Х	Х	Х	Х	Х	Х	Х	Х	Х	Х
2	Demand Study	Х	Х	Х									
3	Supply Study			Х	Х								
4	Groundwater Model			Х	Х	Х	Х	Х					
5	Infrastructure Analysis				Х				Х	Х			
6	Climate Change Analysis		Х	Х									
7	Adaptation & Mitigation Strategies							Х	Х				
8	Mitigation Strategies Siting Analysis								Х	Х	Х		
9	Reporting		Х		Х		Х		Х		Х	Х	Х

Table 7 – Study Milestone Schedule

ELOY & MARICOPA-STANFIELD BASIN STUDY PROPOSAL

APPENDIX A

LETTERS OF SUPPORT



March 27, 2017

Ms. Amanda Erath Bureau of Reclamation Mail Code: 84-51000 P.O. Box 25007 Denver, CO 80225

Subject: Maricopa –Stanfield and Eloy Basin Study Proposal Bureau of Reclamation FY2017 Basin Study

Dear Ms. Erath:

The Central Arizona Water Conservation District (CAWCD) is pleased to offer its support for the proposed Maricopa-Stanfield and Eloy Basin Study. The Study is timely and will help further the understanding of the complex and rapidly changing water resource picture in the primary basins of the Pinal Active Management Area. Currently, approximately one-third of the entire Colorado River supply that CAWCD delivers through the Central Arizona Project is being used in the Study area. However, Colorado River shortages and planned reductions in agricultural supplies are likely to dramatically alter that proportion. The Study area has also experienced periods of rapid population growth, and may experience similar periods in the future, placing further pressure on the available water supplies.

In addition to delivering Colorado River water to the Study area, CAWCD has responsibilities for recovery of up to 1.4 million acre-feet of water stored by the Arizona Water Banking Authority in the Study area, and CAWCD holds an additional 318,695 acre-feet of credits for water stored on its own behalf. Those credits are currently dedicated to support one of CAWCD's further responsibilities—the Central Arizona Groundwater Replenishment District—which has a current enrollment of 62,309 homes in 137 subdivisions in the Study area. The Study will offer an opportunity to refine the regional understanding of CAWCD's role in both groundwater replenishment and credit recovery.

CAWCD anticipates being an active in-kind study partner, with significant contributions to the planning effort. CAWCD's regional CAP:SAM model will assist in the evaluation of supply and demand imbalances, and can be used to develop a wide range of scenarios,

including those incorporating climate change. CAWCD is currently providing similar support for the two adjacent Basin Studies, (WESTCAPS and Lower Santa Cruz), and we are confident that the Maricopa-Stanfield and Eloy Basin Study will provide additional local and regional value.

Sincerely,

C 4

Theodore Cooke General Manager

Copy: Mary J. Reece, P.E. Manager, Program Development Division U.S. Bureau of Reclamation



Pinal County Water Augmentation Authority

P.O. Box 12684 Casa Grande, AZ 85130

April 12, 2017

Bureau of Reclamation Attn: Amanda Erath Mail Code 84-51000 P.O. Box 25007 Denver, CO 80225

RE: Pinal Partnership Basin Study Proposal Bureau of Reclamation FY 2017 Basin Study

Dear Ms. Erath:

The Pinal County Water Augmentation Authority (PCWAA), is a corporate and political body consisting of municipalities, irrigation districts and water interests that seek to support the development of responsible, collaborative, and sustainable water planning and management within the Pinal Active Management Area (AMA).

The Pinal AMA faces increasing challenges to its water supplies. The effects of drought, climate change, population growth and the existence of scant renewable water supplies raise serious questions concerning the long-term viability of regional groundwater supplies. A basin study that identifies water supplies and demand imbalances and looks at augmentation issues would prove an invaluable tool for decision makers to utilize in developing strategies and policies in order to mitigate difficulties that arise as a result of these issues.

On behalf of the PCWAA and its member agencies, please accept this Pinal Partnership Basin Study proposal for Fiscal Year 2017. Should you have any questions or need additional information please feel free to contact Joe Singleton, Executive Director at 520-518-1726.

el Suide

David Snider Chairman



April 19, 2017

Bureau of Reclamation Attn: Ms. Amanda Erath Mail Code: 84-52000 P.O. Box 25007 Denver, CO 80225

Re: Eloy and Maricopa-Stanfield Basin Study Proposal

Dear Ms. Erath,

Global Water Resources, Inc. is a private utility that provides water, wastewater and recycled water services to nearly 50,000 customers in Pinal County. As a water resource management company, our focus is on the broad issues of water supply and scarcity and our business model applies principles of water conservation through water reclamation and reuse.

As a member of Pinal Partnership, we strongly support the proposed Eloy and Maricopa-Stanfield Basin Study. As one of the largest water providers in Pinal County with significant service areas throughout the Basin Study area, Global Water recognizes the importance of sustainable water use to safeguard the long term environmental and economic viability of this region. The proposed Basin Study will facilitate a collaborative effort to identify water supply and demand imbalances within the region and enable the development of adaptation and mitigation strategies to ensure the region's future water demands are met.

It is our belief that this region will greatly benefit from a Basin Study, and therefore we thank you for your consideration.

Ron Fleming

President & Chief Executive Officer

ARIZONA WATER COMPANY

3805 N. BLACK CANYON HIGHWAY, PHOENIX, ARIZONA 85015-5351 • P.O. BOX 29006, PHOENIX, AZ 85038-9006 PHONE: (602) 240-6860 • FAX: (602) 240-6874 • TOLL FREE: (800) 533-6023 • www.azwater.com

April 5, 2017

Bureau of Reclamation Attn: Amanda Erath Mail Code: 84-52000 P.O. Box 25007 Denver, CO 80225

RE: Eloy and Maricopa-Stanfield Basin Study Proposal

Dear Ms. Erath:

Arizona Water Company ("Company") is a private utility company that provides water service to nearly 50,000 connections or over 100,000 people in Pinal County. The Company expresses its support for the Eloy and Maricopa-Stanfield Basin Study proposal as outlined in the Pinal Partnership Letter of Interest dated January 20, 2017, authored by Mr. Ron Fleming.

As an active member of the Pinal Partnership, we believe it is important for the Basin Study to quantify the amount and locations of water supplies in the Eloy and Maricopa-Stanfield basin and to quantify demand imbalances in order to identify adaptive and mitigation strategies to meet the various water resource needs in the Pinal AMA. We also recognize and support the importance of the Basin Study in evaluating climate change impacts on water supply and demand imbalances.

The proposed study will be beneficial in planning the next steps for long term water supplies to the Pinal Valley region and the Cities of Casa Grande and Coolidge. In addition, the Basin Study will help to continue to promote regional cooperation and collaboration for future water supply and delivery.

Sincerely,

Fredrick K. Schneider, P.E. Vice President - Engineering

vts



39700 W. Civic Center Plaza Maricopa, AZ 85138 Ph: 520.568.9098 Fx: 520.568.9120 www.maricopa-az.gov

CITY MANAGER OFFICE

April 11, 2017

Bureau of Reclamation Attn: Ms. Amanda Erath Mail Code: 84-52000 P.O. Box 25007 Denver, CO 80225

RE: Maricopa, Stanfield & Eloy basin study proposal application

Dear Ms. Erath,

The City of Maricopa would like to express our support for the basin study proposal application being submitted by Global Water. The proposed study will be beneficial in planning the next steps for long term water supplies to the entire southern Arizona region.

The City of Maricopa is predominately an agricultural community located approximately sixteen miles southeast of the Phoenix metropolitan area. The current drought in the southwest United States and the possibility of a shortage declaration on the Colorado River in the near future is understandably of great concern to us. If approved the proposed study would facilitate the creation of a sustainable water supply for the entire region.

Thank you so much for your consideration. Please feel free to contact me should you have any questions or require additional information.

Sincerely,

Gregory E. Rose, ICMA-CM City Manager





City of Casa Grande

Public Works Department North Operations Center

March 28, 2017

Bureau of Reclamation Attn: Amanda Erath Mail Code: 84-51000 P.O. Box 25007 Denver, CO 80225

RE: Maricopa-Stanfield and Eloy Basin Study Proposal

Dear Ms. Erath:

The City of Casa Grande Public Works Department would like to express our support for the Maricopa-Stanfield and Eloy Basin Study Proposal as outlined in the Pinal Partnership Letter of Interest dated April 4, 2016 authored by Ron Fleming.

We believe it is important for the Basin Study to identify the magnitude and location of water supply and demand imbalances and to identify adaptive and mitigation strategies to meet the various water resources needs in the Pinal AMA. We also recognize the importance of the Basin Study in evaluating climate change impacts on water supply and demand imbalances.

The proposed study will be beneficial in planning the next steps for long term water supplies to the City of Casa Grande and the Pinal County Region. In addition, the Basin Study will help to continue to promote regional cooperation and collaboration for future water supple and delivery.

Sincerely

Kevin Louis Director of Public Works

3181 N. Lear Avenue · Casa Grande, Arizona 85122-7925 Phone: 520-421-8625 · Fax: 520-421-8626 · www.casagrandeaz.gov



April 3, 2017

Bureau of Reclamation Attn: Amanda Erath Mail Code: 84-51000 P. O. Box 25007 Denver, CO 80225

Re: Maricopa-Stanfield and Eloy Basin Study Proposal

Dear Ms. Erath,

As Mayor for the City of Casa Grande, I am writing you to express my and our City support for the Maricopa-Stanfield and Eloy Basin Study proposal. We believe it's key to helping the Pinal AMA meet future water resource needs.

The Basin Study will help identify the magnitude and location of water supply and demand imbalances. It will also help identify adaptive and mitigation strategies. We all recognize the importance of the Basin Study in evaluating climate change impacts on water supply and demand imbalances.

This Study is critical to the City of Casa Grande and Pinal AMA's long term water supplies. Please support this study so we can continue to promote regional cooperation, regional collaboration and good long term water supply.

Respectfully,

maland

Craig H. McFarland Mayor

Telephone: 520/421-8600 – Fax: 520/421-8604 – TDD: 520/421-2035 510 East Florence Boulevard – Casa Grande, Arizona 85122 www.casagrandeaz.gov



June 20, 2016

Bureau of Reclamation ATTN: Amanda Erath Mail Code: 84-51000 P.O. Box 25007 Denver, CO 80225

RE: Maricopa, Stanfield & Eloy Basin Study Proposal Application

Dear Ms. Erath,

On behalf of the City of Eloy I wish to extend our support to the Letter of Interest (LOI) for the Pinal Partnership Basin Study proposal, dated April 4, 2016, submitted to the Bureau of Reclamation.

The City of Eloy, located off Interstate 10 halfway between Phoenix and Tucson, will be greatly impacted by the future supply of water resources for agricultural uses as well as municipal and industrial land uses within the Pinal AMA. Historically agriculture has dominated the economy within the community; however, more recently Eloy has attracted several industrial developments due to its proximity to Interstate 10 and available rail service. It is critical to our economic sustainability that we have a reliable supply of water to ensure that agriculture and industry continue to grow. The proposed Basin Study will assist Eloy in assessing future water supplies and demands which will be beneficial to our community planning and economic development in the years to come.

The City is pleased to work with our public and private partners within the Pinal Partnership in advancing the Basin Study which will further the goal of developing strategies to address any future imbalances between water supply and demand in the region.

Jour

Harvey Krauss City Manager

MARICOPA-STANFIELD IRRIGATION & DRAINAGE DISTRICT

OFFICERS BRYAN M. HARTMAN, President DANIEL W. THELANDER, Vice-President KELLY ANDERSON, Secretary

GENERAL MANAGER/ASSISTANT SECRETARY BRIAN M. BETCHER GENERAL COUNSEL PAUL R. ORME

DIRECTORS

First Division KELLY ANDERSON CRAIG SCOTT BRYAN M. HARTMAN

Second Division SIEBE HAMSTRA JAMES P. WHITEHURST DAVID STUEVE

Third Division DANIEL W. THELANDER LINDA CHENEY TONY DUGAN

April 17, 2017

U.S. Bureau of Reclamation Attn: Amanda Erath Mail Code: 84-51000 P.O. Box 25007 Denver, CO 80225

Re: Basin Study Proposal - Eloy and Maricopa-Stanfield Sub-Basin Area

Dear Ms. Erath:

The Maricopa Stanfield Irrigation & Drainage District (MSIDD) would like to express its support for the Basin Study Proposal – Eloy and Maricopa-Stanfield Sub-Basin Area as outlined in the Pinal Partnership Letter of Interest.

MSIDD, located in the Maricopa-Stanfield Sub-basin, currently provides commercial irrigation water service to over 65,000 acres of farmland in Pinal County relying heavily of water supplies from the Colorado River combined with groundwater produced from its deep-water wells. The District believes it is critical to better understand the potential for and magnitude of future water supply imbalances along with a better understanding of the extent of groundwater supplies it may have to rely on in the future.

The proposed study of the Eloy and Maricopa-Stanfield Sub-basin area would provide area specific evaluations of current and future water supplies, improving on data already available which will be of benefit to the District as it plans for its future water supplies. In addition, this study will continue to promote regional cooperation and collaboration among all Pinal County users for the future water supplies they will share.

M. betcher

Brian M. Betcher General Manager





FARM SOURCES INTERNATIONAL Securing Global Food Supply

April 3, 2017

Bureau of Reclamation Attn: Ms. Amanda Erath Mail Code: 84-52000 PO Box 25007 Denver, CO 80225

Re: Eloy and Maricopa-Stanfield Basin Study Proposal

Dear Ms. Erath,

Farm Sources International Holdings, LLC, is in the business of managing land, leases, water rights and farmers. This letter is in support for the Eloy and Maricopa-Stanfield Basin Study proposal as outlined in the Pinal Partnership Letter of Interest dated April 4, 2016, authored by Ron Fleming.

We believe it is important for the Basin Study to identify the magnitude and location of water supply and demand imbalances, and to identify adaptive and mitigation strategies to meet the various water resource needs in the Pinal AMA. We also recognize the importance of the Basin Study in evaluating climate change impacts on water supply and demand imbalances.

The proposed study will be beneficial in planning the next steps for long-term water supplies to the City of Coolidge and the Pinal County Region. In addition, the Basin Study will help to continue to promote regional cooperation and collaboration for future water supply and delivery.

Jackob H Andersen



3,

April 3, 2017

Bureau of Reclamation Attn: Ms. Amanda Erath Mail Code: 84-52000 P.O. Box 25007 Denver, CO 80225

Re: Eloy and Maricopa-Stanfield Basin Study Proposal

Dear Ms. Erath,

Environmental Defense Fund, Inc. (EDF) is an international conservation group that brings sound science, economics and market-based approaches, and uncommon partnerships to meet the globe's most pressing environmental challenges. In Arizona, EDF is focused on water resources, and is engaged in a wide portfolio of projects that aim to support water users in their efforts to manage demands and successfully adapt to changing water supplies in ways that benefit people and nature. Sustainable groundwater and sustainable agriculture are import components of EDF's approach in Arizona and throughout the Western United States.

As such, we support the proposed Eloy and Maricopa-Stanfield Basin Study. EDF has been engaged with local partners in Pinal County, AZ agricultural districts to identify and study a suite of options that could help mitigate the effects of potentially reduced Colorado River water deliveries in the future, while maintaining regional groundwater supplies and a healthy economy. We recognize the importance of this basin study in meeting the long term goals of water supply security in the region, and EDF is committed to constructively engaging in the study's collaborative process.

Sincerely,

Christopher Kuzdas, Ph.D. Project Manager, Water Program Environmental Defense Fund

T 602 478 9548 F 303 440 8052 edf.org

Walton™

March 22, 2017

Ms. Amanda Erath Bureau of Reclamation Mail Code 84-51000 P.O. Box 25007 Denver, CO 80225

Re: Eloy and Maricopa-Stanfield Basin Study Proposal

Dear Ms. Erath,

Walton is a real estate investment and development company that manages close to 15,000 acres in Pinal County. We would like to renew our support for the Eloy and Maricopa-Stanfield Basin Study proposal authored by Ron Fleming.

We believe it is important for the Basin Study to identify the magnitude and location of water supply and demand imbalances and to identify adaptive and mitigation strategies to meet the various water resource needs in the Pinal Active Management Area. We also recognize the importance of the Basin Study in evaluating climate change impacts on water supply and demand imbalances.

The proposed study will be beneficial in planning the next steps for long-term water supplies to the City of Casa Grande and the Pinal County region. In addition, the Basin Study will help continue regional collaboration for future water supply and delivery, which is a critical component in economic development and the healthy growth of this area.

Jennifer Ruby General Manager



April 3, 2017

Bureau of Reclamation Attn: Ms. Amanda Erath Mail Code: 84-52000 PO Box 25007 Denver, CO 80225

Re: Eloy and Maricopa-Stanfield Basin Study Proposal

Dear Ms. Erath,

Saint Holdings, LLC, is a multi-faceted real estate investment and development company with holdings in industrial, land, multifamily residential, and agriculture. This letter is in support for the Eloy and Maricopa-Stanfield Basin Study proposal as outlined in the Pinal Partnership Letter of Interest dated April 4, 2016, authored by Ron Fleming.

We believe it is important for the Basin Study to identify the magnitude and location of water supply and demand imbalances, and to identify adaptive and mitigation strategies to meet the various water resource needs in the Pinal AMA. We also recognize the importance of the Basin Study in evaluating climate change impacts on water supply and demand imbalances.

The proposed study will be beneficial in planning the next steps for long-term water supplies to the City of Coolidge and the Pinal County Region. In addition, the Basin Study will help to continue to promote regional cooperation and collaboration for future water supply and delivery.

Acupar Maquer

Amber M. Leuer



April 3, 2017

Bureau of Reclamation Attn: Ms. Amanda Erath Mail Code: 84-52000 P.O. Box 25007 Denver, CO 80225

Re: Eloy and Maricopa-Stanfield Basin Study Proposal

Dear Ms. Erath,

El Dorado Holdings, Inc. is a private real estate development company with large land holdings in Pinal County. We would like to express our support for the Eloy and Maricopa-Stanfield Basin Study as outlined in the Pinal Partnership Letter of Interest.

As a large land owner in Pinal County with significant holdings in the Basin Study area, El Dorado Holdings recognizes the importance of ensuring the region's future water supply. The proposed Basin Study will identify water supply and demand imbalances and will assist in the development of innovative strategies to ensure the region has a sustainable water supply.

It is our belief that this region will greatly benefit from a Basin Study, and therefore we thank you for your consideration.

Anda Cheney

Linda Cheney Vice President El Dorado Holdings, Inc.





March 31, 2017

Bureau of Reclamation Attn: Ms. Amanda Erath Mail Code: 84-52000 P.O. Box 25007 Denver, CO 80225

Re: Eloy and Maricopa-Stanfield Basin Study Proposal

Dear Ms. Erath,

On behalf of LeSueur Investments, a land owning and farming company, I would like to express support for the Eloy and Maricopa-Stanfield Basin Study proposal as outlined in the Pinal Partnership Letter of Interest authored by Ron Fleming.

We believe it is important for the Basin Study to identify the magnitude and location of water supply and demand imbalances and to identify adaptive and mitigation strategies to meet the various water resource needs in the Pinal AMA. We also recognize the importance of the Basin Study in evaluating climate change impacts on water supply and demand imbalances.

The proposed study will be beneficial in our agricultural endeavors and land planning/development processes understanding the long term issues related to water supplies within the Pinal County Region. In addition, the Basin Study will help to continue to promote regional cooperation and collaboration for future water supply and delivery.

to the second

Sincerely,

v LeSueur

President of LeSueur Investments General Partner Daybreak Farms

> 3850 E. Baseline Road • Suite II4 • Mesa, AZ 85206 Tel: 480.424.3400 • Fax: 480.424.3401



April 5, 2017

Bureau of Reclamation Attn: Amanda Erath Mail Code: 84-51000 P.O. Box 25007 Denver, CO 80225

RE: Eloy and Maricopa-Stanfield Basin Study Proposal

Dear Ms. Erath:

I represent Arcus Private Capital Holdings. We own approximately 10,000 acres in the Pinal AMA (Eloy and Maricopa-Stanfield Basin) and approximately 20,000 acres in Arizona. We are currently working on development plans for our various holdings and as such, water supplies are of primary interest for us.

In addition, I serve on the Executive Board of Pinal Partnership, a coalition of public and private interests working together to advance the smart growth of Pinal County.

Pinal Partnership's water resources committee is proposing a study of the Maricopa-Stanfield Basin, authored by committee chair Ron Fleming dated April 4, 2016. I would like to offer my strong support for moving forward with the proposed study. This will bring much needed clarity and certainty to our regional understanding of water availability. This will help us work together as a region to devise effective long range planning and mitigation strategies for one of the most critical growth corridors in Arizona and the Southwest.

Sincerely,

Jason Barney Arcus Private Capital Solutions jason@jasonbarney.com 480-818-2000

LANGLEY PROPERTIES

April 11, 2017

Bureau of Reclamation Attn: Ms. Amanda Erath Mail Code: 84-52000 P.O. Box 25007 Denver, CO 80225

Re: Pinal Partnership Eloy and Maricopa-Stanfield Basin Study Proposal

Dear Ms. Erath,

Langley Properties owns land in the Pinal county area and is a member of Pinal Partnership. We would like to formally express our support for the Eloy and Maricopa-Stanfield Basin study proposal outlined in the Pinal Partnership letter of interest from Mr. Ron Fleming.

The Basin study proposed by Pinal Partnership is beneficial in planning long term water supply to the Pinal County area. It is important to locate water supply and to project the demands of water resources to determine any imbalances. We believe this study will be beneficial to plan solutions to meet the water supply needs in Pinal County.

We believe this study will promote regional cooperation and collaboration for future water management. Thank you for your time.

Stacy Brimhall Principal



Strand Associates, Inc.®

4602 East Elwood Street, Suite 16 Phoenix, AZ 85040 (P) 602-437-3733 (F) 480-858-0204

March 22, 2017

Bureau of Reclamation Attn: Amanda Erath Mail Code: 84-51000 P.O. Box 25007 Denver, CO 80225

RE: Eloy and Maricopa-Stanfield Basin Study Proposal

Dear Ms. Erath:

Strand Associates is a leading national engineering consulting firm and an active member of the development community in Arizona for the past 31 years. We support the Basin Study for Eloy and Maricopa-Stanfield as outlined in the Pinal Partnership Letter of Interest authored by Ron Fleming.

It is critically important in Arizona's desert environment to conduct this Basin Study to better understand water supply and demand so that management strategies can be formulated to properly use this precious resource in the Pinal AMA.

The proposed study will become an effective planning tool available to multiple municipalities, irrigation districts, and Central Arizona Project customers in the Pinal County area. It will also promote a collaborative approach to water supply and delivery.

Baird H. Fullerton, P.E, LEED AP Operations Manager Strand Associates, Inc.

Page 1 of 1



Phoenix Metro Office 2152 South Vineyard, Suite 123, Mesa, Arizona 85210 TEL 480.768.8600 | FAX 480.768.8609 | sunrise-eng.com

April 11, 2017

Ms. Amanda Earth Bureau of Reclamation Mail Code: 84-51000 P.O. Box 25007 Denver, CO 80225

RE: Maricopa-Stanfield and Eloy Basin study Proposal Bureau of Reclamation FY2017 Basin Study

Dear Ms. Earth,

Sunrise Engineering, Inc. is pleased to offer its support for the proposed Maricopa-Stanfield and Eloy Basin Study. Sunrise has been providing a wide range of water consulting services in Pinal County for over 30 years. We have been an active part of Pinal County's rapid growth, offering design and management of such projects.

As a member of the Pinal Partnership, we support the Basin Study and recognize that it will greatly impact the future supply of water resources for agricultural, municipal and industrial land uses. The proposed study will help to identify and locate water supply and demand imbalances while developing strategies that will meet the needs of Pinal PMA.

We at Sunrise believe the proposed study will be beneficial in defining and planning next steps for this growing community. In addition, the Basin Study will help to continue to promote regional cooperation and collaboration for future water supply and delivery.

Sincerely, SUNRISE ENGINEERING, INC.

Ricky Holston, P.E., CFM LEED AP Principal/Project Manager

