United States Department of the Interior

U.S. GEOLOGICAL SURVEY
Arizona Water Science Center
520 North Park
Tucson, AZ 85719

October 17, 2023

Ms. Jackie Watkins
Director of Engineering and Natural Resources
Cochise County
1415 Melody Lane, Building F
Bisbee, AZ 85603

Dear Ms. Watkins:

Enclosed is a signed digital copy of our standard joint-funding agreement for the project(s) Arizona Water Science Center Water Resources Investigations, during the period October 1, 2023 through September 30, 2024 in the amount of $97,265 from your agency. U.S. Geological Survey contributions for this agreement are $40,000 for a combined total of $137,265. Please sign and return one fully-executed original to Rudy Richard at the address above.

Federal law requires that we have a signed agreement before we start or continue work. Please return the signed agreement by **October 30, 2023**. If, for any reason, the agreement cannot be signed and returned by the date shown above, please contact Jamie Macy by phone number (928) 556-7276 or email jpmacy@usgs.gov to make alternative arrangements.

This is a fixed cost agreement to be billed quarterly via Down Payment Request (automated Form DI-1040). Please allow 30-days from the end of the billing period for issuance of the bill. If you experience any problems with your invoice(s), please contact Alexis Lopez at phone number (520) 670-3339 or email at aslopez@usgs.gov.

The results of all work performed under this agreement will be available for publication by the U.S. Geological Survey. We look forward to continuing this and future cooperative efforts in these mutually beneficial water resources studies.

Sincerely,

JAMES LEENHOUTS

Digitally signed by JAMES LEENHOUTS
Date: 2023.10.17 15:57:00 -07'00'

James M Leenhouts
Director

Enclosure
24ZFJFA00080100

Form 9-1366
(May 2018)

U.S. Department of the Interior
U.S. Geological Survey
Joint Funding Agreement
FOR
Water Resource Investigations

Customer #: 6000000801
Agreement #: 24ZFJFA00080100
Project #:
TIN #: 86-6000398

Fixed Cost Agreement YES[X] NO[ ]

THIS AGREEMENT is entered into as of the October 1, 2023, by the U.S. GEOLOGICAL SURVEY, Arizona Water Science Center, UNITED STATES DEPARTMENT OF THE INTERIOR, party of the first part, and the Cochise County party of the second part.

1. The parties hereto agree that subject to the availability of appropriations and in accordance with their respective authorities there shall be maintained in cooperation Water Resource Investigations (per attachment), herein called the program. The USGS legal authority is 43 USC 36C; 43 USC 50, and 43 USC 50b.

2. The following amounts shall be contributed to cover all of the cost of the necessary field and analytical work directly related to this program. 2(b) include In-Kind-Services in the amount of $0.00.

(a) $40,000 by the party of the first part during the period October 1, 2023 to September 30, 2024

(b) $97,265 by the party of the second part during the period October 1, 2023 to September 30, 2024

(c) Contributions are provided by the party of the first part through other USGS regional or national programs, in the amount of: $0.00.

Description of the USGS regional/national program:

(d) Additional or reduced amounts by each party during the above period or succeeding periods as may be determined by mutual agreement and set forth in an exchange of letters between the parties.

(e) The performance period may be changed by mutual agreement and set forth in an exchange of letters between the parties.

3. The costs of this program may be paid by either party in conformity with the laws and regulations respectively governing each party.

4. The field and analytical work pertaining to this program shall be under the direction of or subject to periodic review by an authorized representative of the party of the first part.

5. The areas to be included in the program shall be determined by mutual agreement between the parties hereto or their authorized representatives. The methods employed in the field and office shall be those adopted by the party of the first part to insure the required standards of accuracy subject to modification by mutual agreement.

6. During the course of this program, all field and analytical work of either party pertaining to this program shall be open to the inspection of the other party, and if the work is not being carried on in a mutually satisfactory manner, either party may terminate this agreement upon 60 days written notice to the other party.

7. The original records resulting from this program will be deposited in the office of origin of those records. Upon request, copies of the original records will be provided to the office of the other party.

8. The maps, records or reports resulting from this program shall be made available to the public as promptly as possible. The maps, records or reports normally will be published by the party of the first part. However, the party of the second part reserves the right to publish the results of this program, and if already published by the party of the first part shall, upon request, be furnished by the party of the first part, at cost, impressions suitable for purposes of reproduction similar to that for which the original copy was prepared. The maps, records or reports published by either party shall contain a statement of the cooperative relations between the parties. The Parties acknowledge that scientific information and data developed as a result of the Scope of Work (SOW) are subject to applicable USGS review, approval, and release requirements, which are available on the USGS Fundamental Science Practices website (https://www2.usgs.gov/fsp/).

Form 9-1366
(May 2018)

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Joint Funding Agreement
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TIN #: 86-6000398

9. Billing for this agreement will be rendered **quarterly**. Invoices not paid within 60 days from the billing date will bear Interest, Penalties, and Administrative cost at the annual rate pursuant the Debt Collection Act of 1982, (codified at 31 U.S.C. § 3717) established by the U.S. Treasury.

USGS Technical Point of Contact

Name: Jamie Macy
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Customer Technical Point of Contact

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USGS Billing Point of Contact

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Fax:
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U.S. Geological Survey
United States
Department of Interior

Signature

JAMES LEENHOUTS Digitally signed by JAMES LEENHOUTS Date: 2023.10.17 15:57:18 -07'00'

By_____ **Date: 10/17/2023**
Name: James M Leenhouts
Title: Director

Cochise County

Signatures

By_____ **Date:** _____
Name:
Title:

Scope of Work

Agreement # 24ZFJFA00080100, between USGS and Cochise County

For Federal fiscal year 2024 the funds from this agreement will cover ongoing hydrologic monitoring in the Sierra Vista Subwatershed of the Upper San Pedro Basin. This work has specific bearing on monitoring the hydrologic system with respect to attaining a sustainable yield of groundwater withdrawals in accordance with the goals of the Upper San Pedro Partnership (https://uppersanpedropartnership.org). In addition, the information obtained through this basic monitoring is critical to verifying the predictive performance of groundwater modeling of the Sierra Vista Subwatershed.

The combined agreement total for FY2024 is $137,265, of which the USGS will contribute $40,000, or about 29% of the total cost. Cochise County's share is $97,265 which is about a 3% increase from the County's combined share of the monitoring costs for the sites included in the agreement in 2022 (the agreement for fiscal year 2023 used BLM funds to offset Cochise County's cost). This increase is due to cost of labor and materials increases over the last two years, which were offset by a decrease in the cost of collecting and analyzing the isotope samples, relative to fiscal year 2022. The specifics of the work are listed below.

1. Operation of the Lewis Springs study site (09470920). The Lewis Springs site, located just north of where Arizona Route 90 crosses the San Pedro River, has been operating about 28 years. This site has provided some of the most complete information available on the San Pedro River regarding interactions between the regional aquifer system and the perennial San Pedro River reaches. The long period of continuous record at this site makes it particularly valuable for detecting changes in effects of regional-aquifer pumping on the river. Instrumentation at the site includes 6 piezometers at three locations along a line extending perpendicularly away from the river. Two locations have nested piezometers that measure vertical hydraulic gradients from the regional to the stream-alluvium aquifer. The site also records stream stage so the hydraulic gradient to the river may be calculated.

2. Operation of main-stem San Pedro River stream-gaging stations. San Pedro and Babocomari River flow during floods as well as base flow entirely supported from groundwater discharge during the driest times of the year are extremely important discharge data to monitor in order to understand trends in the Sierra Vista subwatershed including those due to climate, natural causes, and human-induced changes in the subwatershed that may affect the regional aquifer and the river.

    a. San Pedro River at Charleston stream-gaging station (09471000) is located where Charleston Road crosses the San Pedro River near the ghost town of Charleston and is one of the oldest and perhaps the most well-known gaging station in southeastern Arizona. The record in the Charleston area began in 1904; the gaging station was moved in 1928 near to its present location and the river in this area has been consistently monitored since April 1935. Financial support for the Charleston gage is split 40%-60% between Cochise County and the U.S. Bureau of Land Management.
    To visit the web page for this station, navigate to:
    http://waterdata.usgs.gov/az/nwis/uv/?site_no=09471000&PARAmeter_cd=00065,00060

    b. The Babocomari River near Tombstone ("Lower Babocomari") stream-gaging station (09471400) is located on the northern boundary of the San Pedro Riparian National Conservation Area northeast of Huachuca City and southwest of the ghost town of Fairbank. The Babocomari River is the primary tributary stream in the Upper San Pedro basin. In combination with the Upper Babocomari gaging station, these gaging station data help to quantify the contribution from the Babocomari River to the surface flow of the San Pedro River as well as to increase understanding of the groundwater – surface water interactions along the intervening reach of the Babocomari River. The Lower Babocomari discharge record covers about 21.5 years, beginning in March of 2000. Financial support for the Lower Babocomari gage is split 40%-60% between Cochise County and the U.S. Bureau of Land Management.

To visit the web page for this station, navigate to:
http://waterdata.usgs.gov/az/nwis/uv/?site_no=09471400&PARAmeter_cd=00065,00060

c. The Upper Babocomari River Near Huachuca City, AZ stream-gaging station (09471380) is located on the Babacomari Ranch about 4 miles west of Arizona Route 90. The Babocomari River is perennial in stretches and is the primary tributary stream in the Upper San Pedro basin. The Babocomari is essentially perennial at the Upper Babocomari gaging station. In combination with the Lower Babocomari gaging station, these gaging station data help to quantify the contribution from the Babocomari River to the surface flow of the San Pedro River as well as to increase understanding of the groundwater – surface water interactions along the intervening reach of the Babocomari River. The Upper Babocomari discharge record covers about 21 years, beginning in July of 2000. To visit the web page for this station, navigate to:
http://waterdata.usgs.gov/az/nwis/uv/?site_no=09471380&PARAmeter_cd=00065,00060

3. Operation of mountain-front, tributary stream-gaging stations. Mountain-front, low-flow stream-gaging stations provide information about the amount of mountain-front recharge that is taking place in the Subwatershed. Flows result from both snow melt in the winter and spring, and from storm runoff during the summer months. Low-flow stream gaging also provides a means of assessing long-term climate change effects on the Subwatershed, if any. Major tributary stream-gaging stations help quantify the tributary contribution to San Pedro River surface flow.

   a. The Banning Creek stream-gaging station (09470700) is located about a mile up Banning Creek toward Bisbee from the intersection of U.S. Routes 80 and 90 and is the only gaging station on the east side of the Subwatershed upstream of Walnut Gulch. Banning Creek is one of the larger watersheds in the Mule Mountains. The Banning Creek discharge record covers nearly 21 years, beginning in February of 2001. To visit the web page for this station, navigate to:
   http://waterdata.usgs.gov/az/nwis/uv/?site_no=09470700&PARAmeter_cd=00065,00060

   b. The Ramsey Canyon stream-gaging station (09470750) is in the Huachuca Mountains at the top of Ramsey Canyon Road, adjacent to The Nature Conservancy's Ramsey Canyon preserve headquarters building. Ramsey Canyon is one of a series of significant watersheds that drain the higher elevations of the Huachuca Mountains and is the southernmost gaging station on the west side of the Subwatershed. The Ramsey Canyon discharge record covers over 21.5 years, beginning in May of 2000. To visit the web page for this station, navigate to:
   http://waterdata.usgs.gov/az/nwis/uv/?site_no=09470750&PARAmeter_cd=00065,00060

4. Collection of stream samples and analysis of stable isotopes of water. The stable isotopes of water provide a sensitive indicator of water sources in a stream. Some of the funds in this agreement will be used to support an ongoing program initiated in the mid-1990s to collect and analyze these isotopes. The collection locations along the San Pedro River are: Palominas (09470500), Hereford (312621110062601), Lewis Springs (09470920), Charleston (09471000), and Tombstone (09471550). Samples are also collected from the Babocomari River at the Lower Babocomari gaging station near Tombstone, AZ (station number 09471400). Samples are collected 8 to 12 months a year, depending upon conditions, and the procedure includes measurements of stream discharge. Collectively, these data provide valuable information regarding the interactions between the regional-aquifer system and the flow in the San Pedro River. In addition, the isotopes are used to look for changes in the relative sources of water to the stream as would occur if regional ground-water pumping captures water that would otherwise have supported base flow.

5. Spring discharge measurements. Groundwater discharges from the subsurface not only through the river streambed, but also through various springs adjacent to the river. Discharge is measured quarterly at five springs, three along the west side of the river (Horsethief (313228110092701), 16 years beginning 2005; Murray (313425110102301), 18 years,

beginning 2003; and Moson Springs (313624110101401), 12 years beginning 2009) and two on the east side of the river (Lewis Spring (313456110081901), 16 years beginning 2005; McDowell-Craig Farm flowing well (312502110060701), 16 years beginning 2005).

6. Water level measurements. Four wells in the Palominas area (PALO FIREHOUSE, 312318110071901; 3-CAN S, 312357110073901; 3-CAN N, 312417110074801; ULLRICH, 312332110063801) and one near Whetstone (RAIN, 314114110211201) are monitored quarterly. As with all USGS data collection, water levels are quality assured in the field and quality controlled in the office before being entered in the USGS National Water Information System data base. The Palominas area data are valuable for monitoring the effects of enhanced recharge at the County's Palominas Flood Control and Recharge Project. The Whetstone Rain Valley Well is the only unpumped well available for monitoring in the northernmost reaches of the Sierra Vista Subwatershed.

7. Data management and other activities. In addition to the activities outlined above, the USGS is engaged in other hydrologic monitoring activities including water level monitoring in wells throughout the Sierra Vista Subwatershed (continuous automated transducer measurements and manual quarterly measurements), vertical gradients monitored in paired deep and shallow piezometers near to the river and used to establish gaining and losing reaches of the river, and additional tributary and main stem stream gaging. All these data need to be compiled, quality assured and controlled, and entered the USGS national data base in a timely fashion. The USGS also participates in various Upper San Pedro Partnership meetings and activities throughout the year and responds to data and information requests from Partnership members.

Budget for federal FY 2024

Agreement #24ZFJFA00080100, between USGS and Cochise County

Task	Cost item	Cost (in dollars)
Operation of Lewis Springs monitoring site	Data collection/site operation	20,550
Operation of Banning Creek stream gaging station	Data collection/site operation	20,680
Operation of Upper Babocomari stream gaging station	Data collection/site operation	20,680
Operation of Ramsey Canyon stream gaging station	Data collection/site operation	20,680
Operation of Charleston stream gaging station (partial share)	Data collection/site operation	8,500
Operation of Babocomari near Tombstone stream gaging station (partial share)	Data collection/site operation	8,500
Collection of stream samples and analyses of stable isotopes of water	6 locations, all costs	14,125
Spring discharge measurements	Data collection, 5 springs	6,925
Water level measurements	Data collection, 5 wells	3,550
Data management and other activities	Subwatershed data management/entry	13,075
	Total of project cost items	137,265

Funding source – USGS	40,000
Funding source – Cochise County	97,265
Total project funding	137,265