



United States Department of the Interior

U.S. GEOLOGICAL SURVEY
California Water Science Center
6000 J Street, Placer Hall
Sacramento, CA 95819

April 9, 2021

Humboldt County Public Works Department
Attn: Mr. Hank Seemann
1106 Second Street
Eureka, California 95501

Dear Mr. Seemann:

This letter confirms discussions between our respective staffs, concerning the cooperative program between the Humboldt County Public Works Department and the U.S. Geological Survey (USGS) during the period of January 2, 2021 to January 31, 2022

The scope of work(SOW) proposed is enclosed with this letter describing task associated with this agreement.

The cost of the proposed cooperative water-resources program is \$99,000. Of this total, HCPWD will contribute \$80,000. and, subject to the availability of Cooperative Matching Funds (CMF), the USGS will contribute \$19,000.

Enclosed is a digital version of Joint Funding Agreement (JFA) 21ZGJFA60763710, signed by our agency, for your approval. If you are in agreement with proposed program, please return a fully executed JFA to our office via email address iaros@usgs.gov. Work performed with funds from this agreement will be conducted on a fixed-price basis.

If you have any questions concerning the program described in the attached SOW, please contact Zachery Stanko (619) 225-6448, in or San Diego Office. If you have any administrative questions, please contact Irene Rios at (619) 225-6156.

Sincerely,

Anke Mueller-Solger
Acting Director, USGS CA Water Science Center

Enclosure
SOW
21ZGJFA60763710

Form 9-1366
(May 2018)

**U.S. DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY**

Customer #: 6000007637
Agreement #: 21ZGJFA60763710
Project #:
TIN #: 94-6000513
Fixed Cost
Agreement YES

JOINT FUNDING AGREEMENT

FOR

WATER RESOURCES INVESTIGATIONS

THIS AGREEMENT is entered into as of the, 9TH day of April, 2021 by the U.S. GEOLOGICAL SURVEY, UNITED STATES DEPARTMENT OF THE INTERIOR, party of the first part, and the Humboldt County Public Works Department, party of the second part.

1. The parties hereto agree that subject to availability of appropriations and in accordance with their respective authorities there shall be maintained in cooperation to provide a framework for scientific studies and consultations in support of the Eel River Valley GSP and Monitoring Well Installation 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) includes In-Kind Services in the amount of \$0.00

(a) by the party of the first part during the period

Amount	Date	to	Date
\$19,000.00	January 2, 2021		January 31, 2022

(b) by the party of the second part during the period

Amount	Date	to	Date
\$80,000.00	January 2, 2021		January 31, 2022

USGS DUNS is 1761-38857. The amount in 2(a) and 2(b) are for this agreement only. Total agreement is \$99,000.00

- (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:

No additional funding

- (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.

9-1366 (Continuation) Customer #: 6000007637 Agreement #: 21ZGJFA60763710


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/>).
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.

<p>U.S. Geological Survey United States Department of the Interior <u>USGS Point of Contact</u></p>	<p>Humboldt County Public Works Department</p>
<p>Name: Irene A. Rios, Budget Analyst Address: 4165 Spruance Rd., Suite 200 San Diego, CA 92101 Telephone: 619-225-6156 Email: iaros@usgs.gov</p>	<p><u>Customer Point of Contact</u></p> <p>Name: Mr. Hank Seemann Address: 1106 Second Street Eureka, CA 95501 Telephone: Email:</p>

Signatures and Date

Signature:	ANKE MUELLER-SOLGER  Digitally signed by ANKE MUELLER-SOLGER Date: 2021.04.09 10:58:25 -07'00'	Date:	Signature:	Date:
Name:	Anke Mueller-Solger	Name:		
Title:	Acting Director, USGS CA Water Science Center	Title:		

Project Name: Eel River Valley Groundwater Sustainability Plan, Humboldt County, CA

Joint Funding Agreement #

Funding Agreement Term ends January 31, 2022

Background

The Eel River Valley Groundwater Basin (ERVGB) covers 115 square miles in Humboldt County, California (fig. 1). The basin includes the lower 8 miles of the Van Duzen River Valley and the Eel River Valley, including the City of Fortuna, the City of Ferndale, the City of Rio Dell, and the unincorporated communities of Loleta, Carlotta, Hydesville, and Scotia. Environmental, municipal, and agricultural interests depend on the groundwater system. A regional study by the US Geological Survey (USGS) evaluated rainfall, runoff, and recharge over the watershed encompassing the ERVGB using Precipitation Runoff Modeling System (PRMS) and Basin Characterization Model (BCM). This study also included an analysis of the geologic and hydrogeologic framework of the ERVGB.

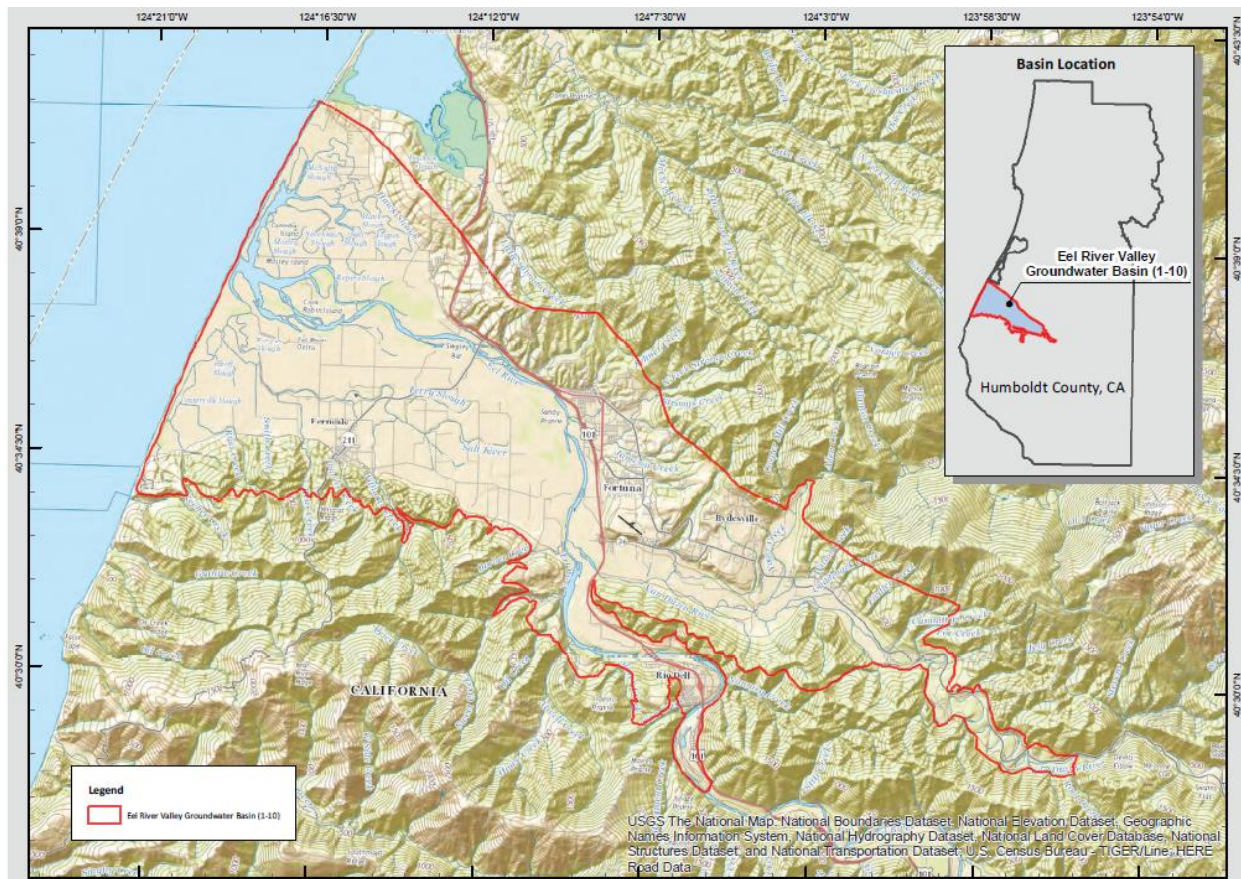


Figure 1. Location of Eel River Valley Groundwater Basin.

Problem

The Eel River Valley groundwater has multiple uses including agriculture irrigation, municipal and water district suppliers, and environmental. The unanswered question is if the basin is managed sustainably. California Department of Water Resources (DWR) designated the Eel River Valley groundwater basin as

a medium-priority basin in 2014 and again in 2018. The [Sustainable Groundwater Management Act](#) (SGMA) of 2014 applies to designated medium- and high-priority basins within the state. The Humboldt County Department of Public Works (HCDPW or Cooperator) is coordinating the local response to SGMA with input and guidance from stakeholders. As part of that response, Humboldt County Groundwater Sustainability Agency (GSA) was formed and is in the process of developing a Groundwater Sustainability Plan (GSP) for the Eel River Valley groundwater basin (ERVGB) by January 31, 2022. To develop this plan, it will be important to define the quantity and quality of the groundwater supply and establish tools to explore scenarios, and understand the dynamics of the aquifer, interconnected surface waters and limits of groundwater resources.

Purpose and Objectives

The Cooperator is requesting assistance from the USGS in the development of a GSP for the Eel River Valley basin. In order to assist, this Joint Funding Agreement (JFA) 21ZGJFA6073710 between the USGS and HCDPW is being developed. The purpose of this agreement is to provide a framework for scientific studies and consultations in support of the Eel River Valley GSP and Monitoring Well Installation Project and to release information products relevant to the application of USGS products. The objectives of this agreement are to: (1) develop a geohydrologic framework of the ERVGB; (2) provide hydrologic and geologic data, tools, and analyses relevant to the ERVGB; (3) compare groundwater recharge estimates from available models; (4) develop hydrologic modeling tools to aid in managing the groundwater resources in the ERVGB; and (5) provide technical assistance.

Relevance and Benefit to the Cooperator and USGS

The USGS has several national and regional projects that can directly inform the development of the Eel River Valley GSP. By entering this agreement, the USGS will explicitly assist the Cooperator in using information and tools developed by past and current USGS projects. A successful application of national and regional projects will set a valuable precedent for the utility of USGS science in locally focused studies. The cooperator will benefit from the information, tools, and technical expertise of the USGS. Specifically, the collaboration would exemplify the way a general, regional modeling approach can benefit a local agency by alleviating some of the burden of developing a local groundwater model.

Scope of Work

Task 1: Hydrogeologic framework

First, a collection hydrogeologic framework models of the ERVGB will be compiled. Specifically, the USGS will work with the Cooperator in the development of the framework model data sets and document these data sets and interpretations in file formats mutually agreed upon by the USGS and the Cooperator. As needed, data releases will be prepared and provided for the hydrogeologic framework model and supporting data sets.

The following items will be delivered to the Cooperator:

- Well locations and digitized lithologic logs for the ERVGB.
- Geologic map with faults, structures and contours.
- Documentation of the data sets and the hydrogeologic framework model. This will include an interpretive report or journal article on the hydrogeologic framework model for the ERVGB.

- Shapefiles of layer elevations for the hydrogeologic units in the hydrogeologic framework model(s).

Task 2: Hydrologic data

The available hydrologic data in the region will be organized, compiled, and documented. GIS databases for the watershed will include surface water networks and well information. PRMS and BCM models of surface watershed will be completed and documented. These models will include digital data sets for precipitation, vegetation, and temperature as well as simulated evapotranspiration, recharge, and runoff for the Eel River Valley Watershed. As needed, data releases will be prepared and provided for the watershed models and supporting data sets.

The following items will be delivered to the Cooperator:

- Available hydrologic data including a geodatabase of wells.
- BCM model of the Eel River Valley watershed (including all input and output files).
- PRMS model of the Eel River Valley watershed (including all input and output files).
- Documentation for using watershed model results as recharge to groundwater models.

Task 3: Recharge comparison

Recharge estimates for the ERVGB can be used to develop sustainability scenarios for the GSP. The sensitivity of each sustainability indicator to different recharge estimates will provide an understanding of uncertainty needed for the GSP. For completeness, a variety of recharge to the ERVGB simulations will be compared. This comparison along with future-climatic condition scenarios will be published, and provided to the Cooperator, as an interpretive report or journal article and will include:

- Model documentation and calibration description
- Figures that compare the available models.
- Mutually agreed upon future climate simulations

The analyses are planned to include:

- Detailed results for the recharge comparison including magnitude and spatial and temporal variation of recharge and their effects on the groundwater model.
- Assessment of sensitivity and uncertainty in modeling predictions.
- A comparison between different climate datasets.
- Discussion of other available alternative recharge estimates
- Impact of future climate scenarios on recharge.

Task 4: Model-building tools

The USGS will provide model-building scripts on code.usgs.gov Gitlab repository. Documentation along with the scripts will describe how to process the necessary data, build the appropriate python environment, and execute various model-building options. These tools are generally an extension of existing USGS tools. The USGS will collaborate with the HCDPW on script and model development to customize the application to the ERVGB.

The following items will be delivered to the Cooperator:

- ERVGB model python scripts including documentation for how to use the scripts to build various versions of the groundwater flow model.
- Software release for the model-building python package including written documentation.

Task 5: Technical assistance

The USGS will participate in meetings and discussion related to the model and GSP development. Additional review of technical work related to the hydrologic modeling will also be provided as requested. As needed, the USGS will aid with the development of the GSP. Hydrologists and geologists will be available for discussions involving technical details of the hydrogeologic framework models, groundwater flow models, surface water models, and integrated hydrologic models.

Project Timeline

The USGS will work with the Cooperator for the collection of data, development of models, and completion of the GSP. Additionally, the following schedule will be used for the USGS-specific tasks.

Task or Element	FY 2021				FY 2022			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
	Oct-Dec	Jan-Mar	Apr-Jun	Jul-Sep	Oct-Dec	Jan-Mar	Apr-Jun	Jul-Sep
Task 1: Hydrogeologic Framework	X	X			X			
Task 2: Hydrologic Data	X	X	X		X			
Task 3: Recharge Comparison		X	X	X	X			
Task 4: Model-building tools	X	X	X		X			
Task 5: Technical assistance		X	X	X	X	X		

Project Budget

All work reimbursed by the Cooperator will be completed by January 31, 2022. The maximum amount payable by Cooperator for services rendered by USGS is Eighty Thousand Dollars (\$80,000). Services rendered by USGS after January 31, 2022 is not reimbursable by the Cooperator.

Technical assistance will be provided to the Cooperator after January 31, 2022 using USGS matching funds only.

FY21				
		HCPWD	USGS	Combined
Task 1	Hydrogeologic Framework	\$ 10,000	\$ 2,000	\$ 12,000
Task 2	Hydrologic Data	\$ 9,400	\$ 2,000	\$ 11,400
Task 3	Recharge Comparison	\$ 12,500	\$ 3,000	\$ 15,500
Task 4	Model-building tools	\$ 12,200	\$ 3,000	\$ 15,200
Task 5	Technical assistance	\$ 15,400	\$ 4,000	\$ 19,400
	TOTAL	\$ 59,500	\$ 14,000	\$ 73,500
FY22				
		HCPWD	USGS	Combined
Task 1	Hydrogeologic Framework	\$ 2,100	\$ 500	\$ 2,600
Task 2	Hydrologic Data	\$ 2,100	\$ 500	\$ 2,600
Task 3	Recharge Comparison	\$ 4,100	\$ 1,000	\$ 5,100
Task 4	Model-building tools	\$ 2,100	\$ 500	\$ 2,600
Task 5	Technical assistance	\$ 10,100	\$ 2,500	\$ 12,600
	TOTAL	\$ 20,500	\$ 5,000	\$ 25,500
TOTALS				
		HCPWD	USGS	Combined
Task 1	Hydrogeologic Framework	\$ 12,100	\$ 2,500	\$ 14,600
Task 2	Hydrologic Data	\$ 11,500	\$ 2,500	\$ 14,000
Task 3	Recharge Comparison	\$ 16,600	\$ 4,000	\$ 20,600
Task 4	Model-building tools	\$ 14,300	\$ 3,500	\$ 17,800
Task 5	Technical assistance	\$ 25,500	\$ 6,500	\$ 32,000
	TOTAL	\$ 80,000	\$ 19,000	\$ 99,000

Billing Rate Schedule

USGS Staff Name and Title	Rate (Hourly)
Hydrologist, GS12	\$58.00
Hydrologist, GS11	\$48.00
Hydrologist, GS12	\$61.00
Geologist, GS12	\$60.00