

ATTACHMENT 3

WORK PLAN

Grant Proposal Title: Eel River Valley Groundwater Sustainability Plan and Monitoring Well Installation Project

Applicant: Humboldt County

PROJECT JUSTIFICATION

A. Project Description

Humboldt County is applying for funds to prepare a Groundwater Sustainability Plan (“GSP”) for the Eel River Valley groundwater basin (“basin”) as a proxy for the soon-to-be-formed Eel River Valley Groundwater Sustainability Agency (“GSA”). The Eel River Valley GSA will be formed prior to execution of the Grant Agreement. It is anticipated that Humboldt County, as a member agency of the GSA, will serve as grantee for the project.

The Eel River Valley groundwater basin is situated along the coast with a cool maritime climate and high winter rainfall. The basin has a total area of 72,957 acres with the majority of the land situated within the unincorporated area of the county. The basin contains a population of approximately 21,558 people, with nearly half of this population residing within the City of Fortuna. Groundwater within the Eel River Valley is a highly valuable resource with multiple beneficial uses, including agricultural water supply, municipal and domestic water supply, industrial water supply, and freshwater replenishment of surface waters. The Eel River Valley is the center of Humboldt County’s dairy and beef cattle economy. Approximately 13,558 acres of land are irrigated with groundwater, of which more than 85% is applied to grazed pasture or hay and alfalfa production. Groundwater is used for agricultural irrigation by private pumpers with no centralized irrigation or water district. The basin is bisected by the Eel and Van Duzen Rivers which are migration corridors for salmon and Pacific lamprey.

Development of the GSP requires data collection and analysis, enhancement of the hydrogeologic conceptual model and water budget, numerical modeling of the groundwater-surface water system, stakeholder outreach and engagement, and document preparation. The GSP will incorporate Best Management Practices (“BMPs”) published by DWR and will result in a more complete understanding of the groundwater basin and its interconnected surface waters to support long-term sustainable groundwater management. The project includes installation of twenty-three (23) monitoring wells to fill data gaps and reduce uncertainty in the existing monitoring network, which will result in more accurate hydrologic modeling and a stronger technical basis for developing management criteria.

The project is needed because the Eel River Valley groundwater basin is designated as medium priority and the GSP Alternative that was submitted on December 30, 2016, was disapproved by DWR. A GSA was not previously formed because it was presumed that the submitted GSP Alternative would be approved. DWR issued their notice of intent to disapprove the GSP Alternative on July 17, 2019. Humboldt County submitted a comment letter on September 30, 2019, and DWR issued their statement of findings and final determination disapproving the GSP Alternative on November 13, 2019. In its review of the GSP Alternative, DWR did not conclude that the basin is, or has been, managed unsustainably. However, the GSP Alternative was disapproved primarily because:

- Objective management criteria were not established for at least 10 years prior to 2014.
- The GSP Alternative did not sufficiently demonstrate the absence of all undesirable results.
- A quantitative estimate of sustainable yield was not been developed.
- The GSP Alternative did not quantify the impacts of groundwater use on surface water systems and determine at what point they are significant and unreasonable.

The project includes three components: (1) Grant Agreement Administration; (2) GSP Development; and (3) Monitoring Well Installation. The project is intended to perform the additional data collection and analysis and develop the modeling tools needed to develop sustainable management criteria, investigate the presence or absence of undesirable results, and prepare a GSP document that will guide future management decisions. Component 3 (Monitoring Well Installation) is needed to supplement the existing well network and provide the data needed to characterize the spatial and temporal exchanges between surface water and groundwater, calibrate the groundwater/surface water models, and calculate depletions of surface water caused by groundwater extraction.

The overall goals of the project include:

1. Improve the technical understanding of the physical processes that affect sustainability indicators within the basin.
2. Create a GSP that will ensure high quality and abundant groundwater resources for human consumption, agricultural irrigation, and ecosystem services while avoiding undesirable results.
3. Engage in robust public engagement to support involvement and collaboration with all interested stakeholders.
4. Develop a monitoring network that provides representative and complete information.
5. Create a framework for ongoing management that emphasizes data-driven decision-making, continuous improvement, and integration of learning through monitoring.
6. Create a GSP that conforms with the Sustainable Groundwater Management Act (“SGMA”), the California Code of Regulations (Title 23, Section 350 et seq.), and DWR’s BMP documents.
7. Create a GSP that is supported by stakeholders, approved by DWR, and efficient and affordable to implement.

State funding is needed because data acquisition, numerical modeling, technical evaluation, and preparation of the GSP document require a major investment that is beyond the financial capacity of Humboldt County and the water users within the basin. The entire area of the basin is economically disadvantaged based on median household income (2016 census tract data).

The Eel River Valley GSA will coordinate with DWR, the State Water Resources Control Board, the North Coast Regional Water Quality Control Board, and California Department of Fish & Wildlife regarding their legal authorities and public trust responsibilities as they relate to developing a GSP for the Eel River Valley groundwater basin. The GSA will coordinate with stakeholders through continued involvement with the Eel River Valley Groundwater Working Group. Local partners include the City of Fortuna, City of Rio Dell, Bear River Band of the Rohnerville Rancheria, Loleta Community Services District, Palmer Creek Community Services District, Scotia Community Services District, Hydesville County Water District, Del Oro Water Company, Humboldt County Farm Bureau, Humboldt County Resource Conservation District (“RCD”), University of California-Cooperative Extension (“UCCE”), USDA-Natural Resources Conservation Service (“NRCS”), and U.S. Geological Survey (“USGS”).

B. Project Benefits

The project will ensure that planning and decision-making with regard to groundwater management remain centered at the local level. The project will enable local water users to avoid non-compliance with SGMA and state intervention. The project will support a more complete understanding of the groundwater basin, including interactions with surface water, to support sustainable groundwater management. The project will support the development of more reliable estimates of water budgets and create tools to forecast the basin’s response to changing conditions such as climate change and land use changes. The project will allow water users to explore alternative management strategies and evaluate the effectiveness of potential projects and management actions. The project will ensure that management decisions are based on solid technical information and high-quality modeling tools. The project will provide the financial resources to ensure that disadvantaged communities within the Eel River Valley basin do not suffer economic hardship from the unfunded mandate of SGMA to develop a GSP. Specific measurable accomplishments are detailed in the Scope of Work.

C. Technical Expertise

Humboldt County (which will be a member agency of the Eel River Valley GSA) has the appropriate experience, knowledge, and skills necessary to successfully implement the project. The County has a need for financial assistance because the volume of work far exceeds the capacity of County staff, and a significant amount of the work requires specialized technical expertise. County staff will have primary responsibility for administering the grant agreement (Component 1) and the County will implement Components 2 and 3 by retaining a prime consultant to provide professional services. A consultant will be selected by publishing a Request for Qualifications and implementing a qualifications-based selection process. The need for a diverse consultant team with multi-disciplinary capabilities is anticipated. One of the minimum qualifications for the selected consultant will be to have staff with the professional licenses required for certifying specified work products under SGMA.

Humboldt County has a strong track record for leading collaborative projects involving public agencies, non-governmental organizations, interested stakeholders, and environmental professionals to address complex natural resource issues. The County received a Sustainable Groundwater Management planning grant (\$250,000) administered by DWR from 2015 through 2017 for the Eel River Valley groundwater basin on behalf of the water users and stakeholders in the basin. The County successfully implemented the commitments in the grant agreement and the work products were used to develop a GSP Alternative. Humboldt County is currently administering a grant from Caltrans (\$425,000) for the Humboldt Bay Sea

Level Rise Adaptation Planning Project, in which Humboldt County is the grantee and the City of Eureka and Humboldt County Association of Governments are co-leads. This project involves coordinating with many stakeholders and developing innovative technical work to understand flood vulnerability and develop conceptual design for adaptation projects in sensitive habitat areas. Humboldt County was recently awarded a grant from the Coastal Conservancy (\$325,000) to develop a feasibility study for anadromous fish habitat enhancement and flood reduction in the lower valley of Jacoby Creek, a tributary to Humboldt Bay, in which Humboldt County will be the grantee and the City of Arcata and Jacoby Creek Land Trust will be co-leads. These projects demonstrate Humboldt County's ability to bring public agencies and private landowners together to form collaborative partnerships and initiate complex, large-scale projects for multiple benefits and purposes.

Humboldt County is the regional grant administrator for the North Coast Resource Partnership, which is the Integrated Regional Water Management organization for the counties of Sonoma, Mendocino, Humboldt, Del Norte, Trinity, Siskiyou, and Modoc (partial) and the associated tribal entities. The County enters into grant agreements with DWR on behalf of the North Coast Resource Partnership and administers the grants to comply with the agreements. For the Prop. 84 implementation grants, Humboldt County administered four grant agreements covering 66 projects with a total budget of nearly \$33 million. Humboldt County will soon be administering a grant agreement for the first round of Prop. 1 implementation project grants with a total budget of \$12.7 million.

Humboldt County has embraced the paradigm of integrated regional water management and managing water resources for multiple benefits. This approach guides the County's management of three federal flood control projects, implementation of the municipal separate storm sewer system ("MS4") permit, support for local restoration projects, and involvement with major regional water projects such as the Potter Valley Project on the Eel River and the Trinity River Division of the Central Valley Project. Humboldt County will apply this collaborative, multi-benefit approach to the project of developing a GSP for the Eel River Valley groundwater basin.

Humboldt County's experience with landscape-scale natural resource planning projects has generated an awareness of some of the keys to success. The County utilizes senior project managers who are actively involved in the project. County staff are the primary point of contact with public agencies, stakeholders, and the general public and provide regular direction and guidance to the consultant. The County maintains high standards and expectations for consultant performance. The consultant contract contains a well-defined scope of work with clearly identified work products. Changes in scope, budget, and schedule are documented through contract amendments. County staff are responsible for having detailed knowledge of the grant agreement and the funding agency's administrative processes. The County implements accounting systems that conform to Accounting Standards and Procedures for Counties (California State Controller's Office) and Generally Accepted Accounting Principles. The overall project approach places an emphasis on transparency, accountability, and maintaining the integrity of technical data. Reports are thorough and well written.

The project budget includes funds for the Humboldt County RCD and USGS to provide assistance on the project. The RCD is a non-regulatory organization that works in voluntary cooperation with landowners, residents, and community groups to enhance and improve the sustainability of natural resources in an economically viable manner. The RCD is governed by a board of directors made up of voluntary community leaders appointed by the Humboldt County Board of Supervisors. The RCD has an ongoing cooperative partnership with NRCS and works on various grant-funded projects. The RCD is a trusted partner that specializes in outreach and education in natural resource-based projects and has a unique role in Humboldt County assisting private landowners in voluntary planning, design, and installation of soil and water conservation practices. The Humboldt County RCD will assist with landowner outreach, water use assessment, data collection, and other tasks related development of the GSP.

The USGS is a federal scientific research agency that has a technical study currently in progress to assess water availability in the Eel River Valley groundwater basin as part of the Regional Groundwater Availability Study of the California Coastal Basins (<https://www.usgs.gov/centers/ca-water/science/regional-groundwater-availability-study-california-coastal-basins>). This project was specifically designed to support local agencies comply with SGMA. The USGS will provide technical assistance with hydrologic modeling and development of the hydrogeologic conceptual model and water budget. The USGS will advise the County's team, make their data and work products readily available, participate in meetings, and review draft documents. Collaboration with the USGS will help avoid duplicative work and maximize the value of the state funds for the project and will enable the project to benefit from USGS' technical expertise and perspective working along the entire California coast.

Humboldt County and the selected consultant team will have a strong commitment to ensuring that the GSP conforms to SGMA regulations and DWR requirements and ensuring that the completed GSP is adopted and submitted to DWR for review by January 2022.

PROJECT DETAILS

D. Scope of Work and Deliverables

a. Scope of Work

Component 1: Grant Administration

Component 1 involves the overall administration of the Grant Agreement between DWR and Humboldt County.

Category (a): Grant Agreement Administration

Reports detailing work completed during the reporting period will be prepared as outlined in Exhibit F, "Report Formats and Requirements" of the Grant Agreement. Progress Reports will include sufficient information for the DWR Project Manager to understand and review the backup documentation submitted with the invoices. Quarterly invoices will accompany the Progress Reports and will be submitted to the DWR Project Manager for review to receive reimbursement of Eligible Project Costs. Backup documentation will be collected and organized by task and a summary Excel document will be prepared detailing contents of the backup documentation organized by task.

A Draft Grant Completion Report will be prepared and submitted to the DWR Project Manager for comment and review no later than 90 days after work completion. A Final Grant Completion Report will be prepared addressing the Project Manager's comments. The report will be prepared and presented in accordance with the provisions of Exhibit F, "Report Formats and Requirements."

Component 2: GSP Development

Component 2 involves the data collection and analysis, hydrologic modeling, hydrogeologic conceptual model, water budget, and document preparation leading to development and adoption of the GSP.

Category (a): Component Administration

Reports detailing component work completed during the reporting period will be prepared as outlined in Exhibit F, "Report Formats and Requirements" of the Grant Agreement, for inclusion in Quarterly Progress Reports. Quarterly Progress Reports will include sufficient information for the DWR Project Manager to understand and review the backup documentation submitted with invoices. Quarterly invoices will accompany the Quarterly Progress Reports and will be submitted for receive reimbursement of Eligible Project Costs. Backup documentation will be collected and organized by task and a summary Excel document will be prepared detailing contents of the backup documentation organized by task.

A Draft Component Completion Report will be prepared and submitted to the DWR Project Manager for comment and review no later than 90 days after work completion. A Final Component Completion Report will be prepared addressing the Project Manager's comments. The report will be prepared and presented in accordance with the provisions of Exhibit F, "Report Formats and Requirements."

Humboldt County will retain a consultant to provide professional services based on a qualifications-based selection process. A Request for Qualifications for professional services will be prepared and a selection committee will select the preferred consultant team for contract negotiation. Humboldt County will administer the invoicing and recordkeeping provisions of the professional services contract.

Category (b): Stakeholder Engagement/Outreach

An Outreach and Communications Plan will be prepared to ensure that interested parties have opportunities to be informed about progress and opportunities to provide input and feedback. A minimum of eight (8) stakeholder meetings of the Eel River Valley Groundwater Working Group will be convened. Information and updates will be provided at a minimum of sixteen (16) meetings involving the Humboldt County Board of Supervisors, city councils and special district boards within the basin, the Bear River Band of the Rohnerville Rancheria tribal council, the Humboldt County Farm Bureau, the Eel River Forum, or similar public venues. A user-friendly website will be developed and interim work products (e.g., work plans and technical memoranda) will be posted. At least three handouts (fact sheets) will be prepared. At least three (3) letters and handouts will be sent to all municipal, agricultural, and industrial water users within the basin. The budget for this Category includes funds for retaining an outreach specialist and for assistance from the Humboldt County RCD. The outreach specialist will have specialized knowledge, experience, and working relationships with the agricultural community in the basin.

Category (c): GSP Development

A GSP will be prepared for the Eel River Valley Groundwater Basin that meets SGMA requirements and DWR regulations and is based upon work and findings as described below. This Category is subdivided into eight (8) Tasks.

Task 1. Data Collection and Analysis

Task 1 involves the data collection and analysis needed to support the hydrologic modeling, hydrogeologic conceptual model, water budget, and development of sustainable management criteria. Task 1 is subdivided into ten (10) sub-tasks. A Work Plan will be developed to summarize existing data, identify data gaps, describe methods, identify sampling and monitoring locations, and discuss linkages between the sub-tasks. The Work Plan will help optimize the value and quality of the data collection.

Task 1.1 Land Use

Humboldt County Public Works Department will coordinate with the Humboldt County Building & Planning Department and the planning departments of the City of Fortuna and City of Rio Dell to compile a detailed inventory of land use types within the basin. Potentially significant future land use changes based on General Plan land use designations and zoning will be identified.

Task 1.2 Water Use

A detailed inventory of municipal and agricultural irrigation supply wells will be developed with attribute data including location, size, screen depth, and type. A minimum of six (6) flow meters will be purchased and installed to obtain direct flow measurements from representative irrigation systems. In addition, the County's team will coordinate with NRCS to work collaboratively with landowners who have installed flow meters as part of NRCS-funded projects to request voluntary sharing of irrigation water use. Information will be collected to allow an accounting of cannabis production in the water use inventory. The preliminary irrigation water use study (2016) prepared by the Humboldt County RCD will be updated and refined based on the direct flow data and other relevant data and information.

The County's team will consult with DWR to review the most current estimate for agricultural irrigation water use developed by DWR using the California Simulation of Evapotranspiration of Applied Water ("Cal-SIMETAW") soil water balance program. This estimate was developed prior to the installation of a California Irrigation and Management Information System ("CIMIS") weather station within the Eel River Valley basin in early 2019. The County will consult with DWR to determine whether an update of the agricultural irrigation water use using Cal-SIMETAW is warranted to support the GSP for the basin. The need for an update of the water use estimate from the Cal-SIMETAW model is anticipated due to discrepancies between DWR's 2018 model results and the estimate from the Humboldt County RCD's 2016 water user study.

Task 1.3 Water Levels

Water levels will be measured at existing and new wells. Point-in-time measurements will be collected in at least seventy-five (75) wells (including County wells, private wells, and municipal wells) in Fall 2020 and Spring 2021. Data will be tabulated and groundwater contour maps will be prepared. In addition, pressure transducers and data loggers will be purchased and installed to collect continuous water level data in at least 35 wells (primarily County wells). Transducer data will be stored electronically and depicted in a set of graphical figures. This task will support development of the water budget and hydrogeologic conceptual model and calibration of the hydrologic models.

Task 1.4 Water Quality

Existing data and information regarding groundwater quality within the basin will be compiled and evaluated. Sources of information include the GAMA groundwater information system, GeoTracker data management system, USGS National Water Information System, and Humboldt County Division of Environmental Health records. The County will consult with the appropriate regulatory agencies (e.g., USEPA, Department of Toxic Substances Control, State and Regional Water Boards, Humboldt County Division of Environmental Health) to identify known groundwater quality problems and to identify data gaps. This assessment will determine whether known groundwater quality problems are under the purview of any agency and the current status of any response plans. If a known groundwater quality problem is not under the purview of any agency and/or the response plan is not clearly developed, the County will consult with federal, state, and local agencies to determine an appropriate action plan. This assessment will also

compile and summarize monitoring data for drinking water supplies within the basin and evaluate any exceedances of applicable water quality standards.

Water samples will be collected from at least fifteen (15) wells distributed throughout the basin for laboratory testing to develop a general characterization of groundwater quality in the basin. A Water Quality Sampling Plan will be prepared. Samples will be tested for metals (target analyte list), nutrients, salts, organochlorine and organophosphorus pesticides, chlorinated herbicides, volatile organic compounds, semivolatile organic compounds, PCBs, microbial contaminants, radioactive constituents, and physical parameters (pH, total dissolved solids, dissolved oxygen, redox potential, specific conductance, and temperature).

This task will support the description of general water quality in the hydrogeologic conceptual model and the development of management criteria.

Task 1.5 Surface Water Flows

Streamflow and stage measurements will be collected at a minimum of ten (10) locations. Streamflow will be measured manually during at least three monitoring events. Transducers and data loggers will be purchased and installed to collect continuous stage data at each of the ten (10) locations. This task will support development of the water budget and calibration of the surface water portion of the hydrologic model.

Task 1.6 Saltwater Intrusion

Water samples will be collected in Fall 2020 and Spring 2021 from at least thirty (30) wells from within the vicinity of the freshwater-seawater transition zone for laboratory testing of chlorides. This task will support the delineation and evaluation of saltwater intrusion.

Task 1.7 Topography/bathymetry/imagery

Terrain data will be collected to support development of the hydrologic models, hydrogeologic conceptual model, and land use geodatabase. This task includes collection of aerial Light Detection and Ranging (LiDAR) data and high resolution orthophotography with spatial coverage over the entire basin (114 square miles) and surveyed ground control. It is assumed that the project specifications for the LiDAR acquisition will include collection of 12 points per square meter to support a digital terrain model with one-meter posting and mapping with one-foot contour intervals. It is assumed that the project specifications for the imagery acquisition will include 1.5-inch pixel resolution. This task includes additional ground survey to collect representative cross-sections of the wetted channels of the Eel River, Van Duzen River, and selected tributaries (because LiDAR does not penetrate below the water surface).

Task 1.8 Aquifer Parameters

Slug tests will be performed on 29 new wells (Component 3) to estimate hydraulic conductivity in the vicinity of the wells. The method for pneumatic slug testing includes: attaching a valve cluster and regulator to the well head, installing a pressure transducer in the well, determining the pre-test equilibrium water level, pressurizing to between 30 and 40 pounds per square inch (psi), and releasing the pressure and recording data until the water level returns to the pre-test level. At least three tests will be performed to ensure stable results. The raw slug test data will be analyzed using either the Bouwer and Rice (1976) method for water levels that smoothly and gradually return to the pre-test level or the van der Kamp (1976) method when the water level oscillates back to the pre-test level. This task will provide input parameters for the hydrologic modeling and support the development of the hydrogeologic conceptual model.

Task 1.9 Groundwater Dependent Ecosystems Assessment

Groundwater dependent ecosystems (“GDEs”) within the basin will be identified and characterized. The GDEs will be assessed to determine whether they are being impacted by current groundwater conditions and whether they could be impacted by future groundwater conditions. This assessment will generally follow Groundwater Dependent Ecosystems under the Sustainable Groundwater Management Act: Guidance for Preparing Groundwater Sustainability Plans (Rohde et al, 2018). This task will support consideration of GDEs in the development of sustainable management criteria, monitoring networks, and projects and management actions.

Task 1.10 Surface Water Beneficial Use Assessment

The flow needs for surface water beneficial uses identified in the Water Quality Control Plan for the North Coast Region (“Basin Plan”) (North Coast Regional Water Quality Control Board, June 2018) will be assessed. The assessment will account for changing flow needs as a function of time of year. This assessment will include mapping of the principal habitat types (pools, flatwaters, riffles, alcoves) and specific micro-habitat features relevant for salmonid life history stages (e.g., spawning, adult holding, and juvenile rearing habitat) within the Eel River, Van Duzen River, and readily accessible reaches of other fish-bearing streams that are interconnected with groundwater. This task will support developing standards for surface water depletions that would cause significant and unreasonable impacts to beneficial uses.

Task 2. Hydrologic Modeling

Task 2 involves the development of appropriate analytical and numerical modeling tools to represent the groundwater system in the basin. The models will be used to evaluate changes in conditions caused by management actions, changes in population and land use, climate change, and other factors. The general purposes of the modeling include supporting the development of the water budget, establishing sustainable management criteria, supporting identification and development of potential projects and management actions to address undesirable results, and supporting the refinement of the monitoring network (Modeling BMP, 2016). In addition to DWR’s Modeling BMP (2016), a useful reference for Task 2 will be Project Forward: A Framework for Groundwater Model Development under the Sustainable Groundwater Management Act (Moran, 2016). Task 2 is subdivided into four (4) sub-tasks.

Task 2.1 Model Preparation

Hydrogeologic and surface water data will be collected and organized. The project-specific modeling purpose and objectives will be developed. Available modeling options will be evaluated. One or more models with the appropriate level of complexity to address the key sustainability questions will be selected. Model selection will follow the four guiding principles in DWR’s Modeling BMP (2016). The selected model(s) must be consistent with the level of completeness and accuracy of the available data and have a development cost that fits within the available budget. The selected model(s) must be able to simulate the processes that could have a significant influence on the sustainability indicators that are relevant for the basin. In particular, the selected model(s) will account for the effects of pumping on streamflow and be able to quantify the depletion of interconnected surface waters. The model(s) will help translate minimum thresholds for groundwater levels into the amount of groundwater pumping that can be sustained (or the amount of recharge needed). The surface water model for the Eel River and Van Duzen River must be able to account for complex morphology (e.g., braided channels, wide gravel bars, thick bed deposits). A useful reference for model selection will be Peer Review of the IWF, MODFLOW and HGS Model Codes: Potential for Water Management Applications in California’s Central Valley and Other Irrigated Groundwater Basins (Harter and Morel-Seytoux, 2013).

Assumptions:

- Either a coupled or integrated hydrologic model will be developed to represent the groundwater basin and the interconnected reaches of the Eel River and Van Duzen River.
- Analytical models will be used as appropriate for an initial screening to determine which tributaries may require more complex numerical modeling.
- An analytical model may be sufficient to evaluate saltwater intrusion.

Task 2.2 Model Construction

Numerical model(s) will be constructed based on the hydrogeologic conceptual model (Task 4.1), existing data, and available new data (Task 1). Model construction includes constructing the model grid, populating the model with hydrogeologic parameters, assigning boundary conditions, and incorporating water budget components. The models will be calibrated using an iterative approach of adjusting model parameters to achieve a reasonable fit between simulated and measured groundwater levels, streamflows, and water surface elevations. Following the model calibration process, the sensitivity of the model will be analyzed to identify parameters or boundary conditions to which model forecasts are particularly sensitive.

Task 2.3 Model Predictions

Model scenarios will be developed, model runs will be completed, and the model results will be evaluated. The model(s) will be used to support evaluation of a range of predictive scenarios, development of sustainable management criteria, and consideration of potential projects and management actions. The modeling approach will be consistent with Moran (2016) and DWR's Modeling BMP (2016). The impact of parameter uncertainty will be analyzed to promote an informed understanding of the model's ability to support management decisions.

Task 2.4 Model Documentation

The modeling process will be documented. Documentation will include information on the model code(s) and detailed descriptions of the model development, including model conceptualization, assumptions, data inputs, boundary conditions, calibration, sensitivity and uncertainty analysis, and other applicable modeling elements.

Task 3. GSP Administrative Information

Information necessary for completing the Administrative Information section of the GSP will be compiled and organized in accordance with 23 CCR §354, Subarticle 1.

Task 4. Basin Setting

A GSP Basin Setting section will be developed for the basin in accordance with 23 CCR §354, Subarticle 2, including, but not limited to, hydrogeologic conceptual model, current and historical groundwater conditions, water budget, and management areas (as applicable). Task 4 is subdivided into four (4) sub-tasks.

Task 4.1 Hydrogeological Conceptual Model

A descriptive hydrogeological conceptual model will be developed to characterize the physical components and interaction of the surface water and groundwater systems in the basin. This task will conform to 23 CCR §354.14 and DWR's Hydrogeologic Conceptual Model BMP (2016). The conceptual model will identify the key parameters of the physical setting, aquifer structure and range of aquifer parameters, hydrologic processes, and boundary conditions that govern groundwater and surface water occurrence within the basin. The conceptual model will include a geomorphic evaluation of the interconnected surface waters to characterize dynamic processes such as sedimentation and erosion, channel migration, and braiding. Comments from DWR's critique of the hydrogeological conceptual model contained in the December 2016 GSP Alternative will be addressed as appropriate. Information developed by the USGS through the Regional Groundwater Availability Study of the California Coastal Basins will be incorporated. The conceptual model will provide the technical foundation for hydrologic modeling (Task 2) and the context for developing the water budget (Task 4.3) and monitoring network (Task 6).

Task 4.2 Current and Historical Groundwater Conditions

Current and historical groundwater conditions will be described based on the best available information, including data collected in Task 1, in conformance with 23 CCR §354.16.

Task 4.3 Water Budget

A water budget will be developed to provide an accounting and assessment of the total annual volume of groundwater and surface water entering and leaving the basin in conformance with 23 CCR §354.18 and DWR's Water Budget BMP (2016). The water budget will include the seven overarching components identified in 23 CCR §354.18(b). Water budgets will be developed for current, historical, and projected basin conditions. Water budget information will be presented in tabular and graphical form. The methodologies, assumptions, and data sources used to quantify the components of the water budget will be documented. Comments from DWR's critique of the water budget contained in the December 2016 GSP Alternative will be addressed as appropriate. Information developed by the USGS through the Regional Groundwater Availability Study of the California Coastal Basins will be incorporated. Data from the CIMIS weather station that became operational in the basin in August 2019 will be incorporated. This task will support an understanding of how historical changes to supply, demand, hydrology, population, land use, and climatic conditions can affect sustainability indicators in the basin and an understanding of the interrelationship between changing water budget components and aquifer response.

Task 4.4 Management Areas

The potential designation of management areas within the basin will be evaluated. If proposed, the management areas will be described and depicted on maps in conformance with 23 CCR §354.20.

Task 5. Sustainable Management Criteria

Sustainable management criteria will be developed for the basin in accordance with 23 CCR §354, Subarticle 3, including analysis and determination of a sustainability goal, undesirable results, minimum thresholds, and measurable objectives, as appropriate. The current and projected future status of each sustainability indicator in the basin will be characterized. The point at which conditions in the basin cause undesirable results will be identified. Task 5 will be consistent with DWR's draft Sustainable Management Criteria BMP (2017). The three required components for each undesirable result will be developed [23 CCR §354.26(b)]. The six required components of information to be documented for each minimum threshold will be developed [23 CCR §354.28(b)]. The specific requirements and metrics for each sustainability indicator will be developed [23 CCR §354.28(c)].

Task 6. Monitoring Network

A monitoring network will be developed for the basin in accordance with 23 CCR §354, Subarticle 4. The monitoring network will be capable of collecting sufficient data to demonstrate short-term, seasonal, and long-term trends in groundwater and related surface conditions, and yield representative information about groundwater conditions as necessary to evaluate GSP implementation. Monitoring objectives and the basis for the monitoring network design will be described, including the scientific rationale for the monitoring site selection process. A data management system will be developed in accordance with 23 CCR §352.6 and the data and reporting standards of 23 CCR §352.4. Monitoring protocols will be developed consistent with the GSP regulations. Designation of representative monitoring sites will be evaluated. The monitoring network will be assessment for uncertainty and potential improvement.

Task 7. Projects and Management Actions

Potential projects and management actions to meet the sustainability goal for the basin will be evaluated in accordance with 23 CCR §354, Subarticle 5.

Task 8. GSP Document Preparation and Adoption

A GSP document will be prepared in conformance with 23 CCR §354 et seq. The GSP will be adopted by the board of the GSA and submitted to DWR for review by January 2022.

Category (d): Monitoring/ Assessment *Not Applicable*

Component 3: Monitoring Well Installation

Component 3 involves the installation of monitoring wells to expand the spatial distribution of water level and stratigraphic data, with a focus on locations of greatest interest for identifying potential undesirable results and locations necessary for model calibration.

Category (a): Component Administration

Reports detailing component work completed during the reporting period will be prepared as outlined in Exhibit F, "Report Formats and Requirements" of the Grant Agreement, for inclusion in Quarterly Progress Reports. Quarterly Progress Reports will include sufficient information for the DWR Project Manager to understand and review the backup documentation submitted with invoices. Quarterly invoices will accompany the Quarterly Progress Reports and will be submitted for receive reimbursement of Eligible Project Costs. Backup documentation will be collected and organized by task and a summary Excel document will be prepared detailing contents of the backup documentation organized by task.

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Category (b): Land Purchase/Easement

Locations for the proposed monitoring wells will be selected with a strong preference for publicly-owned property and road right-of-way. Easements and/or access agreements will be developed if necessary.

Category (c): Planning/Design/Environmental

The prime consultant will subcontract with a drilling company to install the monitoring wells. Drilling locations will be surveyed and cleared for utility conflicts. A drilling permit will be obtained from Humboldt County Division of Environmental Health. Either a coastal development permit or de minimis waiver will be obtained from the California Coastal Commission for well sites located within the state jurisdiction portion of the coastal zone. Either a coastal development permit or documentation that no permit is needed will be obtained from the Humboldt County Building and Planning Department for well sites located within the local jurisdiction portion of the coastal zone. The permitting process is relatively straightforward and can be completed within approximately two to four months. Monitoring well installation is expected to qualify for an exemption (Class 6 – Information Collection) from CEQA.

Category (d): Implementation/Construction

A total of four (4) dual-screened monitoring well clusters, resulting in eight (8) new wells, will be advanced to a depth of approximately 250 feet below ground surface using mud rotary drilling. These well clusters will support the evaluation of vertical gradient for groundwater flow and characterization of the shallow and deep portions of the aquifer.

A total of fifteen (15) monitoring wells will be advanced to a depth of approximately 60 feet below ground surface using a GeoProbe direct push drill rig. These shallow wells will supplement the existing well network to fill data gaps and improve the spatial distribution of groundwater data.

Well completion reports will be prepared and submitted to DWR.

b. Project Deliverables

Component 1: Grant Administration		
Category (a): Grant Agreement Administration	<ul style="list-style-type: none"> • Executed Agreement, including Amendment(s) • Quarterly Progress Reports • Quarterly Invoices with all required backup documentation • Draft and Final Grant Completion Reports 	
Component 2: GSP Development		
Category (a): Component Administration	<ul style="list-style-type: none"> • Component reporting to be included in Quarterly Progress Reports • Draft and Final Component Completion Reports • Request for Qualifications and Professional Services Agreement 	
Category (b): Stakeholder Engagement/Outreach	<ul style="list-style-type: none"> • Outreach and Communications Plan • Presentation materials for stakeholder meetings • Meeting summaries included as attachments in the Quarterly Progress Reports • Screen-shot of website • Handouts (fact sheets) and example letters 	
Category (c): GSP Development	Task 1	• Data collection and analysis work plan
	Task 1.1	• Land use geodatabase
	Task 1.2	• Water use geodatabase • Agricultural water use study
	Task 1.3	• Water Level technical memorandum
	Task 1.4	• Water quality sampling plan • Water quality technical memorandum
	Task 1.5	• Surface water flow measurement plan • Surface water flow technical memorandum
	Task 1.6	• Saltwater intrusion sampling plan • Saltwater intrusion technical memorandum
	Task 1.7	• Terrain data and imagery report
	Task 1.8	• Aquifer parameters technical memorandum
	Task 1.9	• Groundwater dependent ecosystems assessment

		technical memorandum
	Task 1.10	• Surface water beneficial uses assessment technical memorandum
	Task 2.1	• Model design report
	Task 2.2	• Model construction and calibration report
	Task 2.3	• Model prediction and uncertainty analysis report
	Task 2.4	• Final hydrologic modeling report
	Task 3	• Content for GSP (no separate deliverable)
	Task 4.1	• Hydrogeological Conceptual Model technical memorandum
	Task 4.2	• Groundwater conditions technical memorandum
	Task 4.3	• Water budget technical memorandum
	Task 4.4	• Content for GSP (no separate deliverable)
	Task 5	• Sustainable management criteria technical memorandum
	Task 6	• Monitoring network technical memorandum
	Task 7	• Content for GSP (no separate deliverable)
	Task 8	• Final GSP • Proof of Final GSP submittal to DWR
Category (d): Monitoring/Assessment		N/A
Component 3: Monitoring Well Installation		
Category (a): Component Administration		• Component reporting to be included in Quarterly Progress Reports • Draft and Final Component Completion Reports
Category (b): Land Purchase/Easement		• Easements and/or access agreements (if necessary)
Category (c): Planning/Design/Environmental		• Environmental Information Form • Required documentation for CEQA compliance • Copies of required permits
Category (d): Implementation/Construction		• Well completion reports • Photographic documentation as an attachment to the Draft and Final Component Completion Reports

MISCELLANEOUS

E. Project Support

The grant application for this project includes support letters from City of Fortuna, City of Rio Dell, Palmer Community Services District, the Bear River Band of the Rohnerville Rancheria, Humboldt County RCD, and the USGS.