# MokeWISE Program Scope of Work:
## *Project 7d: Re-operation of Existing Storage*

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## Problem Statement and MokeWISE Stakeholder Interests

Water purveyors in Amador County and northern Calaveras County are concerned with short-term water supply reliability in conditions of drought and/or potential curtailments by the State Water Resources Control Board. These water purveyors are also concerned with long-term water supply reliability for existing rights and contracts in the face of drought and climate change. Finally, these water purveyors seek to assure a reliable future water supply that will accommodate growth, including under conditions of drought and climate change.

Environmental stakeholders in the MokeWISE process are concerned that unnecessary or poorly planned water development may occur that will have harmful environmental, social, economic and recreational impacts, particularly related to aquatic resources. They are concerned that premature water development may create a structural and financial imbalance between water infrastructure and other infrastructure (including transportation and land-use), incentivizing regional development to pay for water infrastructure. They are concerned that the project may enable development that is inconsistent with good land use planning. They are concerned that surface storage development may create precedent for a new dam building era in California in place of more environmentally appropriate approaches to water supply and water use. Environmental stakeholders are also concerned that uncertainty over future water supply may cause water purveyors to oppose long-term river protection, including Wild & Scenic designation for portions of the upper Mokelumne River. They want the results of the study to identify project design, project operations, and permit conditions to ensure that any proposed projects achieve the MokeWISE objectives of being economically, socially, and environmentally acceptable and compatible with Wild and Scenic protection for the Mokelumne River. Environmental stakeholders are also concerned about the high cost of new dam projects and preferentially seek to diversify the uses of existing water storage facilities on the Mokelumne River and tributaries to meet local water supply needs.

Some non-governmental organizations are concerned that the ultimate use of the water for future development may have unnecessary significant impacts on the environment that should first be reduced through land use planning and pollution prevention. If the re-operation projects ultimately involve substantial investments, these entities see the need for the upcountry water agencies to practice transparent decision-making processes, and to complete long-range financial planning, with appropriate ratepayer involvement, prior to engaging in such a project. Finally, these entities want to ensure that the benefits of the project are equitably reaped, and the burdens equitably distributed.

Water agencies have an interest in protecting their water rights, licenses and facility operations in order to assure water supply reliability for their customers and to continue to meet downstream obligations. Water agencies are willing to consider the possibility of reservoir reoperation scenarios with the understanding that it will retain existing water rights or licenses and ownership of facilities. Further reoperation would be considered if it can be

shown to benefit water agency customers by providing a more reliable water supply, a financial benefit, and/or a benefit to the Lower Mokelumne. Reoperation would require reimbursement, either financial or another equivalent method, to cover the cost(s) associated with reoperation, including the costs of regulatory approvals required and to compensate for ongoing expenses or revenue losses as may be a part of possible scenarios envisioned.

The Re-operation of Existing Storage Project will conduct a study to assess the feasibility of re-operating and diversifying the use of existing storage in the Mokelumne River Watershed to:

- Meet short-term and long-term water supply reliability as well as the long-term water supply needs of Amador County and northern Calaveras County.

- Protect Mokelumne River-related environmental, social and recreational values consistent with the intent of the MokeWISE project, interested stakeholder concerns, and current laws and regulations at the time of project funding.

- Protect the public's right to managed access the Mokelumne River and its tributaries for fishing, recreation, commerce and other public benefits.

The study will evaluate opportunities for re-operating and diversifying existing storage in Pacific Gas & Electric Company's (PG&E) Mokelumne River Project (FERC No. 137) and in East Bay Municipal Utility District's two large storage reservoirs further downstream, consistent with the existing licenses, permits, legal agreements, legal decisions, and operating regimes that currently protect the river's water quality, cultural and historical resources, recreational uses, scenic values.

Costs for this project are estimated to be $750,000.

## Background Information

The Mokelumne River watershed lies on the western slope of the Sierra Nevada in Alpine, Amador, Calaveras, and San Joaquin counties. Snowmelt from parts of Alpine, Amador, and Calaveras counties contribute to the Mokelumne River runoff. The river's primary tributaries are the North, Middle, and South Forks of the Mokelumne River, with the North Fork draining close to 85% of the Mokelumne River watershed. Flows in the North Fork and some of the significant tributaries are regulated by a series of Pacific Gas & Electric (PG&E) reservoirs located directly upstream of East Bay Municipal Utility District's (EBMUD's) Pardee Reservoir. Snowmelt enters the upper reaches of the Mokelumne River and its tributaries, which flow into the reservoirs owned by PG&E. Those on-stream reservoirs release flows back into the streams and the river, which progress downstream ultimately reaching Pardee Reservoir (EBMUD, 2012). A significant amount of water is also routed around the North Fork below Salt

Springs Dam through a diversion and flume system. The FERC license for PG&E's Project 137 includes streamflows based on a multi-stakeholder settlement agreement. They mimic the natural hydrograph of the river and have been adjusted since the license was issued in 2000, in accordance with a stakeholder-supported adaptive management program, in part to protect sensitive biological resources in the North Fork below Salt Springs Dam and the Bear River confluence.

Federal agencies have found sections of the North Fork and main stem Mokelumne River between Salt Springs Reservoir and Pardee Reservoir to be eligible for designation as a National Wild and Scenic River, and they were included in state Wild and Scenic legislation proposed in 2014. Both designations require protecting the river's free-flowing condition and natural character as well as specific, named extraordinary (or "outstandingly remarkable") values. Federal Wild and Scenic studies have named those values as high water quality, scenic beauty, cultural and historic. State legislation proposed in 2014 added recreational values because of the number, popularity, long history, quality and diversity of recreational activities on the river. EBMUD operates two major storage reservoirs on the Mokelumne River whose maximum surface elevations are less than 600 feet above msl: Pardee Reservoir and Camanche Reservoir. Pardee Reservoir is EBMUD's primary storage reservoir for delivering water to its service area located in Alameda and Contra Costa Counties. Camanche Reservoir, located immediately downstream of Pardee Dam, is used primarily to store water for delivery to downstream water users and for flood control. These two reservoirs are operated in a coordinated fashion to optimize uses. One of these uses is the maintenance of cold water for the Mokelumne River Fish Hatchery immediately downstream of Camanche Dam and for the lower Mokelumne River generally. The Lower Mokelumne Joint Settlement Agreement, which took effect in 1998, requires EBMUD to make streamflow releases and carry out other measures to protect salmonids in the lower Mokelumne. A Partnership committee composed of EBMUD, resource agencies and other stakeholders meets quarterly to discuss operational options and protections and enhancements for the fishery. The lower Mokelumne fisheries have consistently out-performed those on most Central Valley rivers in terms of annual escapement exceeding the long-term average and progress towards achieving the Central Valley Project Improvement Act (CVPIA) doubling goal for salmon.

Amador Water Agency has contractual rights to a pre-1914 water right on the Mokelumne River and certain tributary streams. Currently, the place of storage for that 15,000 afa water right is in PG&E reservoirs: the so-called "upper lakes" reservoirs at higher elevations in Alpine County and the Upper Bear River Reservoir in Amador County, as well as Lake Tabeaud. PG&E must annually draw down the upper lakes in winter to avoid damage to the old, earthen dams, which reduces AWA's carryover storage for dry years. AWA also has a water right for its Central Amador Water Project that relies on water stored in Lower Bear River Reservoir and an additional water right pending that would similarly store and convey water. The agency pays PG&E for storage and generation foregone related to its Lower Bear

water right. Jackson Valley Irrigation District has a 1927-priority right to water from direct diversion from the Mokelumne.

# Project Information

## Project Description

The Re-operation of Existing Storage Project will conduct a study to assess the feasibility of re-operating and diversifying the use of existing storage in the Mokelumne River Watershed to meet short-term and long-term water supply reliability and also to meet long-term water supply needs for Amador County and northern Calaveras County. The study will evaluate opportunities relating to existing storage in Pacific Gas & Electric Company's (PG&E) Mokelumne River Project (FERC No. 137) and in East Bay Municipal Utility District's two large storage reservoirs further downstream. The study will evaluate re-operation and diversifying the use of storage in a way that protects the environmental, social and recreational uses consistent with the intent of the MokeWISE project and environmental stakeholders' concerns. The study will require that re-operation scenarios be consistent with existing protections provided by current licenses, permits, legal agreements, legal decisions, and operating regimes that protect the river's water quality, cultural and historical resources, recreational uses, scenic values.

The study will evaluate the adequacy of current water supplies and existing uses of storage facilities to meet short-term needs in Amador and northern Calaveras counties. The study will also evaluate specific water supply needs in Amador and northern Calaveras counties that may not be met in the long-term under a series of clearly defined conditions, including various demand and development scenarios, drought and climate change. The study will identify the sources of the water supply, the nature and amount of the proposed water uses, and the locations and the descriptions of the diversions and the storage facilities. The study will present current and reliable data on the "population to be served" and its future water requirements if water is to be used for municipal purposes. The study will map and identify the land to be irrigated, its acreage, and its irrigation needs, if the project is seeking water for agricultural purposes.

The study will evaluate alternatives in the context of existing uses, licenses and permits. These uses include PG&E and EBMUD's hydropower operations and licenses, existing water supply contracts between PG&E and Amador Water Agency, existing operational requirements on PG&E to meet downstream water supply needs consistent with the Lodi Decrees, and EBMUD's water supply and reservoir operations, both for its own customers and for downstream water users and flood control beneficiaries.

The study will evaluate contractual agreements and/or water rights that are presently available, whether and how they could be modified to meet project purposes, and what new

contractual agreements and/or water rights would additionally be needed to meet the target needs.

The study will conduct a hydrologic re-operation assessment to identify alternatives and will update the MOCASIM model to simulate those alternatives.

The study will evaluate institutional obstacles and opportunities to adding uses.

The study will evaluate potential impacts and benefits to the Mokelumne River, including impacts if any on streamflows and the long-term benefit of avoided water development. The study will identify the amount, or possible amounts, of unappropriated water that will stay in-stream to meet recreation, fish, wildlife, and water quality needs in all water year types.

The study will evaluate any new infrastructure or infrastructure modifications that would be necessary to serve the needs of the target areas.

To the degree that the study evaluates groundwater recharge or in-lieu use in San Joaquin County, this study will demonstrate the degree to which the project could achieve or contribute to a long-term balance of water supply and demand, and to restoration of the groundwater basin, for any water projects that provide irrigation water or groundwater recharge in the San Joaquin Groundwater Basin.

The study will include an economic evaluation of the short-term and long-term costs of re-operation and diversification, including the costs of developing agreements and any needed water rights or water right modifications, any change in hydropower revenues, costs of any needed infrastructure, and range of costs per acre-foot of water that might be delivered under various short-term and long-term conditions.

The study will clarify operational parameters, will evaluate the potential for impacts to existing uses and users (including hydropower, flood control, and water supply), and will propose mitigation measures for any such impacts.

The study will evaluate the degree to which proposed projects provide managed public access to the Mokelumne River and its tributaries for fishing, recreation, commerce and other public benefits and associated maintenance needs.

The study will explain how any proposed project avoids the waste, the unreasonable use, the unreasonable method of use, and the unreasonable method of diversion of water.

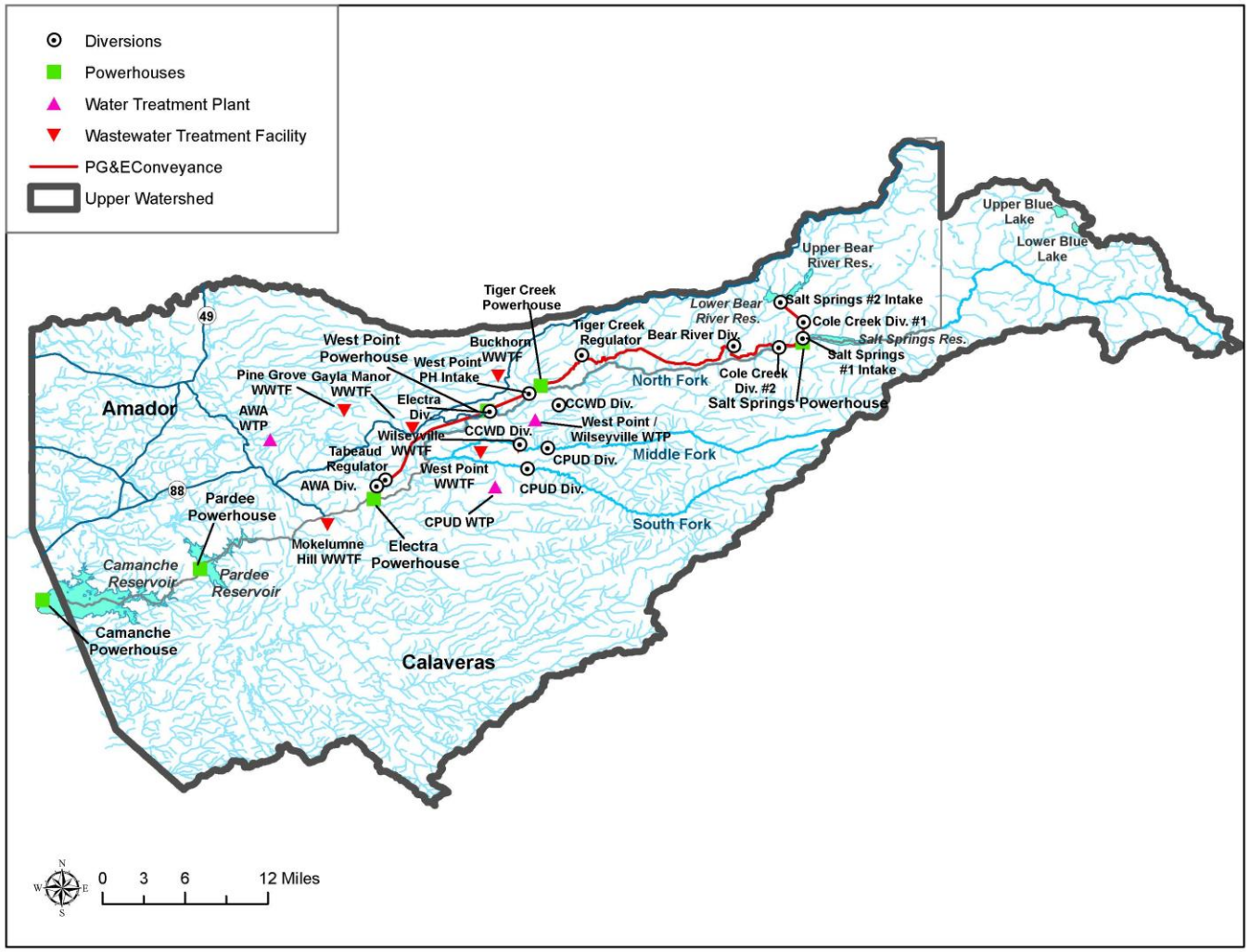
The study will include a consultation process with interested and concerned stakeholders at all stages, from design through approval of results.

More detailed environmental analysis under CEQA and NEPA could be required prior to implementing a project.

## Project Location

The concept would be located in the PG&E and EBMUD reservoirs in the Mokelumne River watershed. Reservoirs in the higher portions of the watershed include the Blue Lakes complex, Lower Bear and Salt Springs, all owned by PG&E. The project would extend downstream to include Pardee and Camanche Reservoirs. **Figure 1** shows the reservoirs and major diversion points of the PG&E system.

**Figure 1: Major Reservoirs and Facilities in the Upper Mokelumne River Watershed**



## Project Sponsor

The Upper Mokelumne River Watershed Authority (UMRWA) is the lead sponsor of the concept and California Sportfishing Protection Alliance (CSPA) is the co-sponsor.

## Scope of Work

The Re-operation of Existing Storage Project will conduct a study to assess the feasibility of re-operating existing storage in the Mokelumne River Watershed to meet both short-term and long-term water supply reliability and also to meet long-term water supply needs for Amador County and northern Calaveras County. The study will evaluate opportunities relating to existing storage that exists in Pacific Gas & Electric Company's (PG&E) Mokelumne River Project (FERC No. 137) and in East Bay Municipal Utility District's two large storage reservoirs further downstream.

### Task 1. Determine Project Need

This task will assess projected future supply reliability for Amador and Calaveras Counties. The reliability assessment will compare projected future supplies and a range of demands in the region. Developed in coordination with stakeholders, the assessment will quantify projected future supply shortfalls under a range of hydrologic and population change conditions and establish a range of future supply needs. Needs and water demand will be based on widely accepted demographic data including, but not limited to the CA Department of Finance population projections for Amador County; reasonable projections for future water use based on increased levels of conservation, reuse, and efficiency; and a reasonable assessment of the water agencies' financial and technical capacity to expand delivery systems outside their current service areas, if doing so is factored into the demand projection.

The study will identify the sources of the water supply, the nature and amount of the proposed water uses, and the locations and the descriptions of any diversions and the storage facilities. The study will present current and reliable data on the "population to be served" and its future water requirements if water is to be used for municipal purposes. The study will map and identify the land to be irrigated, its acreage, and its irrigation needs, if the project is seeking water for agricultural use.

In coordination with stakeholders, at least three climate change scenarios and three demand development scenarios will be developed. The climate change scenarios will reflect minimal, moderate, and severe climate change impacts to address potential changes in supply reliability. Each scenario will include specific assumptions related to future changes in mean temperatures and precipitation patterns in the Upper Mokelumne River watershed. The existing WARMF model of the Upper Mokelumne River watershed will be used to project the

impact of changing temperature and precipitation patterns on supply in the watershed, particularly as it relates to potential curtailment of water rights during drought. Supply availability will be overlaid with projected demand patterns to identify potential supply shortfalls.

The demand management scenarios will reflect minimal, modest, and aggressive demand. . Each scenario will include specific assumptions related to land use, economic growth, population growth, efficiency, and conservation within Amador and northern Calaveras counties. The assessment will determine the impact of each demand management scenario on three temporal horizons that could include 2020, 2040, and 2070.

To the degree to which information is available, the study will explain how any proposed project avoids the waste, the unreasonable use, the unreasonable method of use, and the unreasonable method of diversion of water.

## Task 2. Legal Analysis

The legal analysis includes two components. The first component will evaluate consistency with existing permits and licenses and analyze how conflicts (if any) between current and required legal constructs could be resolved. Existing permits and licenses that could be affected include PG&E and EBMUD's hydropower operation agreements and licenses; water supply contracts between PG&E and Amador Water Agency (AWA); the collective Lodi Decrees; and EBMUD's water supply operations to meet contractual obligations to downstream users,

The second component will analyze new contracts and/or water rights that may be needed to use PG&E's and EBMUD's existing storage facilities to meet short-term and long-term water supply needs in the target areas. This includes an analysis of how currently available water rights could be modified to meet the project purpose. The second component of the legal analysis will also include an evaluation of what contractual or permit terms could be reasonably included that would protect environmental and recreational values.

## Task 3. Model Updates

This task involves working with PG&E and EBMUD to understand and document current operational parameters. This information has been previously documented and is reflected in the operating logic incorporated in the MOCASIM model of the upper watershed. Following discussions with PG&E and EBMUD staff, model logic will be reviewed and confirmed, or updated if necessary based on new information.

## Task 4. Assess Re-operation Scenarios

Once the MOCASIM model has been updated to reflect current PG&E and EBMUD operations, the model will simulate a series of alternate scenarios with the goal of maximizing water

supply benefits while protecting environmental uses and values. The assessment will clarify operational parameters for each scenario to include in the MOCASIM model. For each scenario, the assessment will detail potential benefits and impacts to instream flow, fish, wildlife, recreation, scenic beauty, cultural and historical resources and consumptive use. The study will evaluate the degree to which proposed projects will provide managed public access to the Mokelumne River and its tributaries for fishing, recreation, commerce, and other benefits and associated maintenance needs.

All scenarios will comply with all existing water rights and regulations governing instream flows, including those established by the Joint Settlement Agreement (JSA), the Lodi Decrees, and the FERC 137 relicensing agreement. The study will screen scenarios so that proposed operations are consistent with existing uses, licenses, operating goals and norms adopted by the Lower Mokelumne River Partnership established by the Joint Settlement Agreement for the implementation of Lower Mokelumne River Project 2916 FERC license and by the PG&E Ecological Resources Committee for implementation of the Project 137 FERC license and so that operations do not adversely affect the river's scenic beauty, cultural and historic resources, water quality, or recreational values as they exist today.

## Task 5. Technical Feasibility

### *Subtask 5.1 Implementation Issues*

The assessment will outline the opportunities and constraints for each scenario, as well as assess reservoir operational considerations including timing and duration of filling cycles related to available supply, demands and conveyance capacity, and water quality. The assessment will also quantify the impacts to hydropower generation and to both required and otherwise currently existing streamflows for each scenario.

### *Subtask 5.2 Economic Analysis*

The feasibility analysis will include an economic component that will determine the costs associated with re-operating storage, including the cost of delivered water. These costs will include any staffing and/or additional infrastructure or infrastructure modification needed to realize the benefits of re-operation. The analysis will also determine the potential cost associated with any change in hydropower generation.

The study shall identify prudent methods for district-wide long-term financial planning for capital expenditures, operations, and maintenance. The study will report on the willingness of the water utilities to participate in that planning prior to making further financial commitments associated with reservoir reoperation.

The study shall identify one or more ways in which the water supply will be shared; and one or more ways the capital, operations, and maintenance costs of the project will be shared. Following the study, but before the utilities make further legal commitments, financial

commitments, funding applications, or permit applications associated with reservoir reoperation, the utilities will identify water supply and cost sharing options acceptable to the utilities.

### *Subtask 5.3 Institutional Feasibility*

The assessment will summarize the willingness of EBMUD and/or PG&E to re-operate facilities under each operating scenario, based on coordination with representatives from these agencies.

The study includes consultation with local land use agencies to identify feasible means of reducing impacts of development associated with new water customers anticipated to be served with water resulting from this project. Results of these consultations with any recommendations shall be published in the study.

The study will identify the compatibility of a Wild and Scenic Designation for the Mokelumne River in conjunction with the reoperation projects. After the study, but before the utilities make further legal commitments, financial commitments, funding applications, or permit applications associated with reservoir reoperation, the utilities will indicate their position regarding a Wild and Scenic Designation in conjunction with reservoir reoperation.

## Task 6. Alternatives Analysis

The stakeholder group tasked with overseeing the project will review the results of the assessment to clearly define the potential benefits and impacts of each operating scenario to fish, wildlife, recreation, consumptive use, scenic beauty, water quality, and cultural and historical resources. The study shall identify ongoing means of providing timely information and meaningful opportunities to participate for ratepayers and other interested parties. The study will report on the willingness of the water utilities to provide such a process.

An extensive alternatives analysis process will be documented. The alternatives analysis will consider, at a minimum:

- Operational constraints
- Projected cost of the project and delivered water
- Benefits or impacts to fish and wildlife
- Benefits or impacts to recreation
- Benefits or impacts to consumptive use
- Institutional feasibility

### Task 7. Agency Coordination and Stakeholder Engagement

The project will proceed in collaboration with a targeted stakeholder group including former members of the Mokelumne Collaborative Group (MCG) and other interested stakeholders. Key stakeholder concerns and interests will be identified at the outset of the study, such that the assessment may answer these questions and/or address these issues.

Coordination meetings will be held with water agencies, PG&E, environmental interests, recreation interests, and state and federal agencies.

## Budget

Based on the extent of investigation, modeling, and coordination with PG&E and other agencies required, it is assumed that the Feasibility Study will cost approximately $750,000.

## References

RMC, 2007. Upper Mokelumne River Watershed Assessment and Planning Project. Final Project Report. August 2007.