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COUNTY OF SAN LUIS OBISPO

PASO BASIN SUPPLEMENTAL WATER SUPPLY OPTIONS

TECHNICAL MEMORANDUM NO. 1
PROJECT GOALS, OBJECTIVES, APPROACH AND EVALUATION PROCESS

FINAL
December 2016

2700 YGNACIO VALLEY ROAD, SUITE 300 • WALNUT CREEK, CALIFORNIA 94598 • P. 925.932.1710 • F. 925.930.0208

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PROJECT GOALS, OBJECTIVES, APPROACH, AND EVALUATION PROCESS FOR STRATEGY DEVELOPMENT

This technical memorandum (TM) was originally developed in September 2014 and updated in October 2015. It was used to document the Supplemental Supply Options project goals, project and modeling approaches, strategy development, and evaluation criteria and process. The project has evolved since 2014 but the overall ideas conveyed in this TM still hold true. However, the most updated information can be found in the Paso Robles Groundwater Basin Supplemental Supply Options Feasibility Study.

1.0 INTRODUCTION/BACKGROUND

The Paso Robles Groundwater Basin (Paso Basin) has experienced dropping groundwater levels over several decades and is the subject of many studies to determine perennial[1] yield and whether this perennial yield is being exceeded. In an effort to ensure sustainable water supply for the customers the Paso Basin serves while meeting its management objectives, the San Luis Obispo County Flood Control and Water Conservation District (District) is initiating this feasibility study to identify sources of supply that can be obtained to supplement the Paso Basin. This study shall identify, describe, and analyze the water that may be available from the State Water Project (SWP), Lake Nacimiento, and recycled water. The goal is to develop a prioritized list of the most beneficial and viable options for procuring available state and local water resources to wholly or in part, stabilize groundwater levels and to provide a clear path forward to obtaining these supplies for the Paso Basin. This TM1 outlines the project objectives and needs, vision, goals, and approach to developing/vetting options.

1.1 Water Issues in Paso Robles Basin

The Paso Basin is a 790 square mile basin that serves as the primary water supply for northeastern San Luis Obispo County and southeastern Monterey County and is designated as a high priority basin by the State. Water from the Paso Basin is extracted by agricultural, urban, and rural users. Water use in the Paso Basin has increased over time due to population growth and a shift in agricultural use to a point where the perennial yield

[1] For the purposes of this report, the perennial yield for the Paso Basin is defined as the amount of water that can be withdrawn and consumed on an average annual basis over the long-term and under given land use conditions without exceeding the combined natural and artificial recharge to the groundwater basin (total pumping – change in storage). Managing groundwater basins in a manner consistent with its perennial yield helps avoid long-term adverse impacts such as groundwater level declines. Because land uses and hydrologic conditions can change over time, the perennial yield must be re-evaluated periodically. Perennial yield is interchangeable with terms like “safe” or “sustainable” yield.

has been reached (i.e., basin outflows are equal to or greater than basin inflows) and groundwater levels in certain areas have been in decline for many years. As a result, the San Luis Obispo County Board of Supervisors established a Level of Severity III (most severe level) for applicable areas of the Paso Basin as described in the 2011 Resource Capacity Study and has taken certain actions to limit increased demand on the basin while a groundwater management structure is identified and formed under the requirements of the Sustainable Groundwater Management Act (SGMA). Should the basin's designation of critically overdrafted become finalized by the State Department of Water Resources (DWR) in 2016, the basin must be managed under a groundwater sustainability plan or coordinated groundwater sustainability plans by January 31, 2020, which is two years sooner than other high and medium priority basins.

There are numerous documents and studies that have summarized issues in the Paso Basin. Recent efforts include the 2011 Groundwater Basin Management Plan and the on-going (2014) Water Balance and Computer Model update (Basin Model). Many of the documents and issues related to the Paso Basin are located and described on the County's website: www.pasobasin.org.

2.0 PROJECT GOALS, OBJECTIVES AND APPROACH

The goal of this Supply Options Study is to determine the quantity, quality, cost, and points of transfer of supplemental and recycled water options, infrastructure needs at transfer points, and the terms and/or conditions under which a Paso Basin entity[2] could procure it (e.g., contractual issues/negotiations/"transfer terms").

This Supply Options study was conducted in a step-wise process with the following steps:

1. Identify supply options (Developed in Draft TMs 2 – Nacimiento Water, 3 – SWP Water, and 4 – Recycled Water).
2. Use Paso Robles Groundwater Basin Watershed and Groundwater Model (Basin Model) to estimate how much water and/or basin pumping offset is needed in different parts of the basin to stabilize groundwater levels in accordance with SGMA requirements. (Model runs performed under separate contract).
3. Pair up potential supplies with needs (as determined by model runs) and evaluate infrastructure needs and costs to deliver water to points of transfer locations needed (Strategy Development Phase).
4. Groundwater Management Agency(ies) (GSA) (or other Paso Basin entities) to make the policy decisions and financial commitments to implement potential options to stabilize the basin (Future work).

[2] Paso Basin entities are the target audience for this study, and these entities could be, but are not limited to, the ultimate Groundwater Sustainability Agency or Agencies responsible for meeting the requirements of the Sustainable Groundwater Management Act, a Paso Basin Water District, community water system decision makers, individuals within the Basin or any combination thereof.

The first three steps are being conducted as part of or in conjunction with this study as shown in Figure 1.1. The first step of this study was to identify supply options, volume availability, likely time of use availability, contractual and institutional issues, points of delivery, initial stakeholder issues, and costs of supplies. This information was summarized in three TMs: Nacimiento Water, State Water and Recycled Water. The next several steps of this study are described in the following sections.

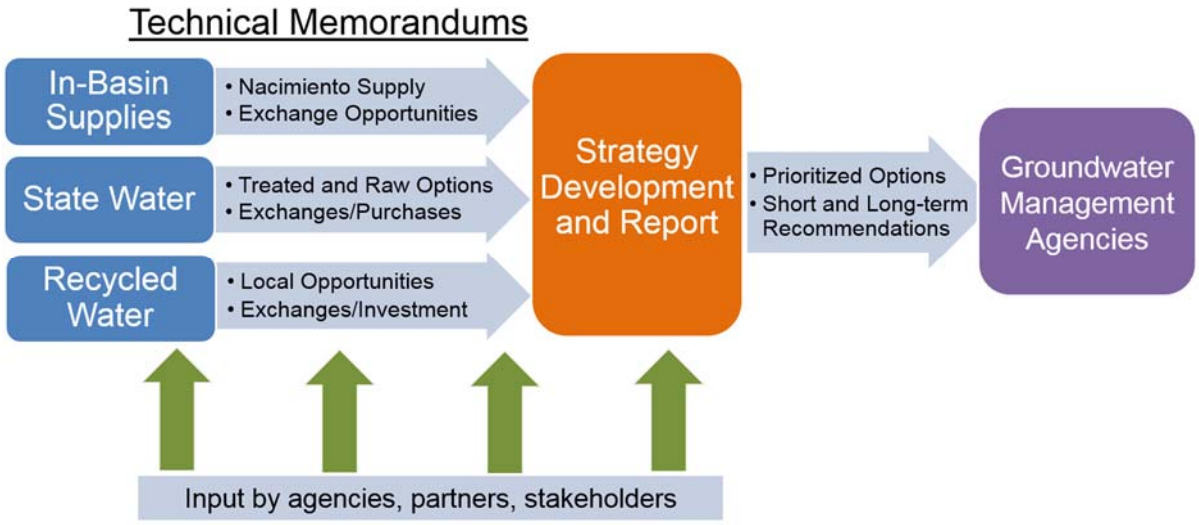

Figure 1.1 Supply Options Study Overall Approach

2.1 Modeling Efforts

As part of a separate effort, the Basin Model was used to evaluate certain specific actions and estimate how much supplemental water or pumping offset would be needed in certain areas[3] to stabilize groundwater levels by 2040. Demonstrating that the basin water levels will be stabilized by 2040 is required by SGMA. The results will be compared to an assumed growth baseline scenario, with projected Nacimiento Water Project deliveries to existing participants, to simulate basin conditions in 2040 absent additional supplemental water projects or demand management actions. The information generated from the model runs is compared to the quantities of supplies identified in this Supply Options Study in order to evaluate the benefit of each option and the potential to combine them for additional cost effectiveness and greater benefit (stabilizing groundwater levels through 2040). The analyses being run using the Basin Model that are relevant to this study are listed in Table 1.1.

[3] The Estrella, Creston and Shandon subareas of the Paso Basin have shown steady declines over time per the annual departure curves developed as part of Groundwater Management Plan implementation and are the focus areas for water level stabilization analysis.

Table 1.1 Basin Model Runs Paso Basin Supplemental Water Supply Options County of San Luis Obispo		
Model Runs		**Brief Description**
1	Conservation/Demand Management	Estimate the effect of uniform demand reduction across the basin on basin water levels.
2	Salinas River Recharge	Estimate the effect of recharging surplus Nacimiento water in recharge facilities along river on basin water levels.
3	Offset Basin Pumping with Recycled Water	Estimate the effect of using recycled water projected to be available for direct use in lieu of pumping on basin water levels.
4	Offset Water Demand in Estrella Sub-Area	Estimate how much supplemental supply for direct use in this sub area would be needed to offset demand on the basin and achieve stable levels.
5	Additional Releases to Huer Huero Creek	Estimate how much additional recharge of new supplies along Huer Huero Creek would be needed to achieve stable levels.
6	Additional Releases to Estrella River	Estimate how much additional recharge of new supplies along Estrella River would be needed to achieve stable levels.
7	Offset Pumping in Creston Sub-Area	Estimate how much supplemental supply for direct use in this sub area would be needed to offset demand on the basin and achieve stable levels.
8	Offset Pumping in Shandon Sub-Area	Estimate how much supplemental supply for direct use in this sub area would be needed to offset demand on the basin and achieve stable levels.

Note:
(1) Modeling scenarios to be run by Geoscience as a separate contract.

2.2 Strategy Development

The strategy development phase of the Supply Options Study builds off the supply options identified and detailed in the supply options TMs and pair up supplies with locations in the Basin identified in the model runs that need to reach stabilization. The following elements are defined in the Supply Options Study:

1. What supply (State Water, Nacimiento Water, and Recycled Water) can feasibly be paired with modeled locations needing stabilization.
2. For each location and supply how much water may be available, including its quality and suitable uses. Define potential volumes available (acre feet/year or AFY) for dry, wet and normal years as well as potential seasonal availability over the next 25 years (through 2040).

3. Costs.
4. Other considerations including regulatory, contractual, environmental, time for implementation and public/institutional acceptance.

3.0 EVALUATION PROCESS/CRITERIA

In the Strategy Development phase of work, the supply options were compared to each other to determine the prioritization ranking as well as compared to the project goals of stabilizing the basin. To compare the options, a consistent set of criteria must be used.

3.1 Evaluation Process

The following four-step evaluation process has been used in the Supply Options Study to screen down the list of options:

Step 1: Identify options under each supply type: Nacimiento Water, State Water, and Recycled Water. Supply options will be defined by their source/quantity, level of treatment and point of delivery.

Step 2: Sort into fatal flaw list (those options screened out), deferred options list (those that may have merit but are not within the scope of this study), and those options to be considered further.

Step 3: Evaluate options using Basin Model runs and evaluation criteria to determine potential benefits to Basin. Consider combining options into strategies for optimal supply reliability and potential cost savings.

Step 4: Develop a prioritized list of strategies for achieving basin water level stabilization based on evaluation results.

Steps 1 and 2 were completed in TMs 2, 3 and 4 for each supply option type (Nacimiento Water, State Water, and Recycled Water). Steps 3 and 4 are included in the Supply Options Study.

3.2 Previous Evaluation Criteria

In 2013, the Paso Robles Groundwater Basin Blue Ribbon Steering Committee developed criteria and a weighting system with which to qualitatively evaluate water supply opportunities. Initially, four criteria were considered:

1. Implementation Timeframe.
2. Measureable Basin Benefit (AFY).
3. Estimated Cost.
4. Feasibility (includes technical, political, environmental issues as well as public acceptance).

These preliminary criteria were weighted equally. Then the implementation timeframe was incorporated into the feasibility option, where options which could be implemented immediately were given "high" feasibility rankings. The criteria were then weighted with feasibility as highest (44 percent), followed by basin benefit (33 percent) and estimated cost lowest (22 percent).

3.3 Evaluation Criteria

The Step 3 and 4 evaluation process to identify the most viable options and strategies are based on the following evaluation criteria:

1. Quantity of supply (AFY).
2. Timing of available supply (what time of year and types of year is supply available and for how long into the future).
3. Net benefit to the basin (amount of change in storage in the basin from 2015 through 2040).
4. Cost (Capital and O&M).
5. Environmental impacts.
6. Schedule for implementation.
7. Regulatory/contractual/permitting approvals.
8. Technical complexity.

These evaluation criteria were used to qualitatively and quantitatively compare options. The results of the comparisons will be vetted with the Supply Options Subcommittee prior to completion of the Supply Options Study. An example of how results of the evaluation are presented is shown in Table 1.2.

Table 1.2 Comparison of Water Supply Options
Paso Basin Supplemental Water Supplies Options
County of San Luis Obispo

Supply Option	Supply AFY(1)	Time to Implement	Cost Capital/ O&M	Net Benefit to Basin (change in storage)	Comments on Issues/Benefits(2)
Option 1: [Description]	Normal Dry Wet	yrs to implement	$ $/yr	Ave annual AFY from 2012 - 2040	[comments]
Option 2: [Description]	Normal Dry Wet	yrs to implement	$ $/yr	Ave annual AFY from 2012 - 2040	[comments]

Notes:
(1) Typical available supply in a normal year, range of dry to wet year availability will be determined. Amount will be determined by months of available supply. Footnotes will provide details as to the months of operation and duration of supply.
(2) Quality, regulatory, environmental, contractual, complexity.

3.4 Strategies to be Evaluated

The preliminary pairing of supply options and model runs are identified in Table 1.3. These pairings define the strategies to be evaluated for comparing basin benefit and the other identified criteria. Criteria 1 and 2 are quantified in each of the applicable supply option TMs.

Table 1.3 Supply Options to be Evaluated using Basin Model Run Results
Paso Basin Supplemental Water Supply Options
County of San Luis Obispo

Model Runs		Recycled Water	State Water	Nacimiento Water
2	Salinas River Recharge			X
3	Offset Basin Pumping with Recycled Water	X		
4	Offset Water Demand in Estrella Sub-Area	X		X
5	Additional Releases to Huer Huero Creek	X	X	X
6	Additional Releases to Estrella River	X	X	X
7	Offset Pumping in Creston Sub-Area		X	X
8	Offset Pumping in Shandon Sub-Area		X	

Notes:
(1) Need to identify the water source, quality (raw or treated), and infrastructure (direct delivery vs recharge) for each alternative.

For each pairing, the type of facilities and quality of water needed are identified in order to develop cost estimates and other criteria information for strategy comparison purposes. Figure 1.2 shows the approximate location of each alternative as identified by their alternative number. Potential delivery options include:

1. Direct delivery of either treated or raw water,
2. Injection wells to supplement the deep water basin (*later eliminated due to cost*),
3. Spreading basins that recharge the alluvium for alluvial aquifer pumping to offset deep aquifer pumping (with potentially some benefit to the deeper aquifers), or
4. Spreading basins with recovery or surface storage to maximize ability to use supply during shoulder or off-peak months and then direct delivery.

The final combination of infrastructure and supplies were determined by the results of the model runs in terms of what type of delivery best helps the basin.

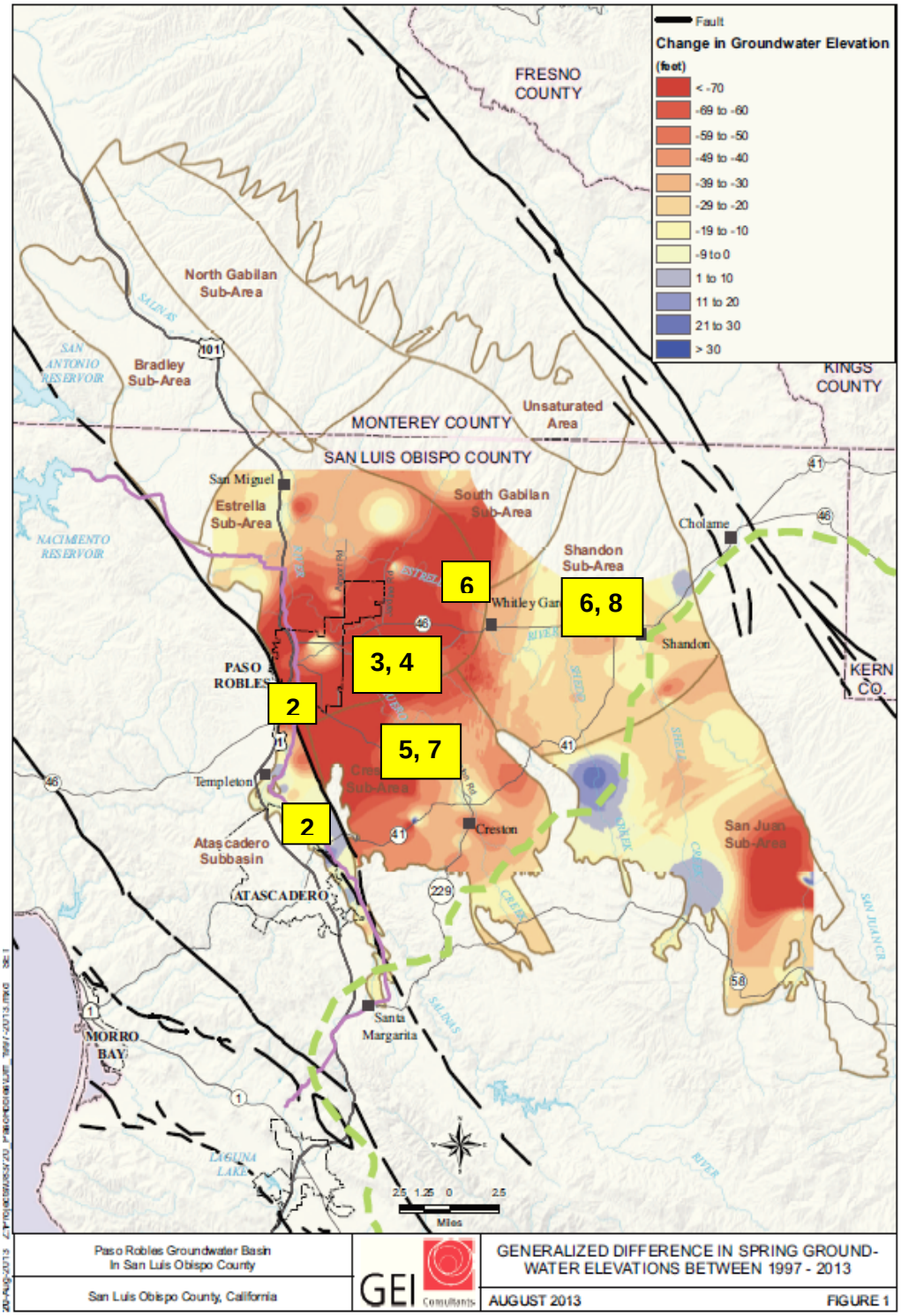

Figure 1.2 Location of Potential Supply Options Compared to GW Elevations