

Drinking Water Well Mitigation Plan Case Studies

Name of Program	Mt. Rose-Galena Fan Domestic Well Mitigation Program	Carrizo Aquifer Well Mitigation Program	Kern County Well Mitigation Strategy	Third-Party Impacts Action Plan
Agency	Truckee Meadows Water Authority (formerly Washoe County) Nevada	San Antonio Water System/Gonzales County Underground Water Conservation District Texas	Rosedale Rio-Bravo Water Storage District, Kern County Water Agency, Pioneer Project Recovery Participants, and Kern Water Bank Authority California	Yuba Water Agency California
Reason for Developing Mitigation Program	Created to address unreasonable adverse impacts to private domestic wells related to pumping of municipal wells in the Mt. Rose Highway and Callahan Road area of Southwest Washoe County.	Developed to proactively address adverse impacts to private wells from the operation of a nearby aquifer storage and recovery system.	Kern County has multiple groundwater mitigation programs, which are the result of litigation between water district banking operations, and the Monterrey Plus EIR litigation. Multiple districts and Kern Water Bank Authority (KWBA) entered a Joint Plan (JP) that requires them to arbitrate liability through a joint mitigation program.	In Yuba County, surface water and groundwater are managed conjunctively. As part of this conjunctive use program, Yuba Water Agency and its member unit irrigation districts monitor groundwater levels and water quality at 300 locations throughout the county. In the event that a third party is impacted by the conjunctive use program, the Third-Party Impacts Action Plan, included in the Conjunctive Use Agreements between Yuba Water and its Member Units, provides guidance on next actions to help potentially affected landowners contact the appropriate parties to resolve impacts to their groundwater wells.

<p>How Cost-Benefit or Feasibility Analysis Developed</p>	<p>Future costs are projected, and determined to be covered by connection fees, user fees, and contribution by South Truckee Meadows General Improvement District.</p>	<p>No information about feasibility analysis performed. Funding by permittees with well fields pumping > 3,000 acre-feet per year from Carrizo Aquifer. Mitigation is part of the operating agreement for the aquifer storage and recovery system.</p>	<p>The Joint Plan, which arose from lawsuits, had no analysis performed.</p> <p>The Kern Water Bank Authority has its own mitigation program arising from the Monterey Plus Environmental Impact Report, but it is currently superseded by the Joint Plan.</p>	
<p>Structure of Mitigation Program (quality vs. groundwater levels)</p>	<p>Mitigation based on well failure, significant pressure losses, and/or sanding/siltation issues (i.e., mitigation is triggered by the well failure or an imminent well failure).</p>	<p>Based on groundwater level (no water quality testing done). Mitigation may be triggered by modeled groundwater level as opposed to failure of the well.</p>	<p>Joint Plan mitigation program is technically for both quality and quantity but is currently only mitigating for groundwater levels. Program in the Joint Plan is overseen by the Joint Operating Committee (JOC). Members provide the Joint Operating Committee with groundwater monitoring data to create models. Mitigation is triggered by comparing the model without project to model with project. If the model indicates that the project was likely to cause the well impact, mitigation measures are provided.</p>	

<p>Nature of Services Provided (interim and long-term)</p>	<ul style="list-style-type: none"> - Compensation for deepening wells by 150 feet (\$66/foot during Fiscal Year 2011-2012, for a total of \$9,961). - Property owners who have already deepened their wells receive \$9,961. - For property owners whose well cannot be deepened to provide a sustainable water supply, the program covers the cost of drilling a new well to adequate depth. - For property owners that can hook up to community water system, program provides a hookup credit for costs of public right-of-way work (value of between \$12,500 and \$13,600).- Compensation only covers approximately two-thirds of total costs, with the remainder to be provided by the well owner. - This is a reimbursement program, so contractors to be hired by well owner. 	<ul style="list-style-type: none"> - Initial investigation to collect well data and perform diagnostics on well. - Mitigation committee reviews data collected and determines appropriate mitigation. - Potential well mitigations include lowering pump, drilling a replacement well, and connecting to water purveyor. - All costs are covered, and all contractors are hired and paid for by the District. 	<p>Both Kern Water Bank Authority and Joint Plan can provide any combination of the following services:</p> <ul style="list-style-type: none"> - Initial investigation of well. - Short term emergency water supply is provided within 14 days of notice to the Joint Operating Committee (but normally >48 hours). - Provide funds to lower the well pump. - Provide funds to complete connection to municipal and industrial water provider. - Supplying equivalent water supply from an alternative source. - Provide funds to replace well with deeper well. - Reduce or adjust recovery pumping to reduce impact. - Other methods as appropriate. 	
<p>Criteria for Eligible Applicants</p>	<ul style="list-style-type: none"> - Impacted well must have existed prior to July 1, 2011. - Impacted domestic well must be experiencing an actual or imminent unreasonable adverse effect that results in the reduction of groundwater supply to the well and leads to 	<ul style="list-style-type: none"> - Well located within the defined impact area - Drilled before the start of the aquifer storage and recovery project. - Completed in the same formation as the aquifer storage and recovery system 	<ul style="list-style-type: none"> - Inspection by Joint Operating Committee - Difference between model with project and model without project is in 15' - 45' window ("mitigable") - Not due to general environmental conditions 	

	<p>actual well failure, significant pressure losses, sanding/siltation, as determined by the Water Authority.</p> <ul style="list-style-type: none"> - Impacted well must draw from the same source aquifer as the municipal well. - Water Authority must determine that evidence exists that clearly relates the pumping of the municipal well to the impairment of the affected well, such as water level data. - Protectable interest in the impacted well is limited to 2 acre-feet per year of use. 	<p>(Carrizo Aquifer)</p> <ul style="list-style-type: none"> - Fully operational and capable of producing water, as confirmed by the District. - Registered with the appropriate groundwater conservation district. 	<p>(e.g., drought)</p> <ul style="list-style-type: none"> - Occurs as result of extracting banked water. 	
<p>Summary of Past Activity (How many wells, past costs, etc.)</p>	<p>First year of costs of \$943,276. About 60 wells deepened in the first year, and about 25 residences connected to the water system in the first year (as back-calculated by based on costs and data on per-residence mitigation costs).</p>	<ul style="list-style-type: none"> - 153 well mitigations through 2018, including 53 pumps lowered, 83 new wells drilled, and 17 connections to water purveyor. - Total costs to date of \$6.68 million (2010-2018). 	<p>Summary from Rosedale-Rio Bravo mitigation program only:</p> <ul style="list-style-type: none"> -78 mitigation claims processes -\$1.15 mill in claims approved 	
<p>Funding Structure and Funding Source</p>	<p>Funded by:</p> <ul style="list-style-type: none"> - Connection fees - User fees from water rate payers - Contribution from South Truckee Meadows General Improvement District. <p>Total estimated cost over 20 years of \$2,434,860 (estimated in 2012).</p>	<p>Funded by permittees with well fields that pump greater or equal to 3,000 AFY from Carrizo aquifer.</p>	<p>Funded by members of the Joint Plan. The districts split the costs for approved mitigation claims proportionally based on the harm caused by each district (e.g., two districts could split the costs 60/40, 50/50, etc)</p>	

Implementation Challenges	<p>Later merger of Truckee Meadows Water Authority and Washoe County Community Services Department created doubt about the future of the project and the previous commitments made under the original program.</p>	<p>- Lack of well information, or inaccurate well information from owners.- Substandard wells (e.g., poor construction, no gravel pack, etc.), which often caused District to have to perform additional work beyond just deepening the wells.- Post-mitigation complaints (once you work on a well, you are likely to be contacted if anything goes wrong with the well in the future).</p>	<p>-None in implementation - All of the mitigation plans in Kern County arose from litigation, either between districts or arising from the Monterey Plus Environmental Impact Report.</p>	
Strengths of the Program	<p>- Provides funding without requiring any surcharges on any specific group of customers.- Program appears to be popular amongst the residents.- Maintained access to drinking water for residents.</p>	<p>Program became a means to improve aquifer protection by bringing substandard wells up to State standards.- Improved public perception of the water agency.- Maintained access to drinking water for residents, with all contractors provided by the District, and all costs covered.</p>	<p>- Testing is paid for by the water agencies involved in the MOU or settlement agreement. No direct cost to rate-payers. - Fast actual timeline for emergency replacement water (48 hour avg claimed by Rosedale-RioBravo). - Many options for mitigation are allowed; no one-size-fits-all solution. - Bottled water not contemplated as a long-term solution.</p>	
Weaknesses of the Program, or Gaps the Program Does Not Address	<p>- Only covers about 2/3 of an impacted owner's estimated cost.- Program does not mention option of lowering pump within existing well.-</p>	<p>- Does not appear to address short-term (emergency) water supply interruptions while a permanent solution is being implemented.</p>	<p>- Only covers effects caused by extraction of banked water; no mitigation due to injection or drought effects or other operations.</p>	

	<p>Program apparently does not include any pre-mitigation well assessments, nor does it include proactive groundwater monitoring to anticipate issues.- Does not appear to address short-term (emergency) water supply interruptions while permanent solution is being implemented.- Program does not appear to have significant outreach component, as it relies on well owner to complain or apply for the program.- Does not explicitly address water quality issues.- Since this is a reimbursement program, coordination with contractors needs to be performed by the well owner.</p>	<ul style="list-style-type: none"> - Relatively high costs due to large number of wells that required additional work to bring wells up to standards. - Does not explicitly address water quality issues. 	<ul style="list-style-type: none"> - Definition of “mitigable” precludes some wells (see above). - Relatively limited coverage; it only applies to those impacted by certain water banking operations. - Although the 48-hour emergency water timeline is claimed, the Joint Operating Committee allowed up to 14 days to provide emergency water after a claim is filed. - Mitigation, including emergency water delivery, requires signing a release, the terms of which depend on the cause of mitigation. - Up to 45 days to approve a claim. 	
<p>Average Annual Cost of the Program (if available)</p>	<p>\$943K in the first year, estimated total of \$2.43 million over 20 years.</p>	<p>\$6.68 million over approximately 8 years.</p>	<p>\$1.15 million in claims paid by Rosedale-Rio Bravo since 2017. No info for Kern Water Bank Authority or other districts that are members of the Joint Operations Committee.</p>	