



# SGMA's First Groundwater Market

## AN EARLY CASE STUDY FROM FOX CANYON

In 2014, amid California's most recent drought, the state passed the Sustainable Groundwater Management Act (SGMA). This new law regulates groundwater at scale for the first time, requiring the state's largest source of stored water to be managed for long-term resilience. SGMA delegates the responsibility of achieving sustainable groundwater management by 2040 to local Groundwater Sustainability Agencies (GSAs). GSAs must achieve sustainability for their groundwater basins by developing and implementing Groundwater Sustainability Plans (GSPs). Balancing groundwater basins to achieve sustainability will require increasing water supply to the basin and/or decreasing water demand. The Fox Canyon Groundwater Management Agency (FCGMA), in western Ventura County, is the first GSA to pursue a groundwater market as a tool to decrease water demand when implementing its GSP.

This document summarizes a larger case study that outlines FCGMA's experience—the steps taken and lessons learned—in developing the first groundwater market to emerge under SGMA. It is a combined effort of The Nature Conservancy (TNC), California Lutheran University's (CLU's) Center for Economic Research and Forecasting (CERF) and FCGMA, with the support of local growers and the Farm Bureau of Ventura County (Farm Bureau). This document, as well as the white paper, is meant to serve as a resource for GSAs and other public agencies, organizations, practitioners and stakeholders involved in water resource management and contemplating the creation of groundwater markets to meet SGMA's sustainability mandate. This report focuses on the design and testing of the Fox Canyon groundwater market; a companion report will likely follow to evaluate the performance and share additional lessons learned once the market has launched.

## Fox Canyon Groundwater Market

Ventura County is one of the most productive counties in the nation, with \$2.1B in agricultural revenue in 2017<sup>1</sup>. Its agricultural industry is also largely dependent on groundwater, and decades of overpumping have resulted in the classification of the Oxnard and Pleasant Valley basins by the State of California as in a state of “critical overdraft,” a label that applies to 21 of the 130 basins regulated by SGMA. This means a fast-track for the requisite GSP, which is due in January 2020, two years before the 109 basins that are classified as “high” or “medium” priority.

Cuts of up to 35 percent in groundwater use are expected for the two critical basins to achieve their respective sustainable yields, which is SGMA’s requirement for a locally-determined cap on total water use that balances the needs of communities, agriculture and nature. The magnitude of this reduction motivated growers in the Oxnard basin to call for a groundwater market as a tool to provide flexibility, allowing those with unused water allocations to sell to those with unmet demand. Since 2016, FCGMA has worked with growers, environmental groups and other stakeholders to design and test a groundwater market in the Oxnard basin.

## Enabling Conditions

Groundwater markets can be a useful tool for achieving basin sustainability, but they are not a fit for every basin or GSA. A number of enabling conditions are necessary to ensure that a groundwater market functions effectively—namely that it is utilized by groundwater users and achieves its intended outcomes. The Fox Canyon groundwater market benefitted from the following enabling conditions:

**Water Scarcity:** Under SGMA, the sustainable yield for a basin serves as a cap on total extractions. In the critically overdrafted Oxnard basin, this cap translates into pumping reductions of as much as 35 percent. This

water scarcity creates the conditions for a market by allowing the price of water to reflect its true value to users, motivating both buyers and sellers. Even as water users await FCGMA’s forthcoming GSP, the adoption of an emergency drought ordinance (Emergency Ordinance E) has already created a degree of scarcity in Fox Canyon by placing limits on agricultural water use.

**Fixed Allocations:** A functioning market requires clearly defined and transferrable allocations. SGMA, on the other hand, allows GSAs to determine each basin’s path to sustainability, which may include allocating a specific amount of water to each pumper. FCGMA has opted to create a fixed allocation scheme for agricultural pumpers in the Oxnard basin. Any water pumped beyond that which has been allocated to a given user must be purchased on the market or recorded as a violation. Without this strict adherence to fixed allocations, a cap-and-trade style water market will not function in the face of alternative means to secure additional water.

**Agricultural Stakeholder Support:** The idea for the Fox Canyon groundwater market began with local growers, the majority user (with approximately 60 percent) of groundwater in the area. Area growers are well-organized, and with the support of the Farm Bureau and economics and business academics at CLU, they brought a proposal for a market to FCGMA. Without the buy-in and leadership of the agricultural community, the Fox Canyon groundwater market would likely not have gained traction.

**Market Design Expertise:** A well-functioning water market requires careful design. This is an iterative process that requires ongoing attention, evaluation and adaptation. CERF and TNC both have expertise in the design of environmental markets. Throughout the development of the Fox Canyon groundwater market, CERF and TNC have contributed by helping facilitate and educate stakeholders, create market rules, launch two market pilot phases, and monitor their performance.

<sup>1</sup>County of Ventura. 2018. Ventura County’s 2017 Crop & Livestock Report. Office of the Ventura County Agricultural Commissioner, Camarillo, CA. Available at: <https://cdn.ventura.org/wp-content/uploads/2018/07/Ag-Comm-2017-Annual-Crop-Report-final-1r-07-30-18.pdf>; <https://www.ventura.org/agricultural-commissioner/crop-reports/>.

**Capacity and Funding:** The creation of a water market is a considerable undertaking that requires significant, dedicated capacity from GSA staff, partners and participants. TNC, with support from FCGMA, CERF and the Farm Bureau, secured a Conservation Innovation Grant from the Natural Resources Conservation Service that provided over \$1M to bolster the development of the Fox Canyon groundwater market. Without this infusion of funds, the market may not have endured the resource-intensive development phase.

## Lessons Learned

Two years of designing and testing the Fox Canyon groundwater market have yielded many lessons learned. Chief among these are:

### **GSAs wishing to create water markets should create their GSPs with the market in mind.**

FCGMA created its GSP and water market in parallel. While both require significant agency capacity and resources, this allowed for iteration between the two so that critical elements of the GSP, such as the pumping allocation system, could support a functioning water market. Critical elements of a GSP can support market formation. Without proper attention, some elements may unintentionally exclude the possibility of a market.

**A water market should be developed via a public and transparent process.** FCGMA chartered a public stakeholder group, called the Water Market Group, charged with designing the structure and operational mechanisms of the Fox Canyon groundwater market. Like any public process, this group benefited from the diverse input of growers, cities and environmental organizations, among others. Over a period of seven months, the group educated itself on how markets function, established goals, created market rules and made recommendations to FCGMA that became the basis for the ordinances required to create the groundwater market.

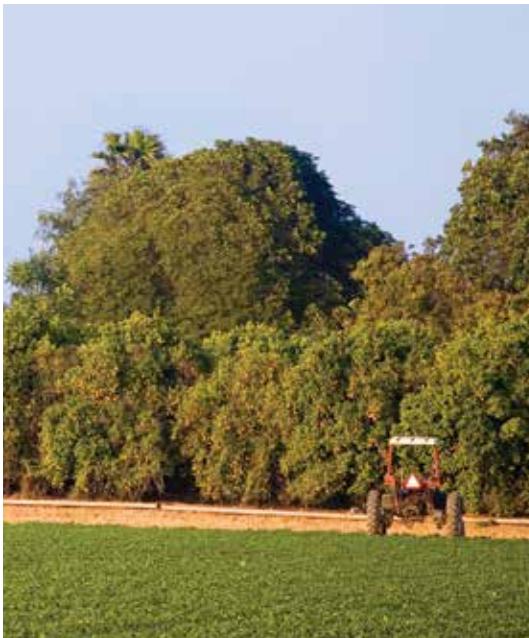
**Developing allocations is controversial, and measures to alleviate the impacts to pumpers should be compatible with a water market.** In Fox Canyon, the prospect of reducing groundwater use by as much as 35 percent generated significant controversy and several proposals to ease this transition. In response, FCGMA opted to gradually ramp down allocations each year and allow unused allocations to be “carried over” to future years. The carryover allowance may initially limit trading, but it incentivizes conservation and is, therefore, an additional tool to achieve basin sustainability. In contrast, a proposal to allow pumpers to borrow from their future allocations would undermine market integrity, by providing an alternative source of supply at no cost. It would also delay the pumping reductions needed to meet the sustainable yield, and was therefore, not adopted by FCGMA.

### **Accurate water use data is essential to ensure compliance with both the GSP and water market.**

FCGMA moved from a system of semiannual self-reporting to tamper-proof telemetric monitoring by requiring Advanced Metering Infrastructure (AMI) on all active agricultural wells to enable accurate reporting of pumping. In Fox Canyon, AMI includes telemetry hardware that reads groundwater meter data and transmits that data to a cloud-based data portal. FCGMA designed specifications for AMI hardware that include tamper detection and other validation measures, which seek to improve the integrity of groundwater extraction data. AMI is required by an ordinance, and TNC and CERF designed a rebate program for FCGMA to offset growers' costs of AMI adoption and water market participation.

### **Water market goals and rules should be tailored to participants' specific interests and needs.**

In designing the Fox Canyon groundwater market, growers placed a high value on developing a market via a transparent process to ensure fairness and preserve participant anonymity during trading. These goals were



satisfied, in part, via a requirement that trading be administered by a third-party that uses an algorithm to match buyers and sellers while not allowing them to interact with one another directly. As interests and needs differ across basins, so too water markets will differ across a number of dimensions.

### **Testing the market before moving to full-scale implementation helps to “get the bugs out.”**

The Fox Canyon groundwater market ran two pilot phases. Both have illuminated the degree of administrative and infrastructure complexity involved, and the need for significant time and capacity from FCGMA and partners. The testing phase offers an

opportunity to learn about the market’s strengths and weaknesses and improve its design before implementing it on a larger scale.

By allowing the price of water to reflect its true value to users, water markets incentivize conservation and investments in efficiency and supplemental supplies, all of which build basin resilience. Groundwater markets are one tool that can aid basins facing a new sustainability mandate under SGMA. The Fox Canyon groundwater market is the first to test this approach, and this report shares the story of its development in the hope that others will benefit from it.

**Read the full report at: <https://groundwaterresourcehub.org/groundwater-markets>**

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