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An Introduction to Water Markets

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Water is used for everything—from drinking and showering to growing the food on our dinner tables and sustaining healthy ecosystems. Because water is scarce and valuable in the Western United States, allocating it across competing uses is a high-stakes endeavor. Effective management is critical and will become even more so as water supplies become increasingly uncertain, patterns of agricultural and urban water use change, and environmental demands receive greater attention. Water markets are one management tool for changing how we use and share water.

What are water markets?

At its simplest, a **water market** is a system for people to trade (that is, buy and sell) water. A **water trade** occurs when someone voluntarily transfers all or part of their water entitlement to another person or entity, either for a short time or forever, in exchange for compensation. Water markets usually develop at times or in places where there is water scarcity, meaning there is not enough water to satisfy every desired use. The term *market* also includes the local rules and institutions that manage trades. Those rules can look different depending on the market's location and the type of water being traded (sidebar 1).

Sidebar 1.

Two main sources of water: Surface water and groundwater

Most water markets involve one of two primary sources of water, and the rules for using and trading these sources can be quite different:

- **Surface water** is water in natural water bodies like rivers and lakes. Once water is withdrawn from a surface-water source, it is often moved through human-constructed canals and may be stored in a reservoir for later use. Trading surface water is more common than trading groundwater.
- **Groundwater** is water in natural underground aquifers. Local groundwater trading often does not involve as much physical infrastructure as surface-water trading because the buyer can use the seller's groundwater allocation by pumping from their own well.

Since surface water and groundwater are often interconnected, some states manage them jointly. In other states, they are mostly managed separately. Regardless, water trades must abide by state or local rules meant to prevent trades from harming other water users.

In the absence of a market, historical allocation rules usually determine who gets to use water. Historical water rights allocations often cannot adapt quickly to changing conditions, which can lead to waste in some places and shortages in others. Water markets can be a helpful tool for addressing both short-term water shortages and longer-term changes in the supply of and demand for water because they generate prices. Market prices send signals to water users that encourage the reallocation of limited water supplies to avoid waste and enable new and more cost-effective uses of water.

Why trade water?

Some of the reasons water users and managers trade water include:

- **To provide flexibility:** For example, during a drought, a farmer growing a permanent crop like almonds might want to purchase additional water to protect their long-term investment. At the same time, a farmer who grows annual crops might choose to sell water to supplement their income because the market price of water is high (Ayres, Hanak et al. 2021).
- **To protect the environment:** Water is sometimes purchased on a short- or long-term basis to support ecosystems, water quality, or meet the needs of endangered species (Elmore et al. 2016; Richter et al. 2020).

Some reasons water managers and policy makers facilitate water markets include:

- **To reduce the costs of scarcity:** Trading can reduce the overall economic impacts of water shortages by allowing flexible water reallocation (Rafey 2023).
- **To protect supplies for the future:** Restrictions on water use are sometimes adopted to ensure sustainable water supplies for current and future generations. Water markets have the potential to help water users adapt to those restrictions (Bruno and Jessoe 2024).

Who participates in water trading?

Water trading can happen at different scales: from among individual neighboring farmers to between utilities hundreds of miles apart. Traders may include farmers, irrigation districts, cities, nonprofit

organizations, or governmental agencies. Here are a few examples:

- A farmer with a fallow field might sell their entitlement for the season in an informal arrangement to a neighbor who wants to keep a vineyard alive during a drought.
- A municipal water utility might contract to buy water from an irrigation district to ensure a reliable supply for homes in its service area.
- Government agencies or nonprofit organizations might buy long-term water entitlements to keep more water in a river for environmental purposes.

Which parties can participate in a given market depends on that market's rules.

Where are water markets happening? Some real-world examples

Water markets exist across the Western United States. Relative to other western states, California experiences the most trading activity in terms of both the volume of water traded and its monetary value (Schwabe et al. 2020). Some specific examples, shown in figure 1, include:

- **Mojave Basin (California):** The Mojave Basin is home to one of the most active groundwater markets in the West. Pumping reductions were adopted to stabilize groundwater levels, and for 30 years the market has generated economic benefits for the region by enabling greater annual allocation flexibility, long-term reallocation (primarily from agriculture to growing urban areas), and flexible offset systems to manage variable groundwater flow conditions (Ayres, Meng et al. 2021).
- **Rio Grande (Texas):** One of the oldest surface-water markets in the United States, the Rio Grande water market facilitated a shift in regional crop production, with water moving from crops that generate less revenue per unit of water (like field crops) to ones that generate more (like fruit and vegetables), especially during droughts (Debaere and Li 2020; Votteler et al. 2025).
- **Snake River Basin (Idaho):** Water transactions in the Snake River Basin led to increased water use on parcels that are more suitable for irrigated agricul-

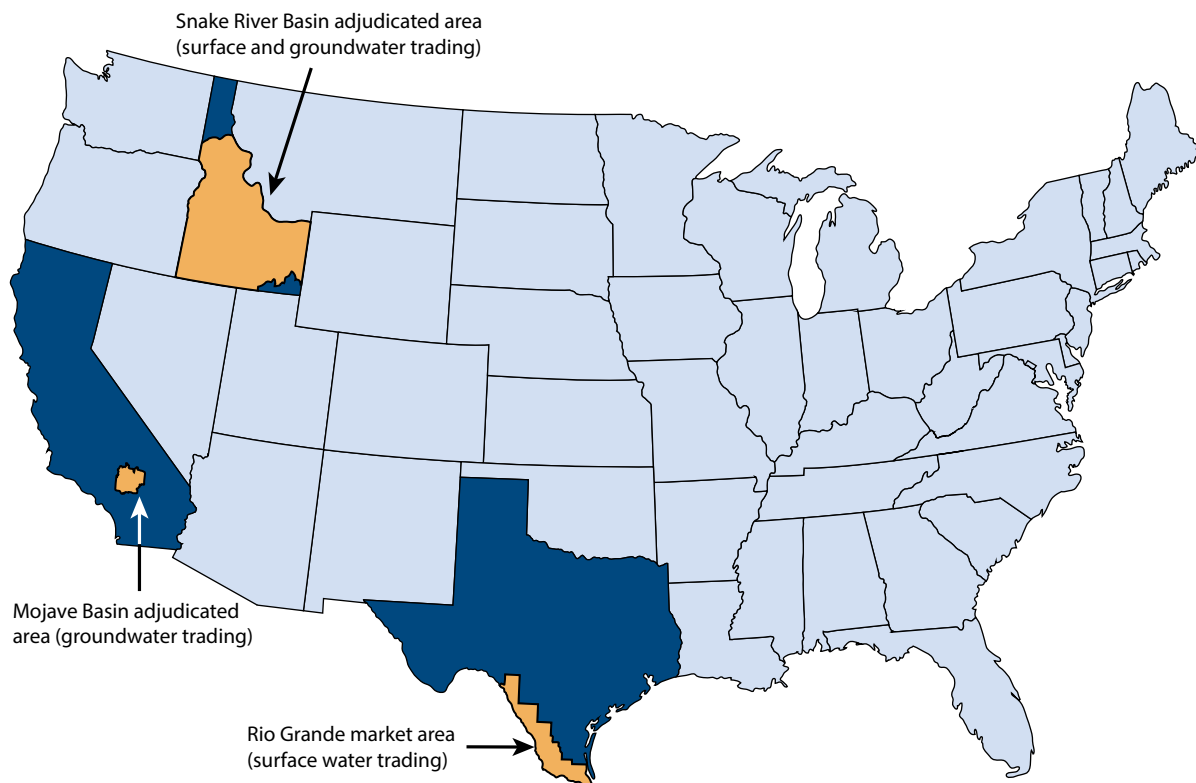


Figure 1. Examples of three active water markets in the Western United States.

ture (as opposed to dryland farming) and a reduction in pasture and idled land (Browne and Ji 2023).

Risks and challenges with water markets

Water markets face their own challenges (Ayres, Hanak et al. 2021). Building them is hard work, and they do not always function well. The risks and challenges associated with water markets can include:

- **Unintended third-party impacts:** When water is traded, the impacts of water use change. For example, trading can alter the physical flow of water in a river or an aquifer which could harm downstream water users and ecosystems.
- **High setup and transaction costs:** It can take a lot of time and money to develop the information base and rules necessary to support water trading. Adequate measurement and reporting of water diversion and use and a clear understanding of potential third-party effects of trading are fundamental (Bruce et al. 2024). Water markets can be designed to avoid or mitigate negative impacts. However, doing so can require significant investment, and the resulting rules—and related transaction costs—may limit trade (Green Nylen et al. 2017; Bruno and Jessoe 2024). When unnecessarily burdensome rules discourage or prohibit otherwise beneficial exchanges, they can reduce the effectiveness of the market (Leonard et al. 2019).
- **Initial allocations can be contentious:** Water is wealth. Those who are allocated more from the get-go hold a valuable resource—something they can capitalize on in a water market. In areas without well-specified allocations, like most groundwater basins, settling on initial allocations may be challenging because different parties may have very different views on how to assign allocations.
- **Potential consolidation:** Sometimes, farmers with smaller operations are more likely to choose to sell their entitlements and exit farming. This can consolidate agricultural production and water use among fewer entities.
- **Changing community dynamics:** If members of an agricultural community sell a large portion of their water entitlements to other sectors, it can lead to structural changes in the local economy. For example, cities may be willing to pay more for water, reducing the amount of farming that goes on over time.

Understanding related terms

The following is a list of terms that are helpful for understanding water markets:

- **Water banking:** This term is used to describe a shared accounting system that enables water users to store or trade water. In some states, such as Utah, water banks operate like a centralized savings account through which users lend and lease water (Utah Water Banking 2021). In other regions, the term *water banking* may or may not involve trading water. In California's Kern County for example, water users store surface water in an underground aquifer—a so-called groundwater bank—for their own later use or to transfer (Kiparsky et al. 2021).
- **Virtual water:** The water used to make a product is sometimes referred to as *virtual water*. For example, it takes water to grow wheat. When a farmer in one area sells wheat to someone in another, this transaction can be thought of as indirectly *trading* the water that was used to grow that wheat.
- **Water futures:** This does not refer to a market for physical water, but a market for *risk*. It is a tool used to protect against the financial *shock* of water prices changing in the future. Futures can be used like an insurance policy, paying out when water prices move in an unfavorable direction (CME Group Inc. 2026).

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