

**WATER IS THE CRITICAL INPUT TO ECONOMIC GROWTH** that can no longer be taken for granted. Every sector of the economy—food and agriculture, housing and real estate development, power generation, oil and gas production, industrial manufacturing, mining, and data storage—all require reliable access to clean water. Global climate change and historically unprecedented droughts combined with pollution and inefficient water use have put reliable water supplies at risk.

The current water supply shortfall in the Southwest US may be more critical to growth than anywhere else in the world. Solutions to this water deficit require creative approaches backed by significant capital investment. Water resources in the West have been owned and sold as real property (water rights) for more than a century. At present, there is a substantial opportunity for private capital investment in water resources to facilitate voluntary water transfers to higher-value economic uses. These transfers will play an important role in adding market-driven allocation efficiencies to maximize the water that is available and to help solve the structural water scarcity problem. In the absence of these transfers, the \$4.1 trillion of GDP<sup>1</sup> in the Southwest states will be at risk.

## Water Supplies in the Southwest US At Unprecedented Risk

The majority of currently available water supplies has been overallocated and is insufficient to support future growth. In the Western US, state government sources estimate that an additional 9.9 to 14.3 million acre feet (AF, one acre foot is 325,851 gallons, or the annual water needs of two to three households) per year of water is needed by municipal and industrial users through 2030 to meet demand from population and industrial growth. This is an amount equivalent to 70% to 90% of the annual flow of the Colorado River (the largest surface water supply in the US), which currently supplies water to 40 million people in seven states. The Colorado River also provides water for 4,200 megawatts of power generation, 5.5 million acres of

farmland (15% of US crops and 13% of US livestock), 22 federally recognized tribes, and 11 national parks.<sup>2</sup>

In December 2013, the US Bureau of Reclamation (BOR), which manages the Colorado River System, reported that water levels of the Colorado River are lower than they have been in 1,000 years.<sup>3</sup> For the first time in its history, the BOR stated in a 2012 report that the Colorado River flows will likely fall short by 3 to 5 million AF by 2060 (Exhibit 1); this may force the BOR to announce unprecedented near-term cuts in water supply allocations to Nevada and Arizona. Lake Mead and Lake Powell, the two largest reservoirs on the Colorado River managed by the BOR to regulate water supply reliability to Nevada, Arizona, New Mexico, and California, are at their lowest levels since their construction in the 1920s. As a consequence, water rights are becoming more valuable.

In addition, recent water supply litigation between New Mexico and Texas may result in the need for an additional 50,000 AF of newly created supply. California is proposing the \$25 billion Sacramento Bay Delta project, two 35-mile tunnels to transport water from the north to the south, which creates no new water supplies. The state of Texas also recently announced that 8 million additional AF are required to support manufacturing and municipal water demand growth driven by the state's unconventional oil and gas boom.

Using individual state government projections of water needs by 2030 multiplied by the current average market price in each state, Water Asset Management estimates that Arizona, California, Colorado, New Mexico, Nevada, and Texas alone will need \$52 billion of additional water resource supplies to meet demand (not including additional infrastructure spending). Most of these needed water resources will be purchased and transitioned from agricultural use by water resource developers to facilitate their availability to municipalities, water agencies, water utilities, industrial users, farmers, home and real estate developers, energy producers, and others that require water to grow.



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1. US Department of Commerce Bureau of Economic Analysis, "Widespread Economic Growth in 2012," [http://www.bea.gov/newsreleases/regional/gdp\\_state/gsp\\_newsrelease.htm](http://www.bea.gov/newsreleases/regional/gdp_state/gsp_newsrelease.htm).

2. US Department of the Interior Bureau of Reclamation, "Colorado River Basin Water Supply and Demand Study," p. 12.

3. US Department of the Interior, "Colorado River System: Current Conditions and Near-Term Outlook," p. 3.

4. Glenn D. Schaible and Marcel P. Aillery, "Water Conservation in Irrigated Agriculture: Trends and Challenges in the Face of Emerging Demands," US Department of Agriculture, Economic Information Bulletin Number 99, September 2012.

5. US Department of Commerce Bureau of Economic Analysis, Regional Economic Accounts 2012, and WAM calculations.

6. USDA Agriculture Census—2007, USDA Land Values—2012, and WAM calculations.

7. Westwater Research presentation to AWRA Annual Water Resources Conference, November 9, 2011 Albuquerque, NM.

8. USDA Land Values 2012, Brent Gloy, Chris Hurt, Michael Boehlje, and Craig Dobbins, "Farmland Values: Current and Future Prospects," Purdue University, March 1, 2011, p. 3, and WAM calculations.

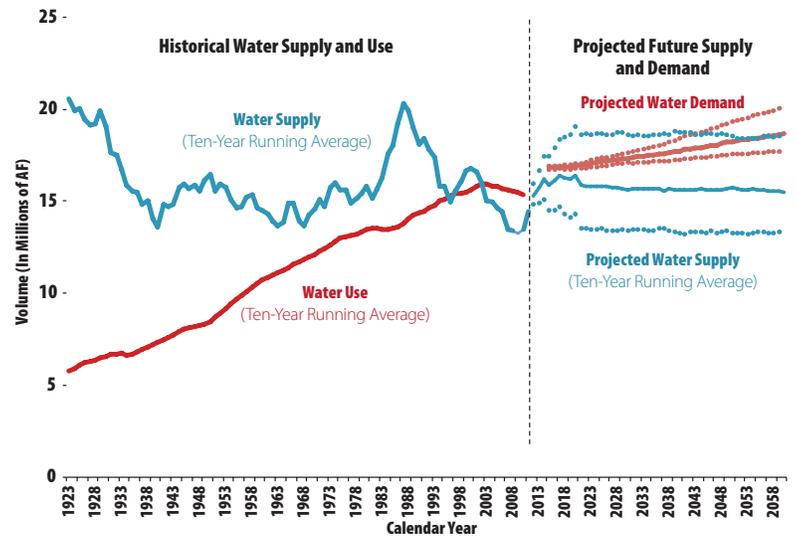
## Investing in the Solution: Agricultural Water Resource Transfers

In the Western US, water rights are legally treated as real property that may be transferred, by sale or lease, separately from land at market prices. Water rights are protected by a state's legal system and enforced through administrative agencies and the judiciary. The legal framework is called the Prior Appropriation Doctrine and has been in place for more than a century. One of the key tenets of the Prior Appropriation Doctrine is the "use-it-or-lose-it" paradigm. The doctrine effectively requires that water rights be put to continual beneficial use in order to retain the character of a vested property right. This incentivizes water users—particularly farmers, who are the heaviest water users in the West—to use as much water as possible to maintain their rights.

Agriculture consumes 80% to 90% of water in the Western US<sup>4</sup> but contributes less than 2% to the region's GDP.<sup>5</sup> A logical long-term water management solution includes a meaningful portion of the region's incremental water supplies to continue to come from the voluntary sale and transfer of water resources from agricultural uses. This trend has occurred consistently since the beginning of the last century. As water demand increases and supplies continue to become scarce, agriculture-to-urban and industrial transfers are accelerating in both pace and size, providing a significant opportunity for institutional capital. In the six Western states with the best water resource investment dynamics, Arizona, California, Colorado, Nevada, New Mexico, and Texas, the total value of water resources is an estimated \$620 billion versus \$129 billion of irrigated farmland in those same states.<sup>6</sup>

Although some investors may question potential headline risk and political sensitivity around agriculture-to-urban water transfers, the Western Governors' Association (WGA) clearly supports the fact that water transfers from agriculture to municipal consumption are a critically important way to ensure water supplies for continued economic growth. In its December 2012 report, *Western Governors' Association—Water Transfers in the West*, the WGA promotes best practices for water transfers and highlights successful case studies from around the West. The WGA notes that states should identify and encourage innovative ways to promote water transfers from agricultural to other uses (including urban, energy, and environmental) while avoiding or mitigating damages to agricultural economies and communities. The benefits to

**Exhibit 1: Historical Supply and Use and Projected Future Colorado River Basin Water Supply and Demand\***



\*US Department of the Interior, "Colorado River System: Current Conditions and Near-Term Outlook," p. 34.

Source: [www.bis.gov/cpi/](http://www.bis.gov/cpi/)

Notes: Water supply represents natural flow as measured at Imperial, Arizona. Water use and demand include deliveries to Mexico and losses such as reservoir evaporation.

Projected water supply computed as the average 10th, 50th, and 90th percentiles of the four water supply scenarios. Projected water demand represented by the six water demand scenarios.

voluntary market-driven transfers outlined in the report include "allocating water to new high-value uses, incentivizing efficiency, and avoiding political or regulatory water allocation decisions."

## Water Market History and Returns

In addition to the long-standing legal precedent of owning and transferring the rights for water resources in the West, a significant number of historical transactions support the depth of market activity. For example, more than 3,500 water transactions between 2002 and 2011 occurred, with a combined sales value in excess of \$1.4 billion.<sup>7</sup> The information draws from 12 market regions within eight states in the Western US and includes only sales and leases of water rights and other entitlements separate from land. Transactions per year in just stand-alone water resources have ranged from 0.5 to 1.2 million AF in volume and between \$100 million and \$300 million in annual value. In addition, approximately \$2.5 billion<sup>8</sup> in annual transactions of agriculture with associated water rights occur annually in just six states: Arizona, California, Colorado, Nevada, New Mexico, and Texas. Buyers for the water resources have

included residential, recreational, and industrial developers, cities, water districts, nature conservation groups, and energy producers.

Because water is a local resource, market prices for water rights are determined by a particular local geography, supply and demand imbalances, and permitted usage. The significant capital costs and energy consumption associated with transporting water great distances creates a durable localized pricing dynamic that cannot be disintermediated by global supplies. This makes water markets unlike other natural resources. Consequently, prices vary considerably by region. An acre foot of water in the Western US presently ranges in price from a few hundred dollars to more than \$40,000.

For investors that acquired water at the agricultural mean price (agriculture being the deepest market) and sold water at the urban mean price, data show a historically achievable cash-on-cash multiple of 1.5 to 2.5x. For investors that paid the agricultural mean and sold for prices in the top quartile of urban demand (typically achieved through an active water resource management strategy), data support an opportunity to earn a multiple over 3x. However, as with all asset classes, returns depend on the individual water resource assets initially selected, the prices paid, the water industry knowledge and resource development experience of the manager, and the ability of the water resource management team to consistently create value. The price differential between agriculture and urban water resources exists in large part because of the lack of access to investment capital, the lack of incentive to reduce market inefficiencies, and the increasing supply and demand disparity. Therefore, a water resource investment manager's ability to effectively change the permitted usage of water resource from one form of consumptive use to another creates significant upside potential for those investors with the necessary experience to manage the transition.

#### **Investment Execution: Deal Types And Value Drivers**

Water rights investments can be classified as those associated with agricultural land and those independent of farmland. For water resource investing where the as-

sets acquired include agricultural properties with water rights, investors often lease the farms to experienced farm operators, generating a current yield, while the water resources are developed to realize maximum return. Many farm leases have triple net lease equivalents, and many water lease contracts have price escalators linked to inflation. The underlying agricultural land values typically provide downside protection. If a water resource is not fully monetized, unleveraged return rates are consistent with long-term agriculture appreciation of 4% to 6% plus the current yield.<sup>9</sup> In cases where water is leased or sold, the land may be retired from farming or developed for other uses, including environmental, residential, energy, and industrial needs.

Certain water investments may also provide the ability for investors to sell parts of the asset to different users. For example, an investor might be able to develop storage options in the aquifer for sale to local agricultural districts, sell water resources to an industrial user for cooling purposes, sell the land's mineral rights to an area miner, and exit through a sale of the land to a solar power developer. In most cases, partial sales or leases do not preclude a long-term water transfer but rather expedite its occurrence and potentially increase a project's overall return. Partial sales or leases also contribute to an increased yield on the water resources, which when combined with an agricultural yield, provide increased income distributable to investors.

Although many water resource investments may include agricultural properties with associated water rights, other water resource investments include stand-alone water rights, water effluent credits, and water storage assets. Investors are also able to purchase or create water conservation credits through retrofits of existing water distribution networks to improve efficiency in order to capture the saved water, which can then be sold to others. One example includes reducing leakage by providing capital to upgrade irrigation infrastructure and replacing flood irrigation with center-pivot irrigation

8. USDA, WAM calculations.

9. Cynthia Nickerson, Mitchell Morehart, et al., "Trends in U.S. Farmland Values and Ownership," US Department of Agriculture, Economic Information Bulletin Number 92, February 2012, p. 13.

10. Federal Reserve Board of St. Louis, Economic Research, All-Transactions House Price Index for California, third-quarter 2013; USDA Farmland Prices Trends—2013, 2011, 2008; Metropolitan Water District of Southern California.

or drip systems. In addition, water storage can be developed or created to capture excess water at attractive prices during times of excess supply to be sold later and provide a long-term reliable supply source with attractive financial characteristics. These development activities require investment and make water systems more flexible and efficient.

Some investors might simply buy and hold water resources to profit from appreciation stemming from the supply-demand imbalance. However, those investors that choose active management with the

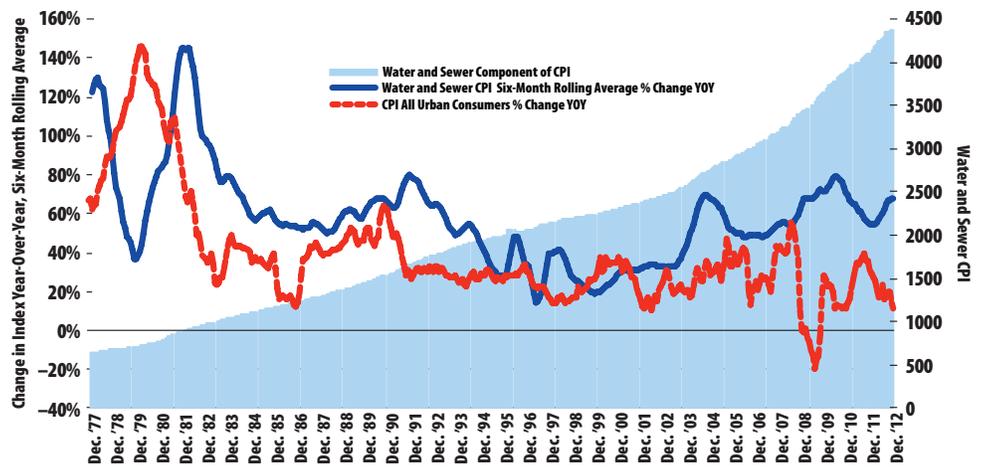
objective of providing specific solutions to satisfy identified demand for water resources increase the probability of value enhancement of their portfolios and can generate higher investment returns. Some of these development activities include the following:

- Identifying future new sources of water demand among agricultural users, municipalities, real estate developers, commercial or industrial users, environmental agencies and organizations, traditional or alternative power producers, and energy producers
- Aggregating water resource assets, including negotiating joint ventures or option agreements with other water rights owners to achieve scale and synergies
- Pursuing permits with appropriate regulatory authorities to allow the water to be consumed in new locations and for different uses
- Implementing conservation and efficiency-oriented investments resulting in opportunities to sell “conserved” water
- Creating competition among buyers by marketing water resource assets to multiple potential buyers to increase cash flow and to induce ideal buyers to act sooner than they might otherwise.

### Impact of Water Resource Investing in a Portfolio

As previously noted, water is a critical input to the majority of future growth areas. Water rights investments provide exposure across multiple real assets and in some

**Exhibit 2: National Water and Sewage Rates Versus CPI for Urban Wage Earners**



Source: [www.bls.gov/cpi/](http://www.bls.gov/cpi/)

cases can hedge the potential negative effects from water scarcity in other areas of the portfolio (housing, energy, agriculture, etc.). Though water prices benefit from increased housing supply, industrial production, and urbanization, water use—both municipal and agricultural—is typically inelastic and not highly correlated to the economy. When leased to a municipality, water resources can provide a long and relatively predictable stream of future cash flow that provides a good inflation hedge and an excellent match to the long-tailed liabilities of many institutional investors. Water’s local nature and relatively inelastic demand in a rising cost environment insulates both nominal and real prices from economic cycles. In most cases, water resources retained their value significantly better than residential real estate during the recent economic crisis. For example, since 2004, California residential real estate values are in many cases unchanged, while California irrigated cropland (with water rights) has appreciated by 89%, and water rates charged per acre foot by the Metropolitan Water District of Southern California have increased by 77%.<sup>10</sup> Although the prices paid for wholesale water resources per acre foot declined during the economic crisis, retail water rates charged to consumers in the Southwest increased (Exhibit 2). In addition, US retail water prices historically have outpaced consumer prices.

Institutional investors may invest in water rights through private equity funds or through a limited number

of listed public equities. Public equities include companies such as Cadiz, J.G. Boswell, Limoneira, and Pure Cycle. However the underlying investments at these public companies are geographically concentrated, and the vehicles are subject to limited research coverage and equity market correlation and volatility. Private investments in water rights can be accessed through specialized water resource investment funds or via direct investments with an operating partner specializing in this unique area. These types of private investments typically offer higher returns, lower correlation, and more opportunity for value-added strategies than their public counterparts. Although water rights investments exhibit a private equity “J-curve,” it is often less pronounced than in other areas of private equity, as water rights often involve a staggered investment outlay with smaller capital expenditure upon acquisition and may frequently be paired with a cash-yielding alternative use as part of the overall strategy.

### Risks

Risks to the strategy include using third-party leverage, buying water resource properties with only one potential end buyer, and inadequately assessing the political and local sentiment around an eventual water sale or lease. In these cases, investors may become overburdened with interest payments, be unable to sell the asset at an attractive price or in a reasonable amount of time, or be forced into an extended permitting process before selling or leasing the water resources. The change-of-use permitting process in particular may be delayed because of local political concern over the potential economic impact, backlash from local politicians and citizens fearing that water exports could deplete their own supplies, lack of contacts within the community, or lack of understanding by the investor as to how the permitting process varies by area. Investors can mitigate these risks by avoiding third-party leverage on their investments, ensuring that there is thorough and knowledgeable due diligence of the local political sentiment prior to investment to avoid situations with insurmountable friction, acting with total transparency and as a known solution provider to the community, and acquiring water resource assets with multiple potential end users.

Historically, municipalities have had the ability in rare cases to acquire water or agricultural assets through the process of condemnation and eminent domain. However, those transactions have been at prices significantly above the market value of the properties being condemned. This is a result of a variety of reasons, including legal precedents to pay a price equal to highest and best consumptive use as well as a desire by the condemning party to reduce the time and costs associated with a protracted legal process.

### Conclusion

Investments in water resources provide attractive uncorrelated return potential. As pricing is directly linked to local supply and demand, and water has no substitute, investors can participate in the positive long-term pricing dynamics of water resources with minimized risk of having those returns disintermediated away by lower-cost global supplies. Water is a critical but currently a relatively inexpensive component of the majority of future economic growth drivers, allowing for price appreciation, providing broad exposure to most economic sectors, and in some cases providing a hedge against the effects of water scarcity to other portfolio assets. Given the water supply needs in the Western US, a significant near-term investment opportunity exists to acquire and develop the lowest-cost solutions: water transfers. The potential loss of economic growth across sectors in the absence of adequate water supplies will greatly exceed the expenditures needed to secure additional supplies. Because water is a relatively new institutional asset class, there are few experienced institutional-quality water investment managers, resulting in an inefficient market and less competition for attractive assets and providing the ability to earn high returns with low risk and limited use of leverage. Investing in water today provides an early-mover advantage to deploy significant capital at attractive valuations with the potential for providing substantial returns, and important solutions, within a typical private equity time horizon. ■

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