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Water Market Insider

WestWater Research is the leading economic and financial consulting firm in the water industry.

Connecting Regional Water Market Conditions to the Statewide NQH2O Price Index

The recent launch of the Nasdaq Veles California water futures is changing the water management toolkit for participants in California's water market. The futures contracts offer a way for participants in California's water market to offset the financial risk associated with physical water transfers by simultaneously engaging in a separate cash settled futures transaction. The futures contracts are settled to the Nasdaq Veles California Water Index (NQH2O). The NQH2O Index is a volume weighted, location adjusted average weekly price for water transacted on the spot market in California.

However, the California water market is not homogenous. Regional variation in spot market water prices results from a combination of many factors, some of which include location, conveyance accessibility, and relative scarcity. Regional sub-markets are a common part of any commodity market, and the relationship between local physical market activity and the broader futures market is captured in a concept called basis.

What is basis?

Basis is a method of quantifying of the relationship between the local physical market price and the futures price. In the context of water futures, having an understanding of basis can help to bridge the gap between the NQH2O Index value and the price of physical water being transacted at a regional or local scale. Accounting for basis when transacting in the futures market can help to increase the efficacy of a hedge at the time of settlement.

How do you calculate basis?

Historical local market price and Index values can be used to estimate average regional basis in a market sub-region.

$$Basis = Cash\ Price - Futures\ Price$$

Because relative water scarcity has a substantial influence on price, it may be useful to calculate multiple basis estimates to represent market behavior under various water supply conditions. In order to refine basis estimates, a representative local market boundary can be developed to select historical market price information used to calculate average basis.

How can you use basis to hedge?

Basis is a useful concept to apply to any hedge, as it will provide an indication of how to adequately cover the desired level of price risk an individual market participant may expect to face when transacting in the physical market. In many markets, including the water market, basis is not a perfect science. Like all aspects of California's water market, several factors including extended drought conditions, water project allocations, environmental requirements, source of supply, and conveyance capacity can impact regional prices in inconsistent ways and to varying degrees. Despite this, there are methods to estimate basis in local markets, which can help quantify the appropriate level of futures risk exposure required to hedge a given level of physical market price risk.

What does this mean?

Anyone who anticipates engaging in the water transfer market, as a buyer or seller, could use historical NQH2O Index values and knowledge of local water market transfer prices to estimate an expected basis depending on water supply conditions and projections. Knowing your basis can improve the effectiveness of hedging in the futures market by adequately accounting for financial risk exposure. The following scenarios exemplify hypothetical outcomes of a long hedge with and without consideration of basis.[1]

Scenario A: Hydrologic projections are indicating a dry year and a farmer anticipates needing to acquire an additional 100 AF of water on the spot market in June. The farmer buys 10 water futures contracts (representing 10 AF each) for $400/AF in January with a June settlement date. In June, the NQH2O Index is at $800/AF and the farmer makes $400/AF on the previously purchased futures contracts. However, the regional market that the farmer is operating in experiences spot market water prices at a premium to the index, and the water available to acquire in June is priced at $1,000/AF. The farmer successfully offset a portion of the financial risk by engaging in the futures market, but could have done better by accounting for basis.

Futures cost = $40,000 (100 AF * $400/AF)

Net futures return = $40,000 (100 AF * $800/AF – futures cost)

Water acquisition cost = $100,000 (100 AF * $1,000 AF)

Net purchase price for water = $600/AF ($100,000 - $40,000 / 100 AF)

Scenario B: The farmer is expecting to need an additional 100 AF of water in June, but knows that in critically dry years like this one, the local water market basis is about +$200/AF. With that knowledge, the farmer buys 15 water futures contracts (representing 10 AF each) for $400/AF in January with a June settlement date. In June, the NQH2O Index is at $800/AF and the farmer makes $400/AF on the futures contracts. The farmer still purchases water in the spot market for the regional price of $1,000/AF, but has effectuated a net purchase price of $400/AF with their futures hedge. By accounting for basis, the farmer was able to hedge against future price exposure and offset higher market prices through a net gain in the futures contracts.

Futures cost = $60,000 (150 AF * $400/AF)

Net futures return = $60,000 (150 AF * $800/AF – futures cost)

Water acquisition cost = $100,000 (100 AF * $1,000 AF)

Net purchase price for water = $400/AF [($100,000 - $60,000) / 100 AF]

[1]The examples provided do not account for margin or transaction costs.

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