Assessing Water Market: Performance, Growth, and New Market Trends

Our Farms Our Future

April 4, 2018
WestWater Research

- **Economic & Financial Advisory Firm**
  - Nationwide practice in water valuation, water acquisition, water investments, and economic planning

- **Waterlitix – Price Database**
  - The most comprehensive database of water right price and sales information
  - Price data on over 20,000 western water rights transactions

- **Creating Value Through Innovation**
  - Arizona effluent transaction nominated for 2014 “Water Deal of the Year”

### Office Locations

<table>
<thead>
<tr>
<th>Main Office</th>
<th>West Coast</th>
<th>Southwest</th>
<th>Intermountain</th>
</tr>
</thead>
<tbody>
<tr>
<td>805 W. Idaho Street</td>
<td>11504 NE 207th Ave</td>
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<td>3rd Floor, Suite 310</td>
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<td>2nd Floor, Suite 220</td>
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<tr>
<td>Boise, ID 83702</td>
<td>Brush Prairie, WA</td>
<td>Phoenix, AZ 85016</td>
<td>Ft. Collins, CO 80521</td>
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Overview

• Defining the Water Rights Market
• Who’s Buying & Selling and Why
• Sizing the Water Market
  – Just How Big is the Market
• Water Rights Price Index
  – How are Water Prices Performing
• Market Trends and Changes on the Horizon
Water Market Outlook

DEFINING THE WATER RIGHTS MARKET
Value of Irrigated Agriculture in the West

Water carries significant value for agriculture and the West. Agriculture is the largest water user in the region, representing over 80% of total use. The sector is also an important part of the West’s economy, generating more than $90 billion in total farm revenue for the region. One measure of the value of water in agriculture is the revenue generated from each acre-foot water used for irrigation.

As the map illustrates, the revenue generated by water use in agriculture varies by county across the West. Counties generating the highest revenue per acre-foot are located in southern and coastal California, central Washington, and southern Nebraska.
Water Markets in the West

- Over 25 Established and Emerging Regional Markets
- Enabling Market Conditions:
  - Supply and Demand: High-growth areas experiencing water scarcity
  - Regulatory/Legal: Defined, transferable water rights
  - Large market entrant often catalyst for early-stage trading
Commonly Traded Water Assets

Asset classes are highly regionalized based on local legal and regulatory institutions

**Surface Water Rights**
- Direct use of stream flows when in priority.
- Active Markets:
  - California
  - Colorado
  - Nevada
  - New Mexico
  - Utah
  - Washington

**Groundwater Rights**
- Withdrawal and use of groundwater through wells.
- Active Markets:
  - Arizona
  - California
  - Colorado
  - Texas

**Groundwater Storage & Recovery**
- Water stored underground in the aquifer to accrue credits authorizing later withdrawal.
- Active Markets:
  - Arizona
  - California

**Storage Water Rights**
- Entitlement to store water for use at a later time.
- Active Markets:
  - California
  - Colorado

**Effluent**
- Entitlement to use treated wastewater, generally for irrigation, industrial use, or groundwater recharge.
- Active Markets:
  - Arizona
  - California
  - Colorado
Water Market Outlook

WHO’S BUYING AND SELLING
Market Participants

Supply Sectors
- Agricultural Producers
- Municipalities
- Investment Firms
- Public & Private Water Companies
- Native American Tribes
- Industrial Facilities (often decommissioned)

Demand Sectors
- Municipalities
- Public & Private Water Companies
- Investment Firms
- Real Estate Developers
- Federal & State Agencies
- Non-profit Conservation Groups
- Native American Tribes
- Golf Courses
- Agricultural Producers

Volume Traded by Supply Sector
- Agricultural 79%
- Municipal 17%
- Tribal 1%
- Industrial 2%
- Other 1%

Volume Traded by Demand Sector
- Municipal 63%
- Environmental 25%
- Agricultural 1%
- Industrial 6%
- Other 6%
Water Market Outlook

SIZING THE MARKET
• **2017 Value Traded:** $371 million.
  • Volume: Leases account for the majority of annual volume traded
  • Value: Evenly divided between sales and leases in 2017
  • Primarily driven by increased trading activity in California
Primary Markets

Transaction Size and Frequency

- **Arizona**
  - Mix of sales, leases, and storage & recovery credit sales
  - Native American tribes active in the leasing market (sell side and buy side)

- **Colorado**
  - Active sale market, growing lease market

- **California**
  - Leasing accounts for the majority of trading
  - Leases are generally large

- **Texas**
  - Active sale and lease market
  - Generally small sales, larger leases
Water Market Outlook

WATER RIGHTS PRICE INDEX
Water Rights Price Index (WRPIx)

- Tracks annual performance of water rights prices in the western United States
- Base year: 2002
- Composite price index using transactions from 14 regional markets
- Includes more than 4,500 individual transactions
  - 1,194 leases
  - 3,312 sales
Western US Water Price Trends
Water Rights Price Index (WRPIx)

Agricultural Boom
2002-2013

Housing Market Boom
2004-2007

Great Recession
2008-2010

Severe Drought
2012-2015

Housing Recovery
2016-2018

9.6% Compounded Annual Growth Rate
Market Developments - Macro Factors

Decline Agricultural Market
- Falling agricultural commodity prices
- Fall farm Income
- Rising interest rates

Drought and Supply Diversification
- Move toward managed water portfolios with short and long term supplies
- Seeking “optional” supplies for dry year and demand management
- Price premiums for callable supplies

The USDA’s recently issued 2018 Net Farm Income forecast calls for a decline of 7%, which would more than erase the modest gains in 2017 and represent the fourth decline in the last five years.

IMPACT: FELE, LNN, VMI, WMS

LATEST:
- 2018E: $59.5B; -7% Y/Y; -52% from peak (2013)

Corn Prices (Near contract, $ per bushel)

Source: CBOT

Source: United States Department of Agriculture
Water Market Outlook

EMERGING TRENDS
## 5 Emerging Water Market Trends

<table>
<thead>
<tr>
<th></th>
<th>Rotational Farm Fallowing for Water</th>
<th>Buy-side Participation by Agriculture</th>
<th>Expansion in Groundwater Banking</th>
<th>Growth in Enviro Water Trading</th>
<th>Smart Market E-Trading</th>
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<tr>
<td>1</td>
<td>Provides high value for ag water without “Buy and Dry” of farmland</td>
<td>Water demand by expansion of high valued specialty crops</td>
<td>Provides water firming and revenue opportunities for Ag</td>
<td>Creates outside and stable revenue opportunities for farms outside of high growth areas.</td>
<td>Streamline regulatory process - reduce transaction costs</td>
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<td>Integrates well with rotational and cover crop practices</td>
<td>Water leasing to manage drought risk</td>
<td>Will require further development of ASR laws and regulations</td>
<td>Transaction structures that integrate with existing ag operations.</td>
<td>Facilitating temporary water transfers within Irrigation Districts</td>
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QUESTIONS