Markets Key to Texas Water Availability

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Overview

• Is water scarce?
• How severe is the drought?
• What are the sources and uses of water?
• How is water allocated and priced?
  – Surface water
  – Groundwater
• Policies for more efficient water allocation
Drought visible in many areas

Lake Meredith

Lake Medina

Palmer Drought Severity Index

September, 2014

SOURCE: Texas Water Development Board
Surface water levels falling

- Statewide levels under 63 percent capacity
  - East Texas reservoirs and lakes at 90 percent
  - Despite recent rainfall, large areas of West and South Texas remain below 33 percent

SOURCE: Texas Water Development Board
Groundwater levels also falling

- Water levels have declined much below normal in majority of major Texas aquifers
  - Trinity aquifer in North Texas has fallen over 1,000 feet in areas around Dallas.
  - Large swaths of Ogallala aquifer down by hundreds of feet

SOURCE: Texas Water Development Board
Water usage will continue to increase...

- Water usage projected to rise 22 percent by 2060 due to rapid urban growth
  - Near doubling of population will increase municipal usage by 70 percent
  - Agricultural use projected to fall by 17 percent
...and supplies will likely fall

• Statewide water supplies projected to fall by 10 percent over the same period, due to:
  – Weather
  – Excessive pumping
  – Limited new reservoirs
Sources and Uses of Water in Texas
Agriculture uses most of the water in Texas

2011 Consumption Shares

- Irrigation: 61%
- Municipal: 27%
- Manufacturing: 6%
- Livestock: 2%
- Steam Electric (Power): 3%
- Mining: 1%

SOURCE: Texas Water Development Board
Uses vary by water source

**Texas Groundwater Use, 2011**
- Irrigation: 77%
- Municipal: 18%
- Mfg: 2%
- Mining: 1%
- Power: 0%
- Livestock: 2%

Accounts for 60% of Statewide Water Use

**Texas Surface Water Use, 2011**
- Irrigation: 39%
- Municipal: 40%
- Mfg: 12%
- Power: 6%
- Mining: 1%
- Livestock: 2%

Accounts for 40% of Statewide Water Use

SOURCE: Texas Water Development Board
Water allocation and price not based on supply and demand

- Surface water rights issued by the state
- Most consumers purchase water from public entities such as cities or water authorities
- Water prices generally based on cost of treatment and delivery
- Groundwater historically open access, but growing powers of Conservation Districts to issue rights
Market principles would allocate water more efficiently

- Water is not priced based on demand and supply, but cost of service
- Prices often do not change with scarcity, discouraging conservation
- Scarcity is often managed by rationing water among users
Surface and Groundwater are Allocated and Priced Differently
Surface water allocation

- Water rights allocated by state
  - First-in-time, first-in-right
  - Most basins fully allocated
- Legal framework allows for water transfers
  - In practice, many restrictions
- Some active water markets exist
  - The Lower Rio Grande Valley

SOURCE: enchantedlearning.com
Challenges for surface water markets

• No-injury rule for water transfers
• Inter-basin transfers hampered further by junior rights rule
• Seventy percent of water rights held by public entities and water authorities
  – Inflexible “take-or-pay” contracts
  – Customers of river authorities not allowed to resell water
Groundwater allocation

• Property rights not clearly defined
• “Rule of Capture” stipulates water is not owned until pumped out of the ground
  – Leads to tragedy of the commons: one person’s actions leave less for everyone else
• Groundwater Conservation Districts (GCD) have been given authority to regulate groundwater
Challenges for groundwater markets

• No legal right to a fixed amount of water means seller can’t guarantee amount
• Groundwater Conservation Districts have imposed export limits and fees
Policy Changes to Encourage Market Principles in Water Allocation
Reducing inefficiencies

• **Surface water:**
  – Better define “injury”
  – Eliminate junior rights rule on inter-basin transfers
  – Encourage water authorities to reduce “take or pay” contracts and to allow re-sales

• **Groundwater:**
  – Strengthen the role of GCDs to assign private property rights
  – Minimize export restrictions

• **In general:**
  – Protect the property rights of others but encourage marketing so that prices reflect scarcity
Water prices moderate in most Texas cities

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<th>Lowest Cost Ranking</th>
<th>50 Gal/Person/Day</th>
<th>150 Gal/Person/Day</th>
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<td>22</td>
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SOURCE: Circle of Blue
Reasons to be optimistic about the future

• Sales of water from agriculture to cities and industries already happening and likely to increase

• Regional water plans under Senate Bill 1 (1997) have embraced water transfers and markets

• More water planners, farmers, cities realizing that market principles are a part of the solution
Further reading

• Keith Phillips, Edward Rodrigue, Mine Yücel
  “Water Scarcity a Potential Drain on the Texas Economy,” *Southwest Economy*, Q4 2013

• Ronald Kaiser, “Solving the Texas Water Puzzle: Market-Based Allocation of Water,”
  Texas Public Policy Foundation, March 2005