California Environmental Water Network

Water Acquisitions and Valuation in California

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Water Market Activity and Transactions

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California's Water Market

An Active Market

- **Volume**: Over 11.7 MAF transferred statewide between 2010 – 2020.
- **Value**: Over $4.1 billion value transacted during same period.

Key Features

- **Connectivity:** Vast array of natural and constructed inter-regional conveyance.
- **Local Dynamics:** Regional differences in supply, demand, assets traded, and prices.
- **Participation**: Includes growers, cities, tribes, refuges, private companies, and NGOs.

Known Water Transfer Activity in California by Total Dollars Spent (2010-2020)[1]

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Market Participation

Regional differences influence the makeup of buyers and their participation in the spot-market.

[1] Note: Share of participation based on volumes purchased and buyer type. Data for spot-market transactions only in selected market regions.

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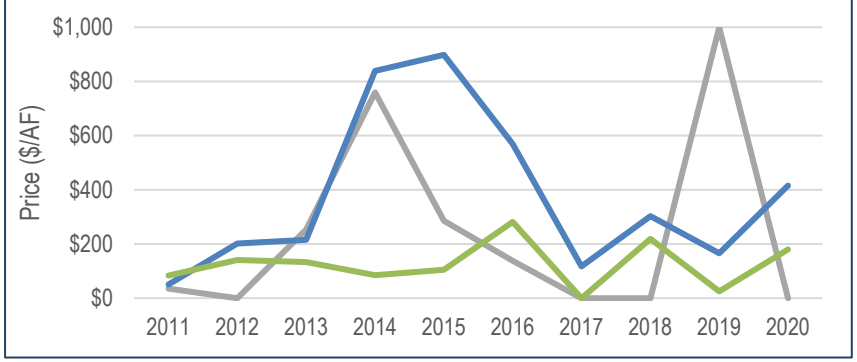
Prices and Activity

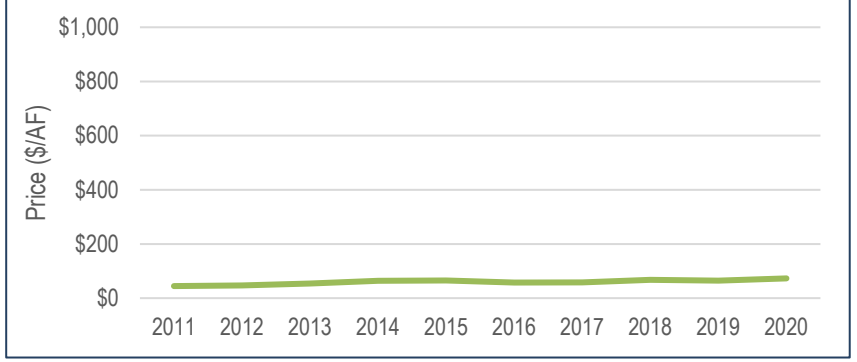
Market prices and activity vary based on supply, demand, and composition of local participants.

Key — Agriculture | Environment | Municipal

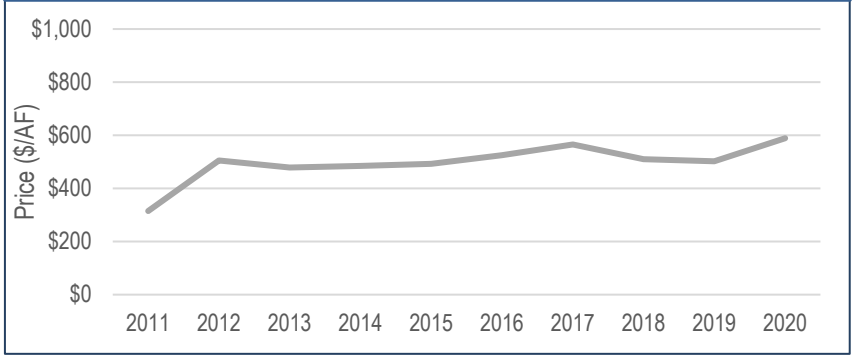
San Joaquin Valley (2011 – 2020)[1]



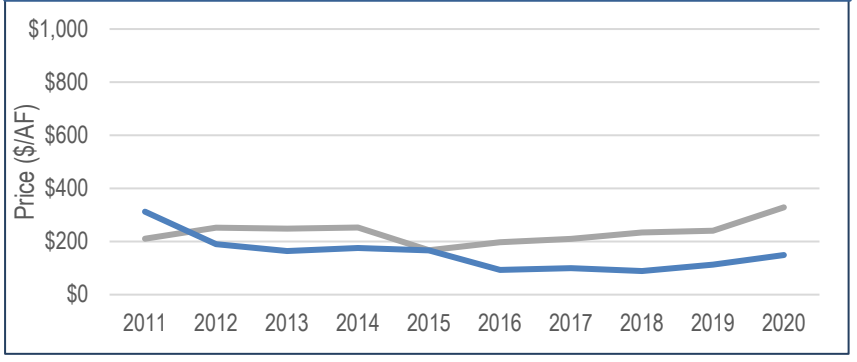
North Coast (2011 – 2020)[1]



Southern California (2011 – 2020)[1]



South Lahontan (2011 – 2020)[1]



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[1] Note: Data for spot-market transactions only in selected market regions.

Total Transfers

Markets vary in size, with total volumes transferred influenced by local transaction costs, available entitlement types, supply, and demand.

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[1] Note: Data for spot-market transactions only for period 2011 - 2020 in selected market regions.

Commonly Traded Assets

Asset	Surface Water Rights	Project Water	Groundwater	Stored Water	Water Storage Capacity
Description	A right to divert a specific quantity of water, at a specific location, for a specific purpose(s). • Pre-1914 • Post-1914	A contractual entitlement to a portion of a major project's annual water supply allocation. • State Water Project • Central Valley Project	Right to withdraw groundwater from a specific location under quantified and un-quantified rights. • Adjudicated Basin • Non-Adjudicated Basin • SGMA Basin (some)	A right to recover a specific quantity of water stored in a groundwater banking facility or in a reservoir.	A right to a specific volume of capacity (incl. storage, recharge, and recovery) in a groundwater banking facility.
Markets	**Primary Regions:** • Central Valley • North Coast • Central Coast	**Primary Regions:** • Central Valley • South Lahontan • Southern California	**Primary Regions:** • South Lahontan • Southern California • Central Valley (emerging)	**Primary Regions:** • Central Valley • South Lahontan • Southern California	**Primary Regions:** • Central Valley • South Lahontan • Southern California

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Acquiring Water for the Environment

Water is commonly acquired for short-term and long-term environmental purposes using a range of transaction methods and programs.

IMPORTANT

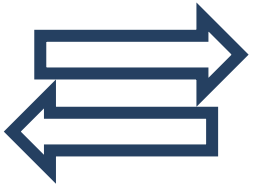
Environmental buyers often have the advantage of being able to enter into more **flexible** and **creative** transaction structures, often because of *non-consumptive end uses*.

Common Methods of Acquiring/Developing Environmental Water

Forbearance & Option Programs

Efficiency Improvements

Rotational Fallowing



Outright Supply Acquisition

Multi-Benefit Irrigation

Outright Land Acquisition

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Multi-Benefit Example: OID/SSJID

Background: USBR is responsible for ESA compliance and, under SWRCB Decision 1641, meeting April – May flow objectives to benefit migratory fish. These flows are monitored at Vernalis downstream of the San Joaquin River's confluence with the Stanislaus River.

Sellers: Oakdale ID and South San Joaquin ID, which divert water from the Stanislaus River by way of historic water rights and storage/delivery contracts with USBR.

Buyers: DWR and SLDMWA (on behalf of their members), in collaboration with USBR

Prices (2016 – 2021): Between $200 - $313 per AF released paid by DWR/SLDMWA

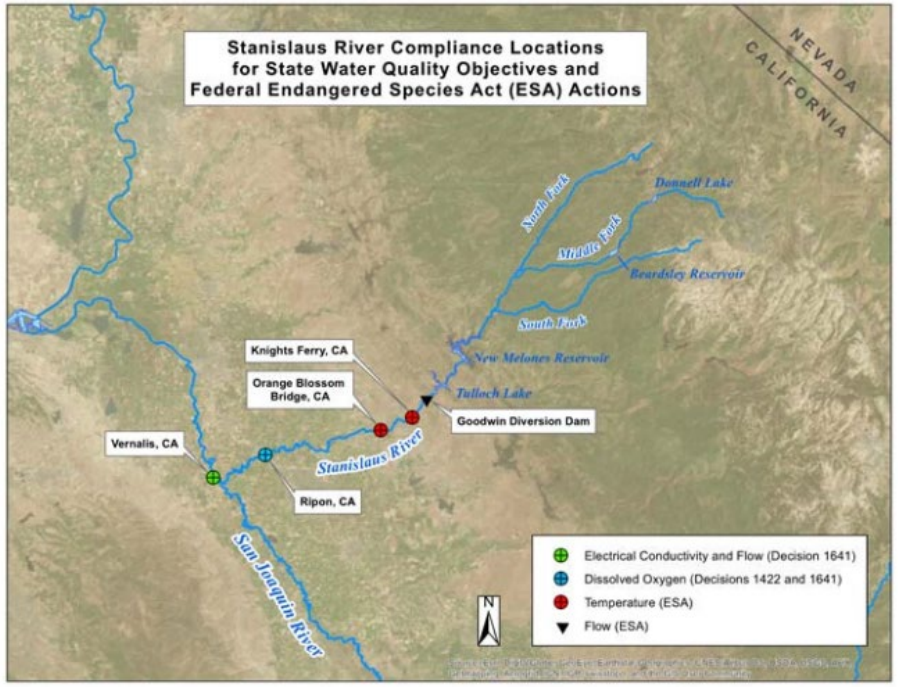

Image Source: Womble (2017)

Multi-Benefit: Pulse flows down the San Joaquin River benefit migratory fish. Upon entering the Delta, the water has achieved its environmental objective and can be diverted by DWR and SLDMWA for delivery to southern contractors.

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Multi-Benefit Habitat Example: Bird Returns

Background: Sacramento Valley rice fields provide important habitat for migratory birds and waterfowl associated with the Pacific Flyway.

Objective: Develop temporary bird habitat and groundwater recharge.

Approach: Acquire grower commitments to irrigate and maintain shallow water during water scarce periods (late summer/early fall).

Sellers: Individual farmers

Buyers: TNC and Colusa Groundwater Authority (in partnership)

Source: TNC

Achievements:

- 58,000 acres of short-term habitat generated
- Participation by over 100 farming entities

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Program Example: Shasta River Valley

Overview

- **Fish Flows**: As critical salmon and steelhead spawning habitat, environmental NGOs have focused on acquiring water to support these threatened species in the Shasta River Valley.
- **Forbearance for Seasonal Flows**: Environmental buyers typically enter into seasonal forbearance agreements where agricultural water right holders forgo use of their water so it can be left instream to support fish during critical periods.
- **Section 1707**: Although less common, buyers are also working to complete water right dedications via Water Code Section 1707 to enhance wildlife ecosystems through acquisitions and conservation projects enabling permanent transfers.

Assets Traded

- **Pre-1914 Water Rights** (annual and permanent rights)
- **Post-1914 Water Rights** (annual and permanent rights)
- **Riparian Rights** (right to divert to adjacent property)

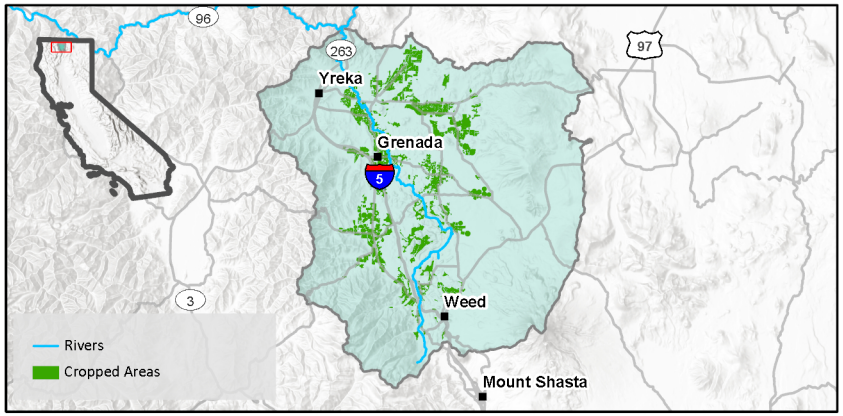
Market Participants

- **Buyers:** Environmental NGOs
- **Sellers:** Ranchers, farmers, local districts

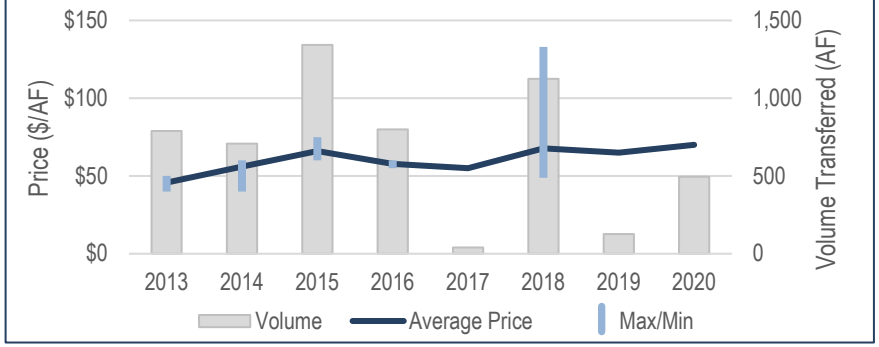
Market Drivers

- **Conservation Activity** (demand for instream flows)
- **Drought** (decreasing supply during critical fish periods)

Shasta River Valley Market Area



Shasta River Market Activity, Temporary Transfers (2013-2020)[1]



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Valuing Water for Environmental Transactions

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Water Valuation – What is Valued?

- Focused on estimating the value of a water right or entitlement as a property right
  - The benefits that exercise and ownership of the right provides the owner or an alternative use
- Does not consider the overall economic benefits or social value of instream flow
  - E.g. the monetary value of endangered species protection
- Valuation is an estimate of fair market value
  - Negotiated value between a reasonably informed buyer and seller

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Water Valuation – Some Key Considerations

- Where can the water be administratively and physically moved?
- Is there unallocated water available in the region?
- Does the water right provide a reliable supply?
- Is there demonstrated demand within the transferable region?
- How does the demand compare with the size and character of the water right?
- What are the terms of the proposed or most likely transaction?

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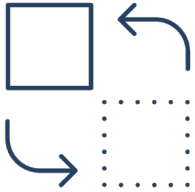
Water Valuation Approaches

Approach	Description	Best Practice Enablers & Assumptions
Sales Comparison	Comparison of subject water resource to similar supplies that have been sold in the past	• Active market for water resources separate from land • Prior transactions of similar (fungible) water resources
Income Capitalization	Water's contribution to net revenue, as an input to current operations	• Intended transaction structure is a lease rather than sale • Water rights are associated with agricultural production
 **Cost Replacement**	Least-cost alternative to develop new water supplies to replace those being acquired	• Generally feasible alternative for water resource replacement • Replacement provides substantially similar benefit to ongoing operations
Land Price Differential	Net value contributed to a property as a result of access to associated water resources	• Active market for both irrigated and non-irrigated land

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Water Valuation – Approaches

- **Multiple valuation approaches are often required in locations where there is a limited history of water right only transactions.**

	Comparable Sales	Income	Land Price Differential	Cost
Annual Lease	x	x		
Partial Season Lease	x	x		
Purchase	x		x	
Infrastructure Improvements	x			x

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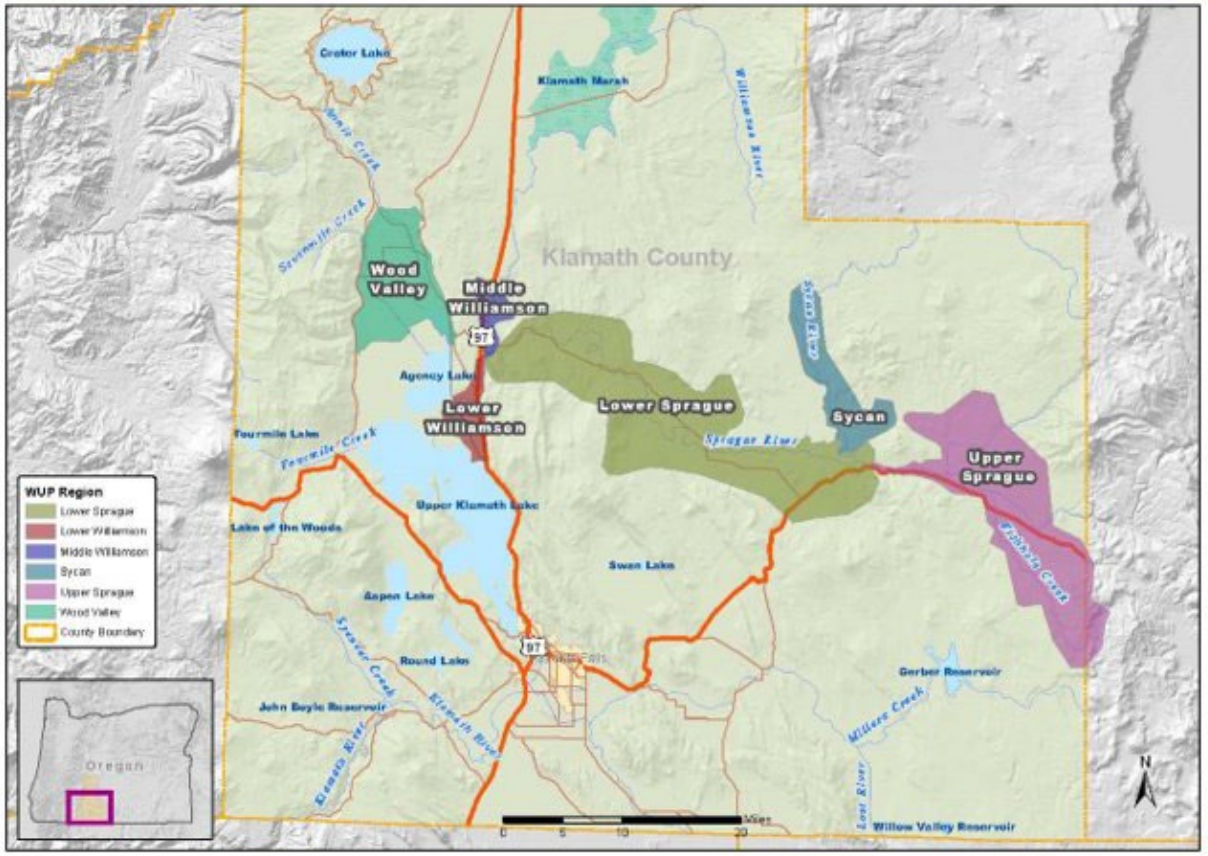
Valuation Challenges – Limited Markets

Case Study: Upper Klamath Basin

- Limited history of permanent water right transactions.
- No urban demand and no transactions for agricultural purposes.
- Multiple valuation approaches
  - Comparable sales
  - Land Sales



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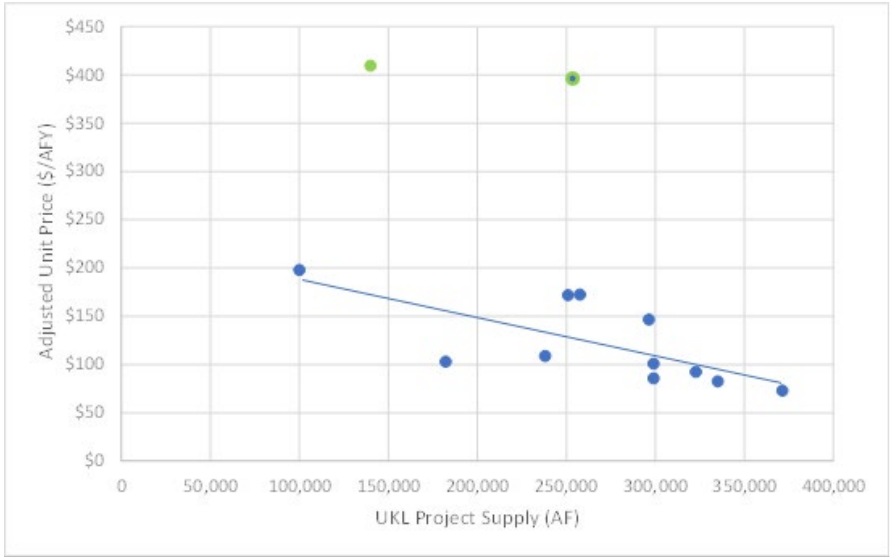
Valuation Challenges – Limited Markets

Case Study: Upper Klamath Basin

- Comparable Sales
  - Few sales across extended time period involving water rights of varying reliability
  - Diverse pricing in Klamath Project leasing

Year	Term	Basin	Total Price ($)	Adjusted Unit Price ($/Acre)	Estimated Volume (AF/Acre)	Adjusted Unit Price ($/AF)	Adjusted Unit Price ($/AFY)
2010	Permanent	Upper Klamath	$2,800,000	$3,485	2.82	$1,236	$124
2011	30 Yr	Upper Klamath	$59,839	$937	2.82	$468	$47
2013	Permanent	Sprague	$162,690	$1,881	2.46	$941	$95
2013	Permanent	Sprague	$1,080,080	$2,239	2.46	$1,119	$113
2016	Permanent	Sprague	$499,734	$2,138	2.46	$1,069	$108
2020 Pending	Permanent	Upper Klamath	$1,000,000	$2,372	2.82	$879	$89



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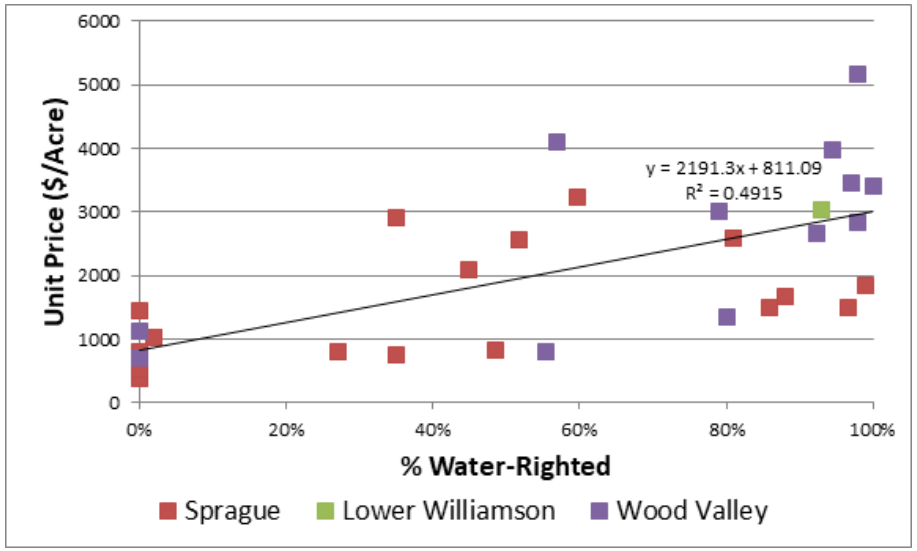
Valuation Challenges – Limited Markets

Case Study: Upper Klamath Basin

- Land Sales Analysis
  - Used to supplement comparable sales
  - Two approaches applied



Variables	Coefficient Estimate	Standard Errors	T-Statistic
Proportion of Sale Acres Water-Righted	16.109	4.879	3.30
Klamath Lake (Priority A)	632.678	339.094	1.87
Klamath Lake (Priority B & C)	-789.714	304.943	-2.59
Elevation	-17.067	5.370	-3.18
Improvements Per Acre	1.0588	0.0738	14.34
_cons	23359.05	7075.096	3.30
Observations: 88			
R^2: 0.78758			

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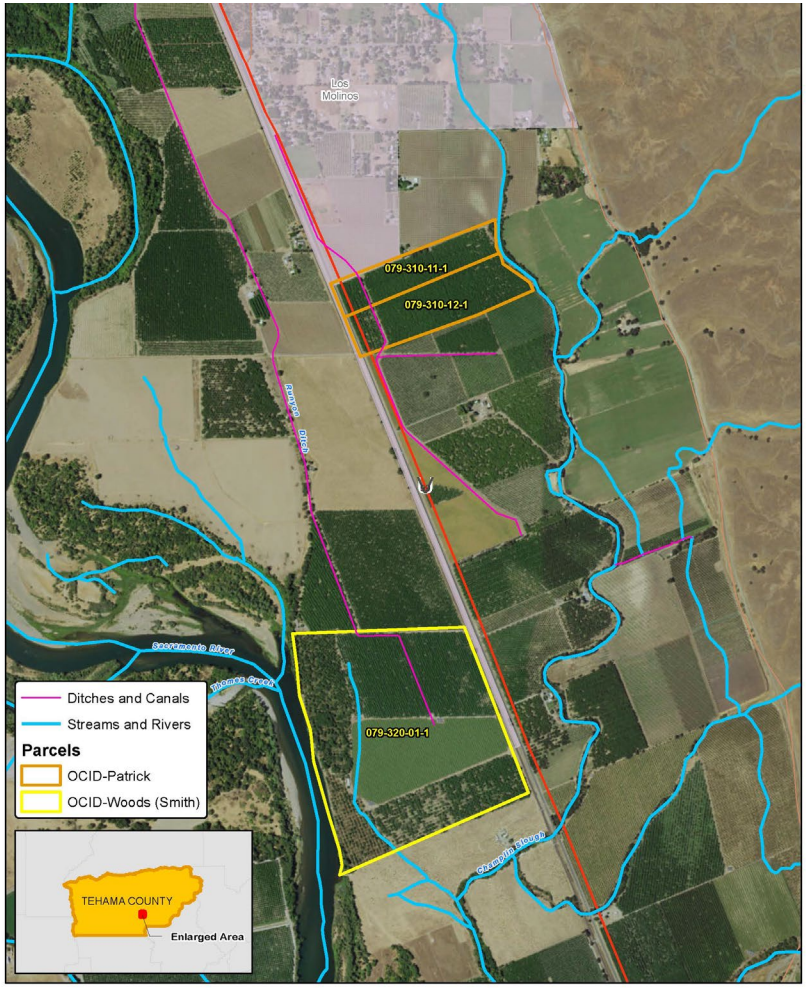
Valuation Challenges – Market Region

Case Study: Mill Creek

- Few permanent water right transactions in the Sacramento Valley
- Limited lease market in the Sacramento Valley
- Active market in the San Joaquin Valley and Bay Area.
- Large potential value differential depending upon the relevant market region



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Valuation Challenges – Market Region

Case Study: Mill Creek

- Ongoing litigation at the time over the transferability of the water rights outside of Mill Creek Basin associated with a proposed transaction
- There had never been a completed permanent transfer of a pre-1914 water right through the Delta
- Delta conveyance window limits opportunity for through-Delta transfers of water rights that lack storage
- Conclusion: Market limited to in-basin use or potential lease/sale in Sacramento Valley

Valuation Approach	Transferable Volume (AF)	Unit Price ($/AF)		Total Value ($millions)	
		Within Mill Creek	Outside Mill Creek	Within Mill Creek	Outside Mill Creek
Leases	775-1,034	N/A	$4,547	N/A	$3.5 - $4.7
Sales	775-1,034	$900 - $1,200	$4,000 - $4,500	$0.8 - $1.2	$3.1 - $4.7

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Valuation Challenges – Quantification

Case Study: Battle Creek

- Pre-1914 water right for 50 cfs
- Water right did not specify a season of use or annual volume limit
- Owner was marketing the water right based upon the historic diversion volume through an unmanaged ditch system that returned unused supply to the creek
- Quantification process is often not well understood by parties to a potential transaction

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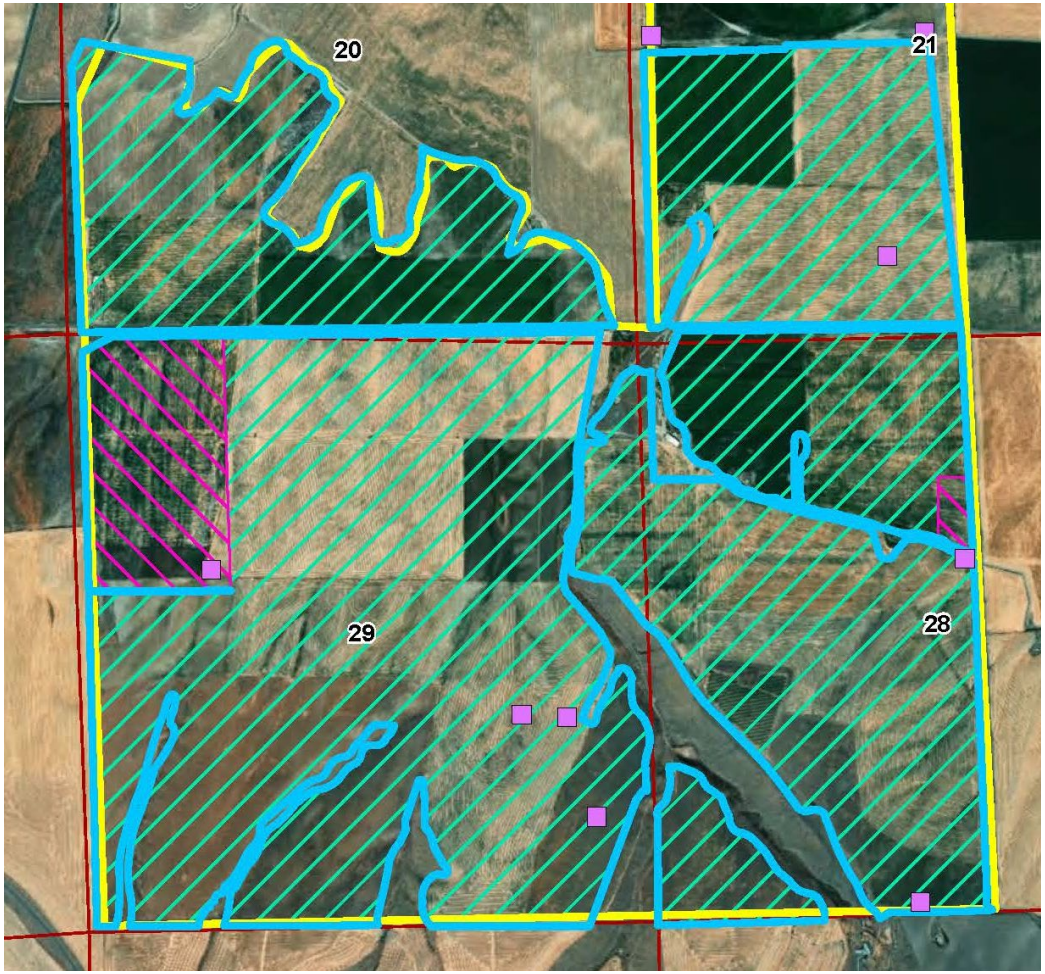
Valuation Challenges – Quantification

Case Study: Battle Creek

- "No injury rule" applies to pre-1914 water rights
- Marketable volume is often limited to historic consumptive use (groundwater substitution and stored water transfers are exceptions)
- Depends upon irrigated area, location, and crops grown
- Subirrigation is a challenge in some areas
- Nonuse and crop fallowing may need to be accounted for



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Discussion & Questions

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