

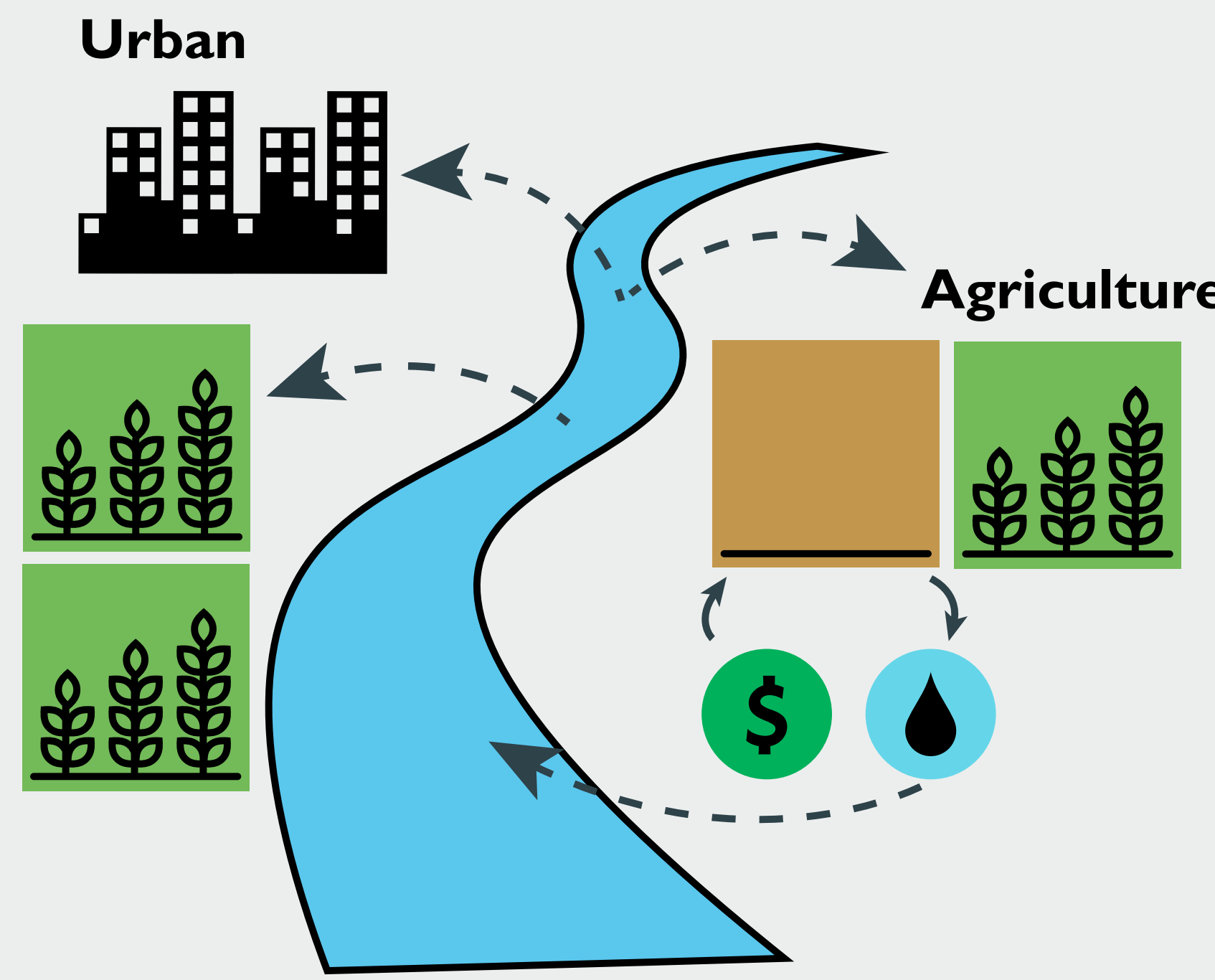
Alex Bennett, Lillian Burns, Adriel Leon, Martin Merz, Patricia Song  
Faculty Advisor: Gary Libecap

## What factors help water markets return water to dewatered streams?

### Introduction

Growing water demand in the western United States has led to the reduction and even loss of stream flows that provide ecological benefits for fish and other wildlife. Environmental water markets provide a means to redistribute water from existing uses, such as agriculture, back into dewatered streams and rivers.

Many obstacles have prevented environmental water markets from expanding to the scale necessary to address the widespread need for streamflow to maintain ecological health.



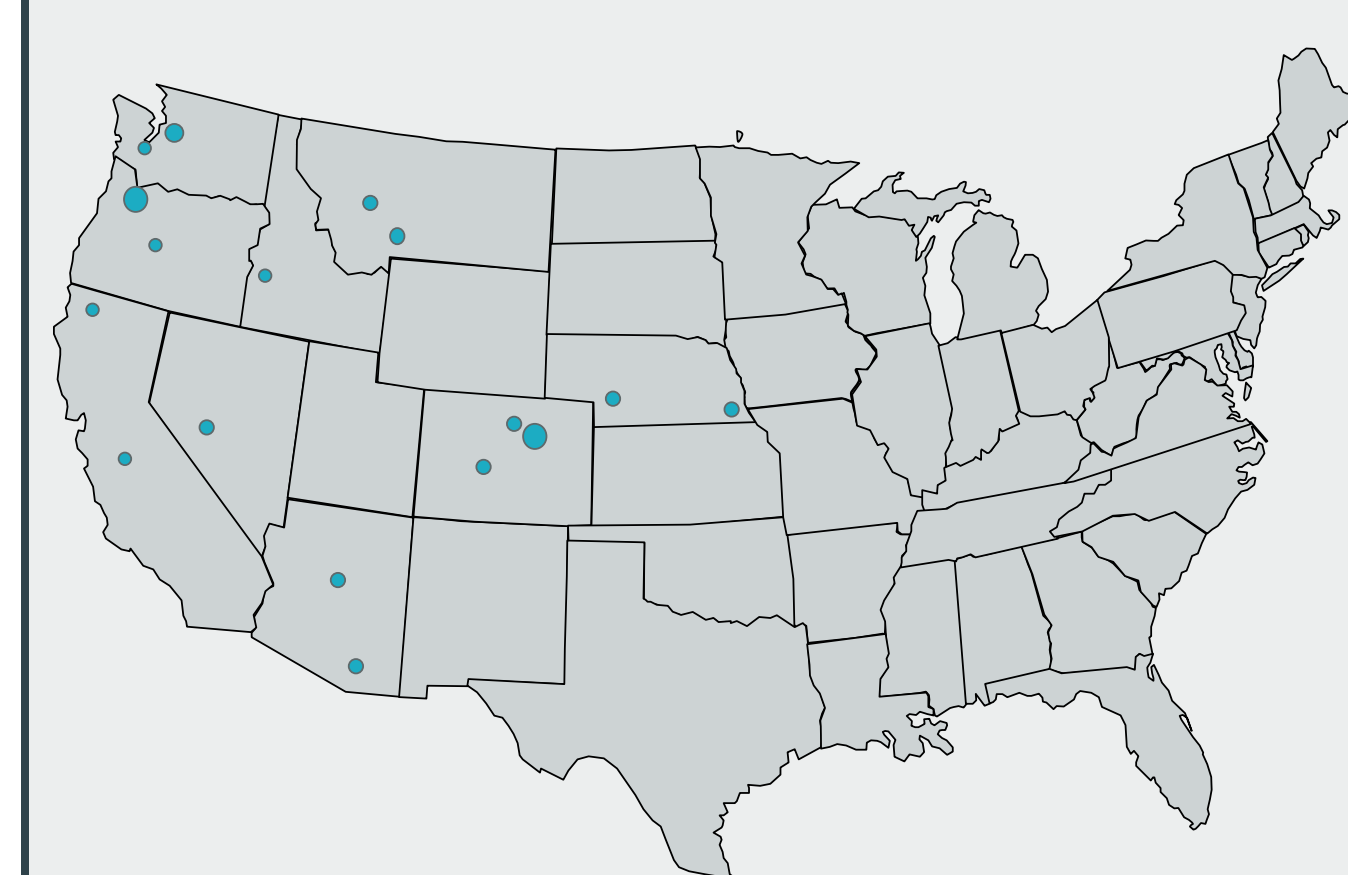
### Questions

- 1 What conditions enable current environmental water markets?
- 2 What strategies allow environmental water buyers to expand environmental water markets?

### Approach

- 1 Build a structure for analyzing conditions that enable environmental water markets.
- 2 Compile and analyze information regarding program operations and environmental water market outcomes.
- 3 Analyze interview findings to identify the key obstacles to expanding environmental water markets, and highlight strategies for overcoming them.

### Interviews with Practitioners



In order to better understand conditions influencing current environmental water markets, and to identify strategies for expanding these markets, our group interviewed 51 individuals involved in environmental water transactions in 9 western states. These interviews gave us an understanding of environmental water markets in the western United States in a way that a literature review alone could not. Below are some questions we included in our interviews.

#### Environmental Water Buyers:

- What are the barriers to be successful in water right transactions?

#### Government Officials:

- Does your agency have a mission to restore stream flow?

#### Water Right Holders:

- What barrier would have to be overcome for you to be willing to participate in water right transactions?

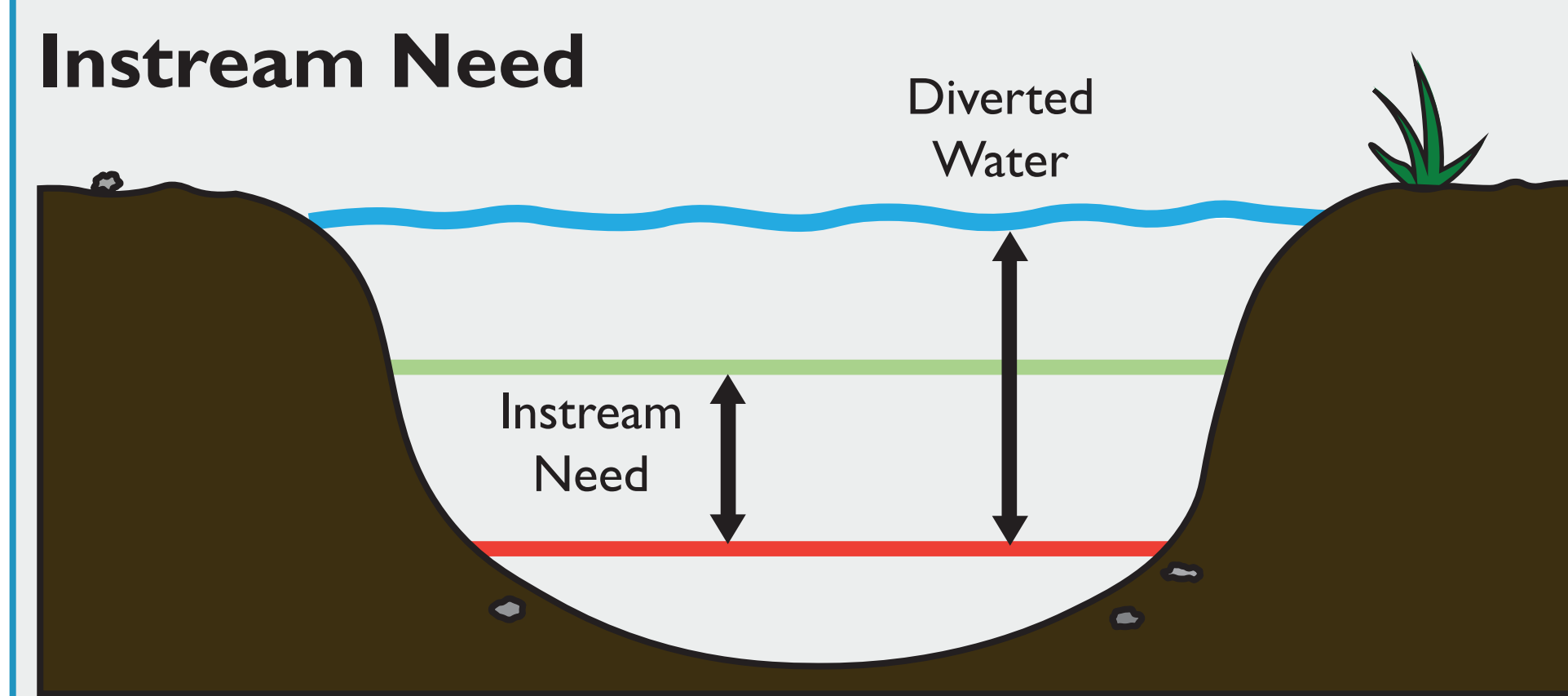


### Acknowledgements

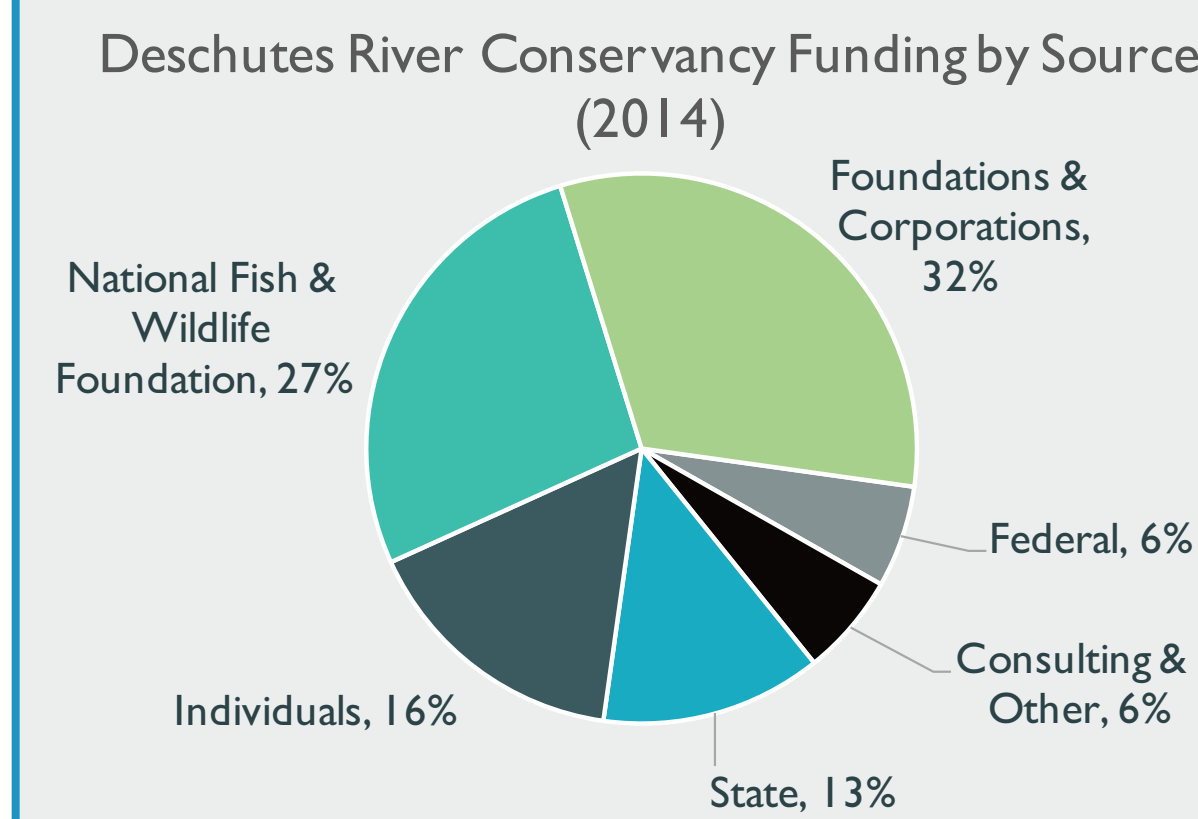
We would like to thank our advisor Gary Libecap; clients Nicholas Brozović and Richael Young; and our external advisor Michael Jolliffe. We would also like to thank Amanda Cronin and all the individuals who took the time to speak with us.

## Conditions Shaping Environmental Water Markets

### Environmental Water Demand



### Funding Sources



Funds available for flow restoration are based on regulatory drivers and philanthropic donations.

### Environmental Water Supply

#### Crop Characteristics

The type, value, and seasonality of crops can affect the participation of water right holders in a market.



#### Availability of Water from Existing Users

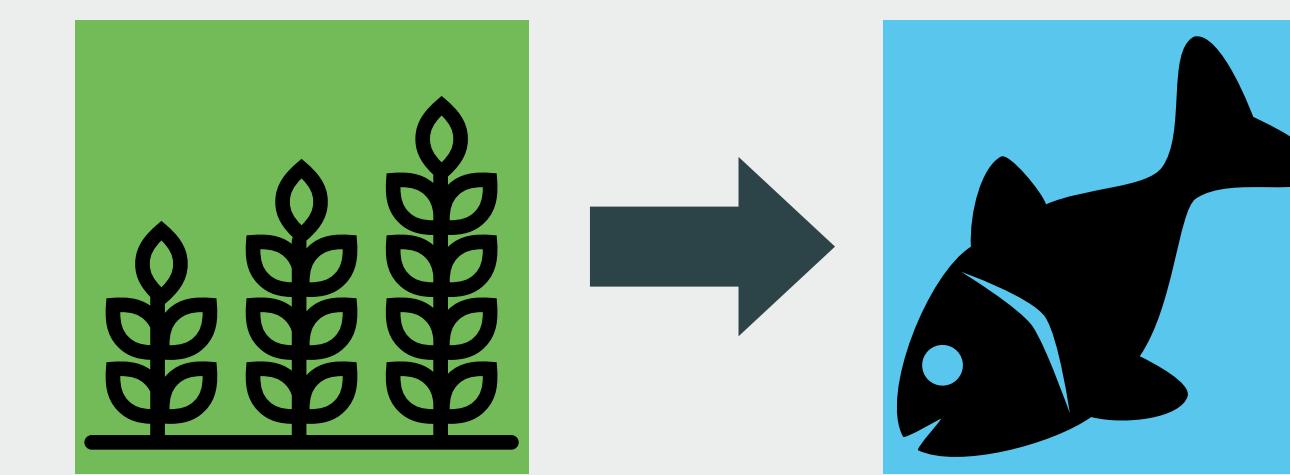
The location of a water right, presence of irrigation organizations and irrigation infrastructure must be considered.



### Legal Component

#### Transferability of Water Right

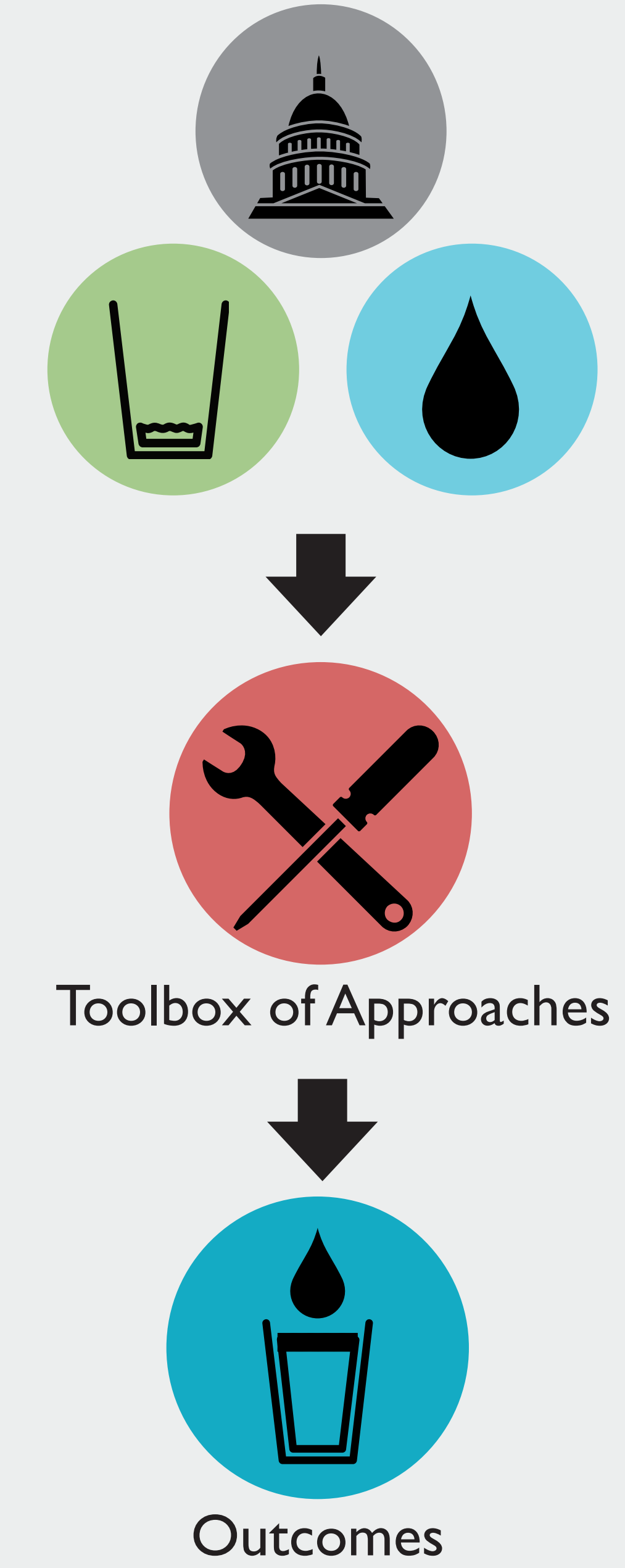
The legal transfer of water from an existing use to instream use is a crucial condition enabling environmental water markets.



#### Transaction Review Time

| State      | Average Review Time                   |
|------------|---------------------------------------|
| California | 1.3 years; 4 months (short term)      |
| Colorado   | 6.5 years                             |
| Idaho      | 3.8 months                            |
| Montana    | 1.5 - 2 years                         |
| Oregon     | 2.8 years ; 30 - 40 days (short term) |
| Texas      | 1 year                                |
| Utah       | 1 - 2 years                           |
| Washington | 0.5 - 6 years                         |
| Wyoming    | 1 year                                |

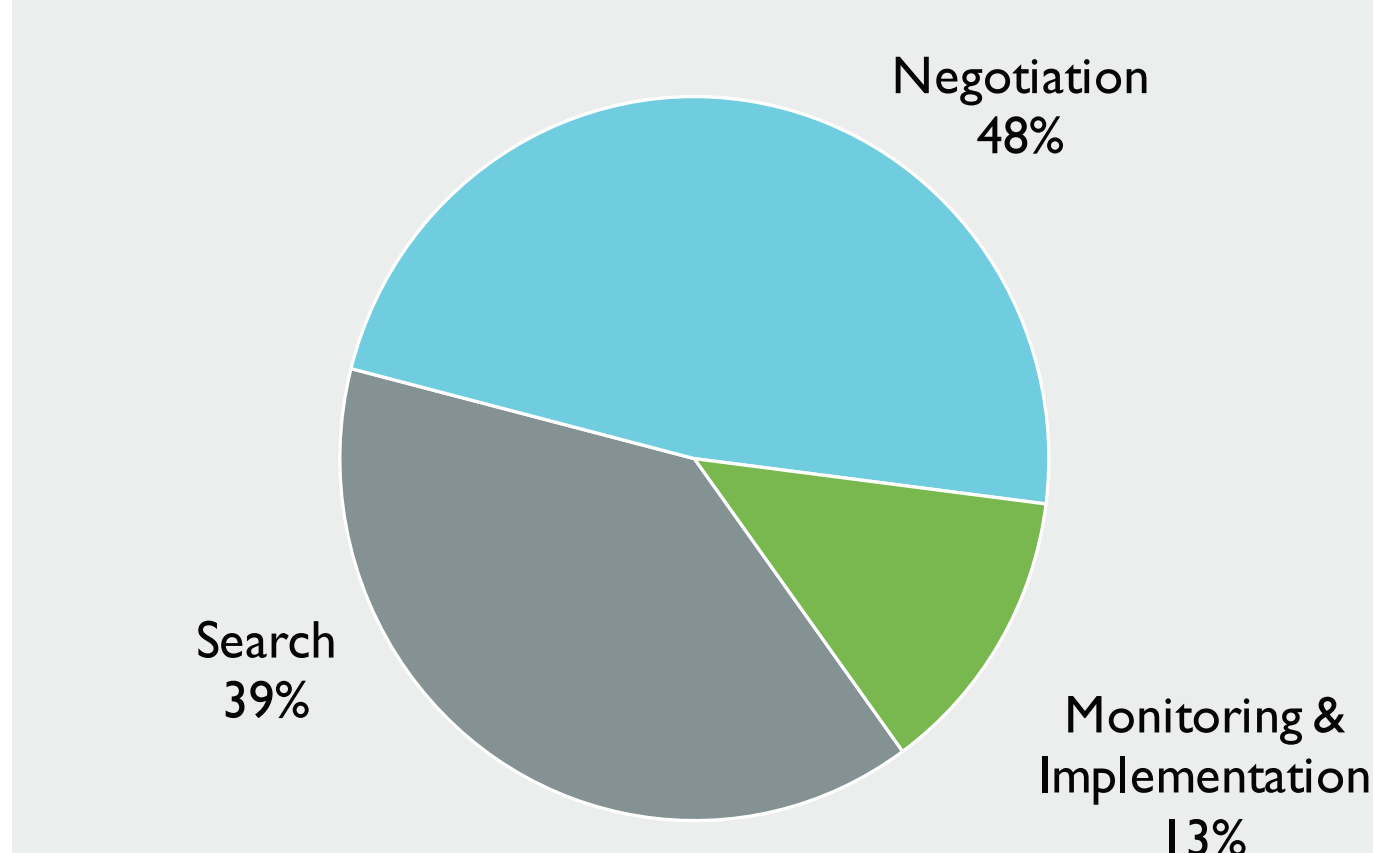
### What Does this Mean?



### Program Operation & Outcomes

#### Transaction Costs

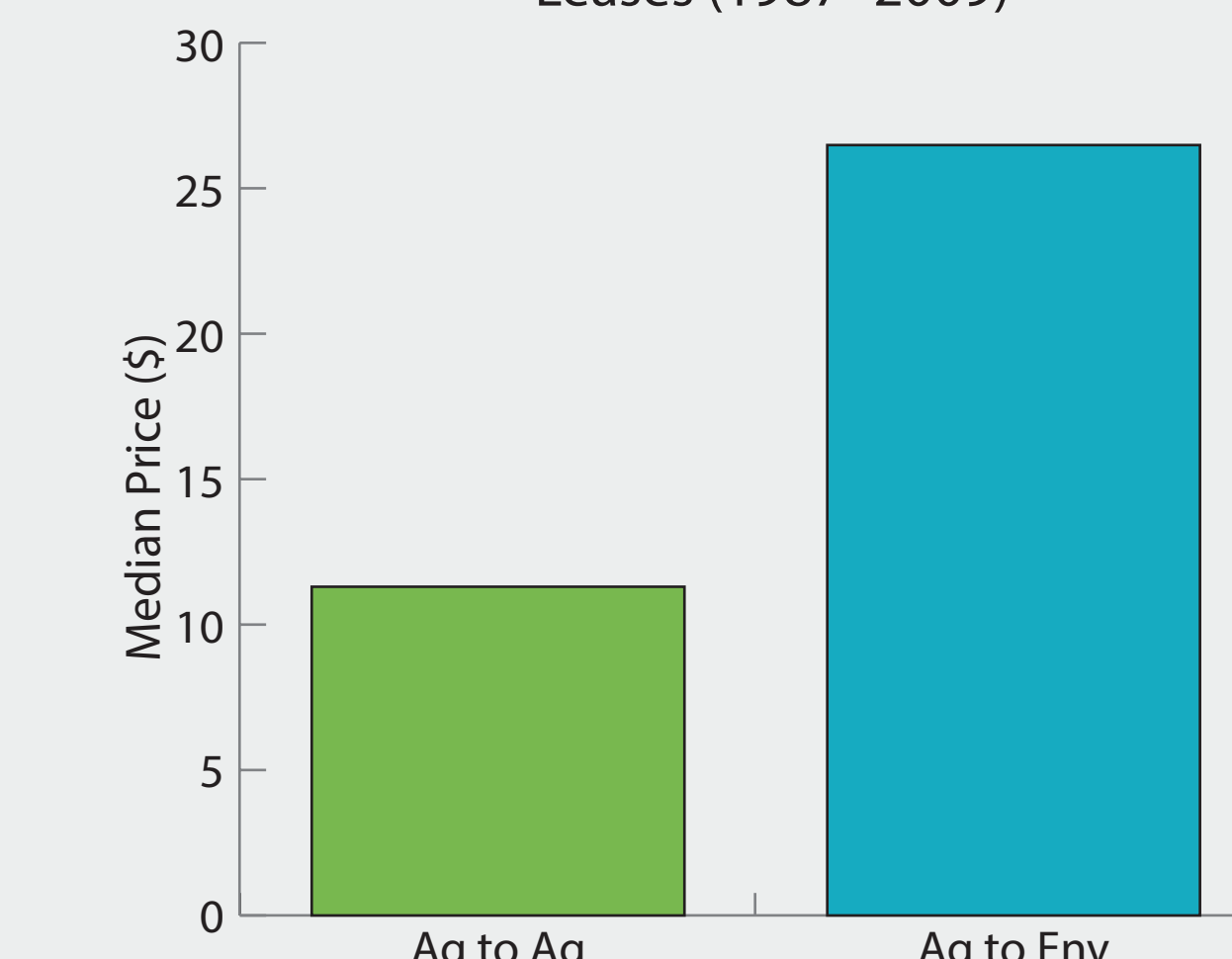
Washington Water Trust Transaction Costs for 2015 Reverse Auction in Dungeness River Basin



The high costs associated with searching for, negotiating, implementing and monitoring environmental water transactions are a barrier to completing more transactions.

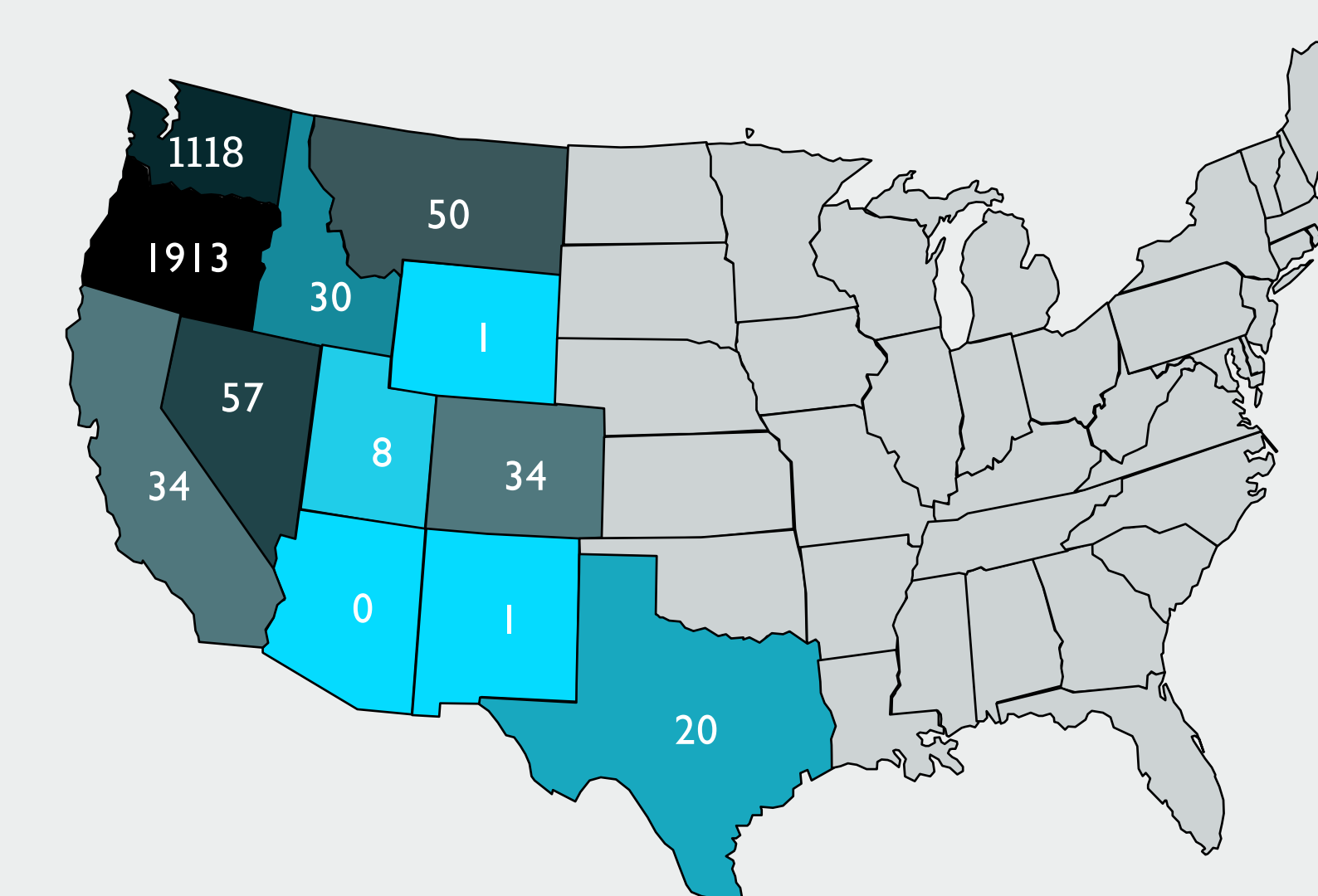
#### Water Valuation

Price per Committed Acre-Foot for Leases (1987-2009)



There is currently no clear financial value of environmental water which can cause tension during price negotiations. Water valuation needs to be transparent in order to build buyer-seller trust.

#### Transaction Results



The number of environmental water transactions processed through the legal system varies widely across the western United States for a number of reasons. Successfully completed transactions are important to future transactions and policy.

### Recommendations & Strategies

- Buyers must have a clear understanding of seller needs and operations to identify mutually beneficial transactions.
- Water valuation should be based on the ecological impact the additional water has on stream flow.
- Diverse funding sources allow for flexibility in identifying mutually beneficial approaches.
- Focused development and effective pilot projects can influence policies and regulations related to environmental water transactions.
- The identity of the market organizer as a nonprofit, government agency, or private business will impact market engagement.
- Develop replicable steps to obtaining water using available tools.