

Water Trading: The Western US Experience

Canadian Water Resources
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Presentation Outline

1. Overview of US Water Trading

- Arizona, California, Colorado, Idaho, Montana, Nevada, Oregon, Utah, Washington, Wyoming
- Trends in Water Trading
- Legislative Basis for Trading
- Goods and Bads
- Transfer Processes

2. What Makes the US Markets Work?

3. How Does This Compare to Alberta?

4. Opportunities for Alberta

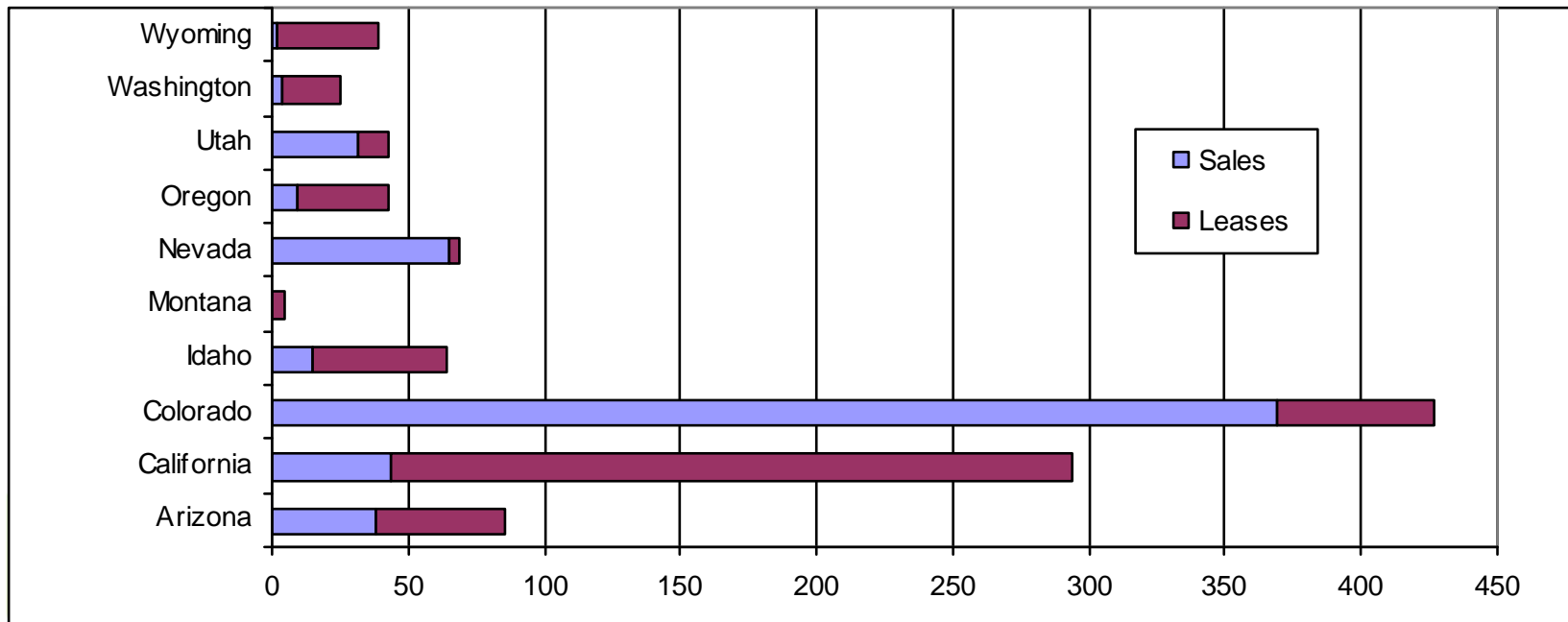
1. Overview of US Water Trading

Western US states have very active water markets

- 1,095 transfers between 1990 and 2003
- Transfers of 26,809 ML (dam³)

Two types of markets

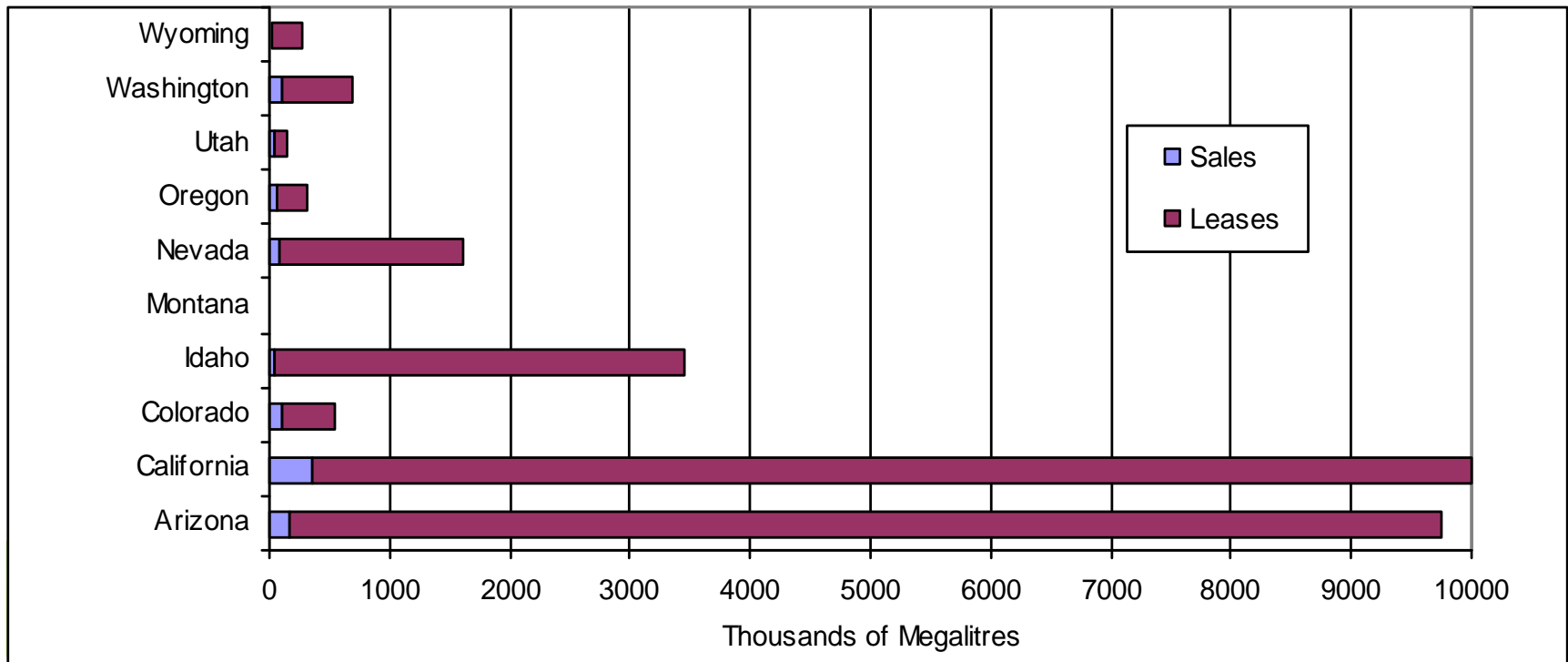
- Leases (fixed term; reversible)
- Sales (permanent)



1. Overview of US Water Trading

Leases account for majority of water market activity in the western US

- 47% of actual transactions
- 96% of volumes being traded



1. Overview of US Water Trading

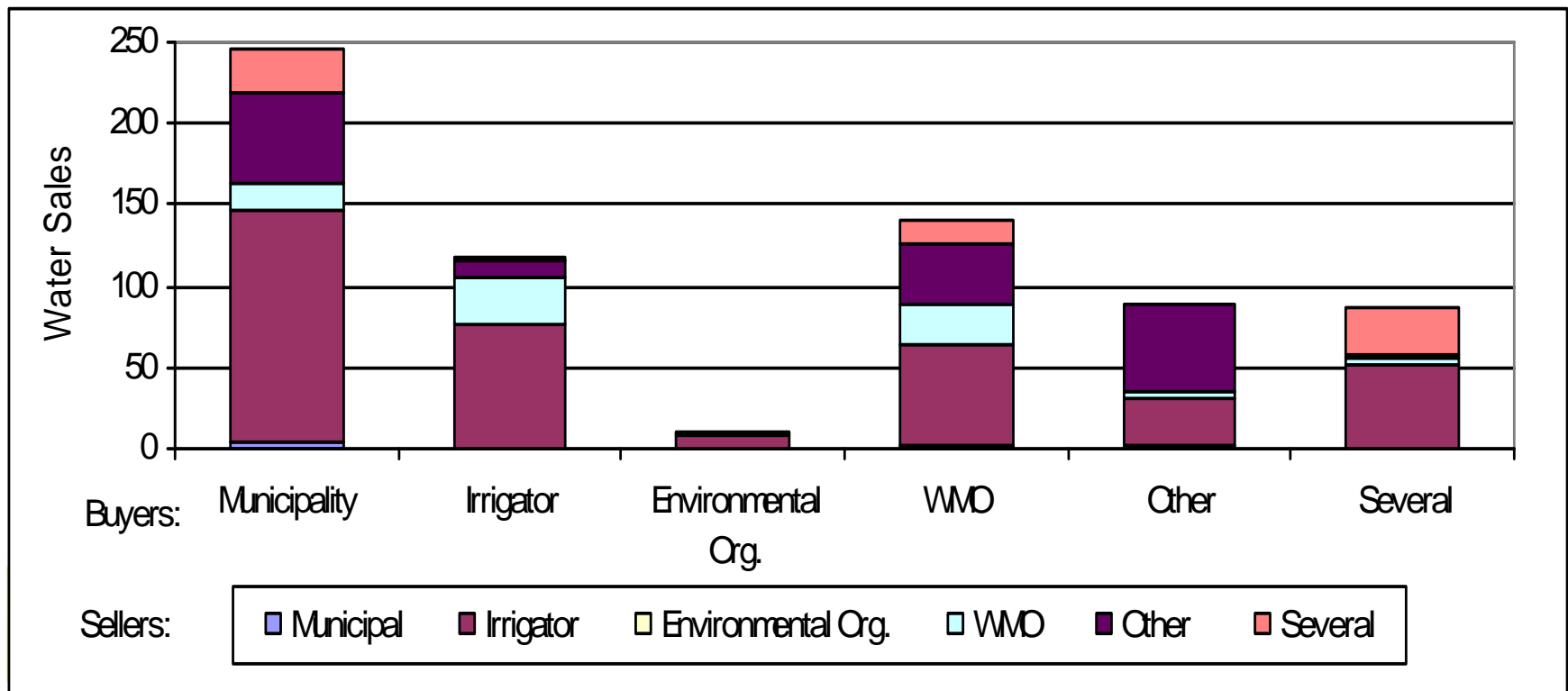
Observations

- Colorado has most active market for water sales, but low volumes
- California has most active market, based on volume, and almost entirely leases.
- Arizona has extensive lease market
- Limited trades in other states; no real shortages yet

1. Overview of US Water Trading

Trends in permanent transfers (sales) 1990-2003

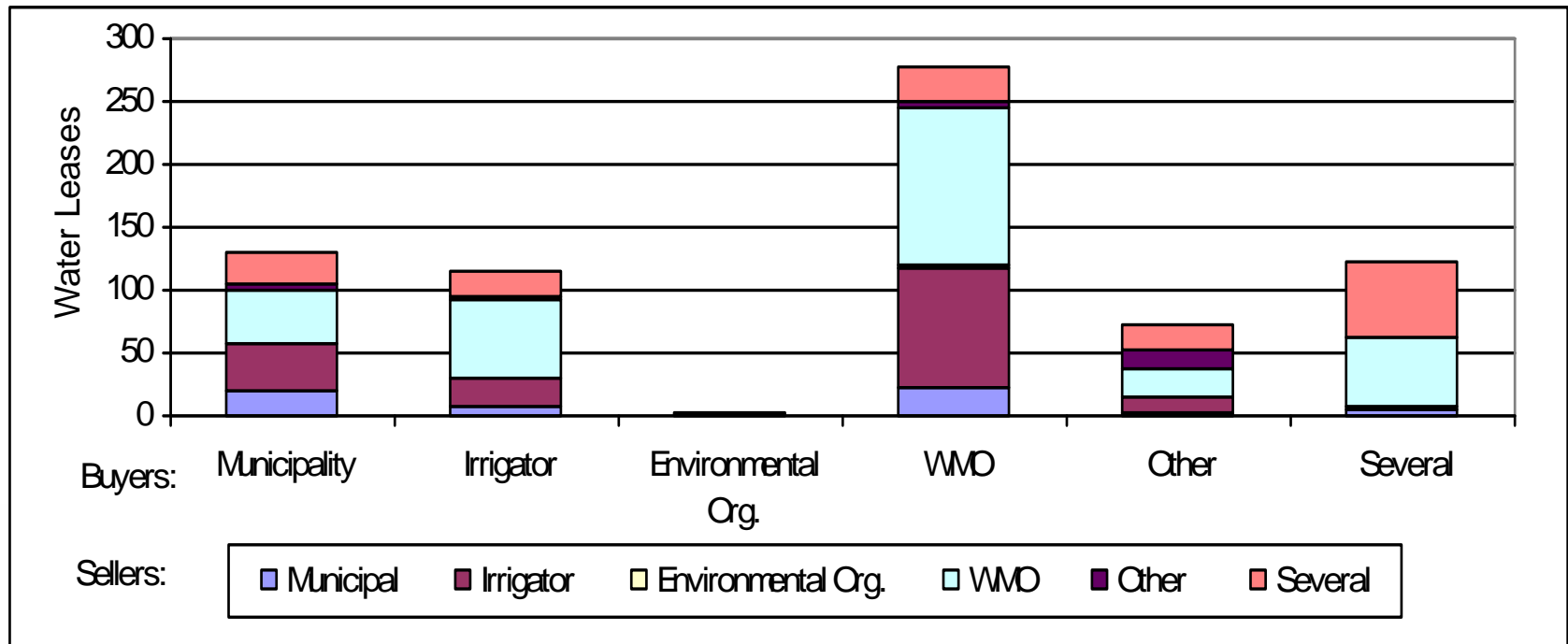
- Municipalities are major buyers
- Irrigators are major sellers
- WMOs are active purchasers of water



1. Overview of US Water Trading

Trends in temporary transfers (leases) 1990-2003

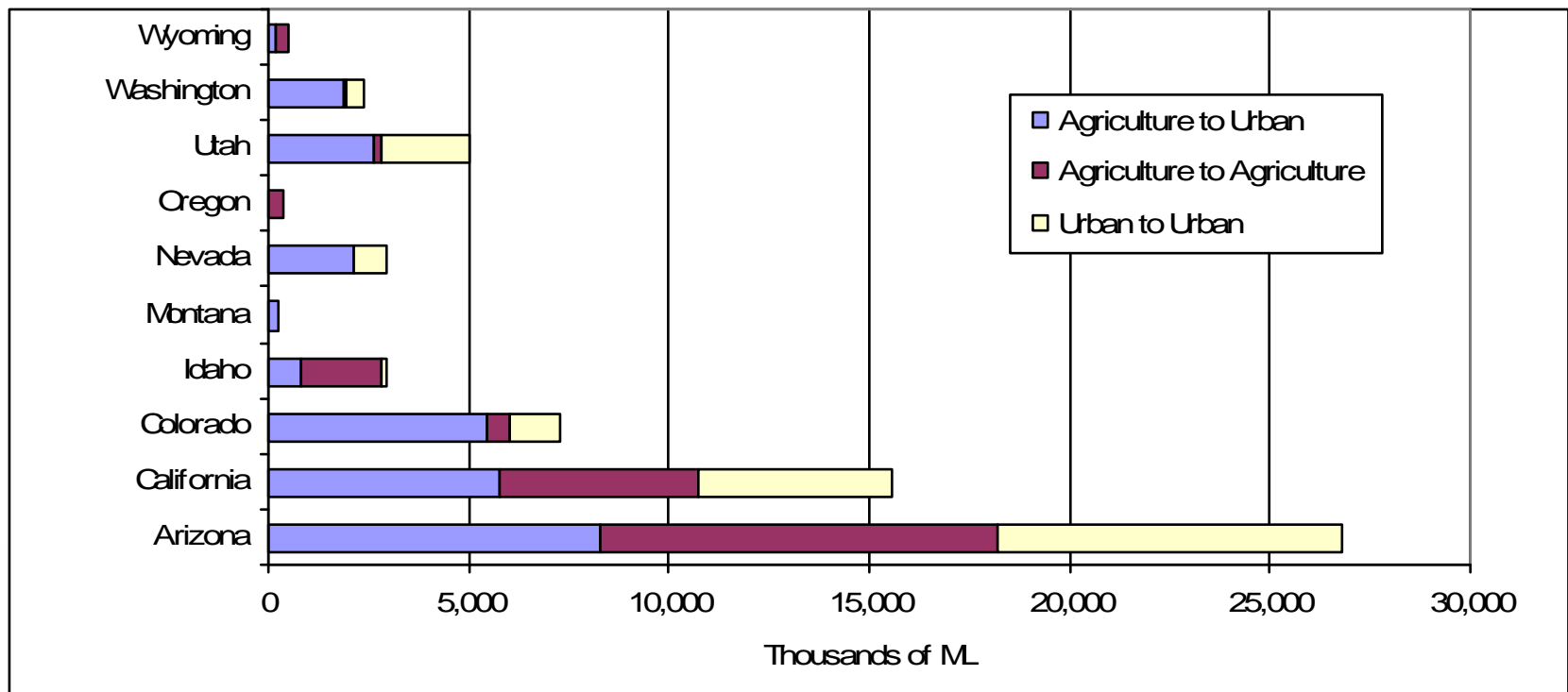
- WMOs are major buyers and sellers
- Municipalities and irrigators also active buyers



1. Overview of US Water Trading

Overall Movement of Water

- Permanent sales from irrigators to municipalities
- Leases from irrigators to irrigators



1. Overview of US Water Trading

Observations

- Most permanent transfers involve municipalities purchasing water from irrigators
- Farmers address seasonal demands through one-year leases from other agricultural.
- WMOs play a major role in the lease market, both as buyer and seller
- Water for environmental purposes is small but growing in importance.

1. Legislative Basis for Trading

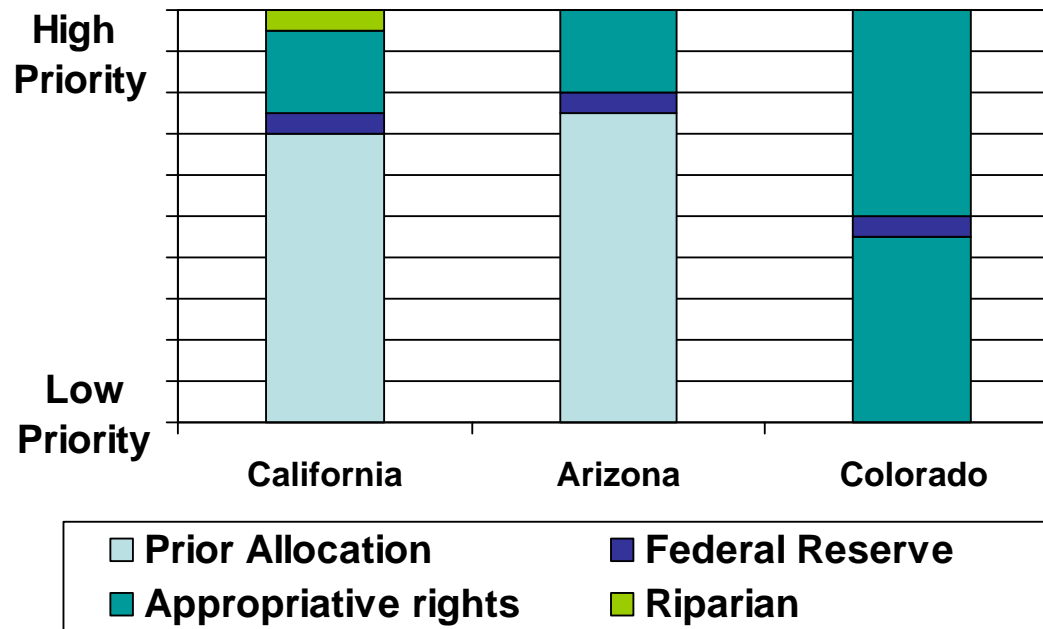
Water Rights in the Western US

- All states initially adopted system based on prior appropriation
- Priority based on First in Time; First in Right (FITFIR)
- Viewed as a property right
- Some states retained some aspects of riparian rights
- Most states shifted to prior allocation (appropriation with prior approval)
- Federal reserve rights (Indian bands, federal lands)

1. Goods and Bads

Problems with the US System

1. Certainty in legal entitlements requires adjudication (Colorado water courts)



Exact entitlement of water for appropriative rights and federal reserve rights is unknown in many basins

1. Goods and Bads

Problems with the US System

2. Appropriations are for flows, not volumes
3. Use it or lose it and beneficial use provisions
 - Who has rights to saved water?
 - Water banks to protect appropriations
4. No appropriation of water for the environment (until recent court decisions)

Lack of clear specification of water rights in the western US represents a significant barrier to trading of appropriative water rights.

1. Goods and Bads

5. Water rights transfer processes are complicated
 - Need clear definition of right being transferred (adjudication)
 - Process involves submitting an application, technical review, providing notice, considering objections
 - Requires consideration of impacts on environment
 - Requires consideration of impacts on other users (no harm principle)
 - May require consideration of social and economic effects
 - Transfer limited to water being consumed
6. High transaction costs, especially in areas where water rights less defined (Colorado)
 - Significant administrative barriers to transfers

So why if water rights in the western US are so poorly defined and there are significant administrative barriers, why is there such an active water market in many western states?

2. What Makes US Water Markets Work?

Federal Government: US Bureau of Reclamation

- 355 storage reservoirs
- 254 diversion dams
- 58 hydro plants
- 60 Billion kWhr
- Deliver 30 million ac-ft
- Direct irrigation of 10 million acres
- Water for 31 million people



2. What Makes US Water Markets Work?

Bureau builds project (appropriative right) and creates reclamation districts

- Districts issues contract rights to other users
- Other users can supply water to third parties
- Users pay district costs (theoretically)
- Many transfers within districts
 - Contract users have equal priority
 - Little consideration of third party interests (operational issues)
 - Minimal transaction costs

Bureau develops operational plans to address environmental and consumptive uses

2. What Makes US Water Markets Work?

State Government Projects

- Some state governments have also developed massive water projects
 - Central Valley Project in California has 20 dams and reservoirs and can store 7 million ac.-ft.
 - Users have equal contract rights
- State develops operating plans for facilities
 - Makes provisions for environmental flows

2. What Makes US Water Markets Work?

Conclusions:

Majority of transfers in western US involve water (contract rights) not appropriative water rights

Assessment of FITFIR implications not required

Minimal requirements to assess third party effects

Low transaction costs

3. How Does This Relate to Alberta?

Similar Legislation

- Alberta has retained some riparian rights
- All other uses must have a licence
- Licence priorities based on FITFIR
- Licences can be transferred

However:

- Alberta has retained higher instream flows (Apportionment Agreement)
- Licences specify rates and maximum volumes

Conclusion

- Alberta's water rights system more clearly defines water entitlement for users

3. How Does This Relate to Alberta?

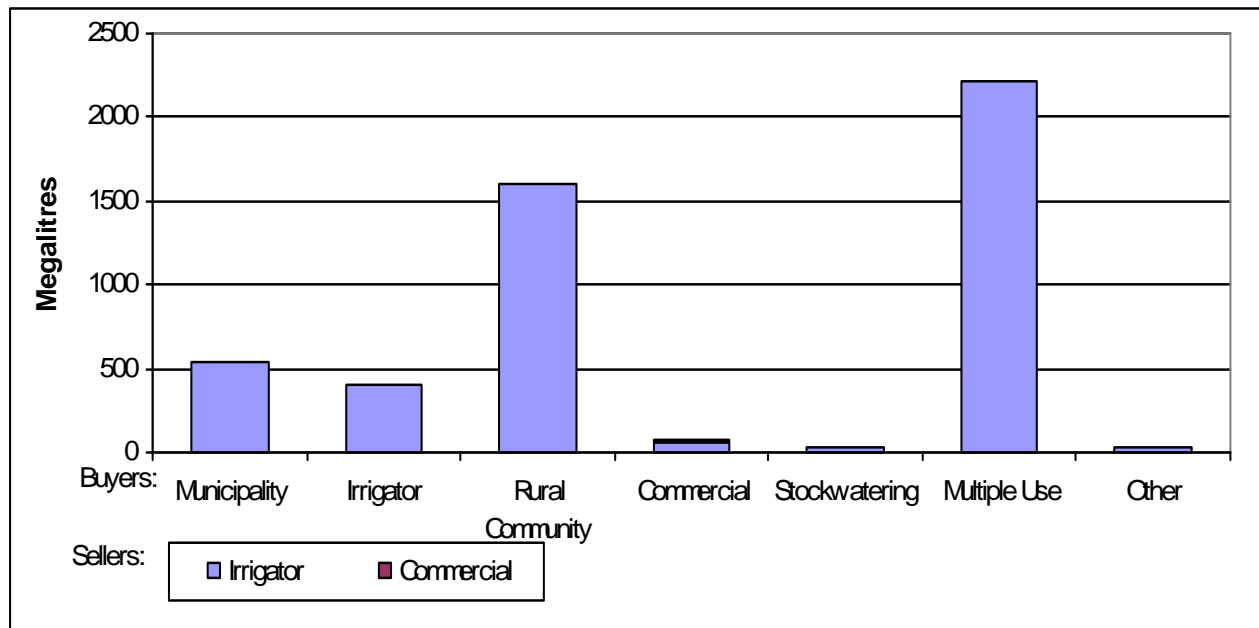
Similar Water Use Profiles

- State withdrawals match water use profile for the SSRB
- Irrigation is highest water use
 - 75% to 97% for agriculture
 - Western states use between 2.16 and 6.21 feet per acre (different crops, soils and growing season)
 - Alberta uses maximum of 1.9 feet per acre
- None of the states has industrial demands (oil and gas and other) that match Alberta's water use (in % terms)
- Alberta has relatively small water use
 - 10% of California or 24% of Colorado; same as Nevada

3. How Does This Relate to Alberta?

Similar Patterns of Transfers

- Alberta has only had 29 transfers of which 15 involved change in ownership or change in purpose
- 12 of 14 other were permanent transfers



- Water being permanently moved from irrigation to accommodate other uses
- However, very few leases (assignments) to date

3. How Does This Relate to Alberta?

Similar Water Rights Transfer Process

- Submit application, technical review, providing notice, considering objections
- Requires consideration of impacts on environment
- Requires consideration of impacts on other users (no harm principle)
- May be limited to water actually being consumed

3. How Does This Relate to Alberta?

Different Capacity to Store Water

- US states have extensive storage
 - Colorado system can store 4.5 years of inflow
 - Utah can store 2.6 years of snow pack
- US governments own most storage
 - Operating plans developed to address multiple uses
 - Implications for water markets
 - With better knowledge about adequacy of water supplies over entire growing period, farmers more likely to participate in trading early in season (before they plant)
- Alberta has little storage and much is privately owned
 - Alberta can store 35 of average flows on the Bow and 67% on the Oldman
 - Private operators own 48% of upstream storage on Bow River
 - Lack of storage may result in fewer short term trades (leases) than in US.

3. How Does This Relate to Alberta?

Similar Management Issues

- Water for the Environment
 - Government and NGOs in US purchasing permanent rights and leases for environmental purposes.
 - Alberta: holdbacks on licence transfers
- Possible development of drought management plans
 - A system to share water during critical droughts?
- US Water reform:
 - Water demands being included in local and regional growth strategies
 - More information for management
 - More federal infrastructure funding (new projects)
 - Developing strategies to address climate change
 - Better protection of aquatic species
- Issues in western US similar to those in Alberta
 - Water for Life addresses most issues
 - Key difference is demands for federal funding

3. How Does This Relate to Alberta?

Conclusions

- Water markets are key to reallocating water to meet changing demands in US and Alberta
 - Challenge is to find the right balance between allowing markets to function while protecting third party interests
- Permanent transfers used to accommodate new demands (municipal)
- Majority of water market activity in the western US is leases to manage short term-drought (irrigators and WMOs)
- Activity in Alberta water markets should be compared to permanent sales of water rights in US (relatively small market)
- Need to be monitoring lease market in Alberta (assignments)

4. Opportunities for Alberta

More Active Markets in US than Alberta

- US markets trade water, not water rights
- Water districts in US with shared rights makes trading easier
- Irrigators in US upstream from municipalities, so more trades
- More storage allows users to better anticipate seasonal droughts leading to more active leasing of water
- More infrastructure provides operational flexibility and allows broader geographical redistribution of water
- Governments in US control of infrastructure to meet multiple needs
- Alberta doesn't even report lease arrangements (assignments)

4. Opportunities for Alberta

Legislative Reform

- Clarify nature of water rights that can be traded (gross diversion or actual use; return flow)
- Improve administrative procedures for water licence transfers that continue to protect third party interests but do not interfere with trading
- Allow NGOs to secure and hold water for environmental purposes

4. Opportunities for Alberta

Water Management

- Establish WCOs for rivers and reaches that are not fully allocated
- Examine opportunities for coordinated management of public and private storage to meet needs
- Government could buy licences for environmental needs
- Monitor and report on water leasing activities