



NEW ZEALAND INSTITUTE FOR THE STUDY
OF COMPETITION AND REGULATION INC.

Allocating Water among Competing Uses: The Potential for Water Markets in New Zealand

Christopher Goemans

Assistant Professor, Colorado State University

CORPORATE MEMBERS

Contact Energy Ltd

Fonterra Co-operative
Dairy Group Limited

Meridian Energy

Powerco

Telecom Corporation
of New Zealand Ltd

Transpower New Zealand Ltd

Vector Ltd

Victoria University of Wellington

Westpac Institutional Bank

The income distribution which results from the market mechanism is in no sense an absolutely ideal distribution... The distribution which a country considers fair and equitable is a matter of judgment, which can only be made on a foundation of ethical values. The process by which differences about this conception of fairness are settled is a political one; the economist has no right to make this judgment for society. He has the duty, however, to make clear the economic implications of policies designed to determine or alter the income distribution..."

(Eckstein 1958)



Outline

- Objectives in Resource Allocation
- Water Markets: What are they and why do we want them?
- Defining Property Rights Over Water
- Water Rights and Markets for Water in New Zealand
- Example: Markets for water rights in Colorado
- Example: Water banks in Colorado and Idaho
- Concluding Thoughts and Areas of Future Research

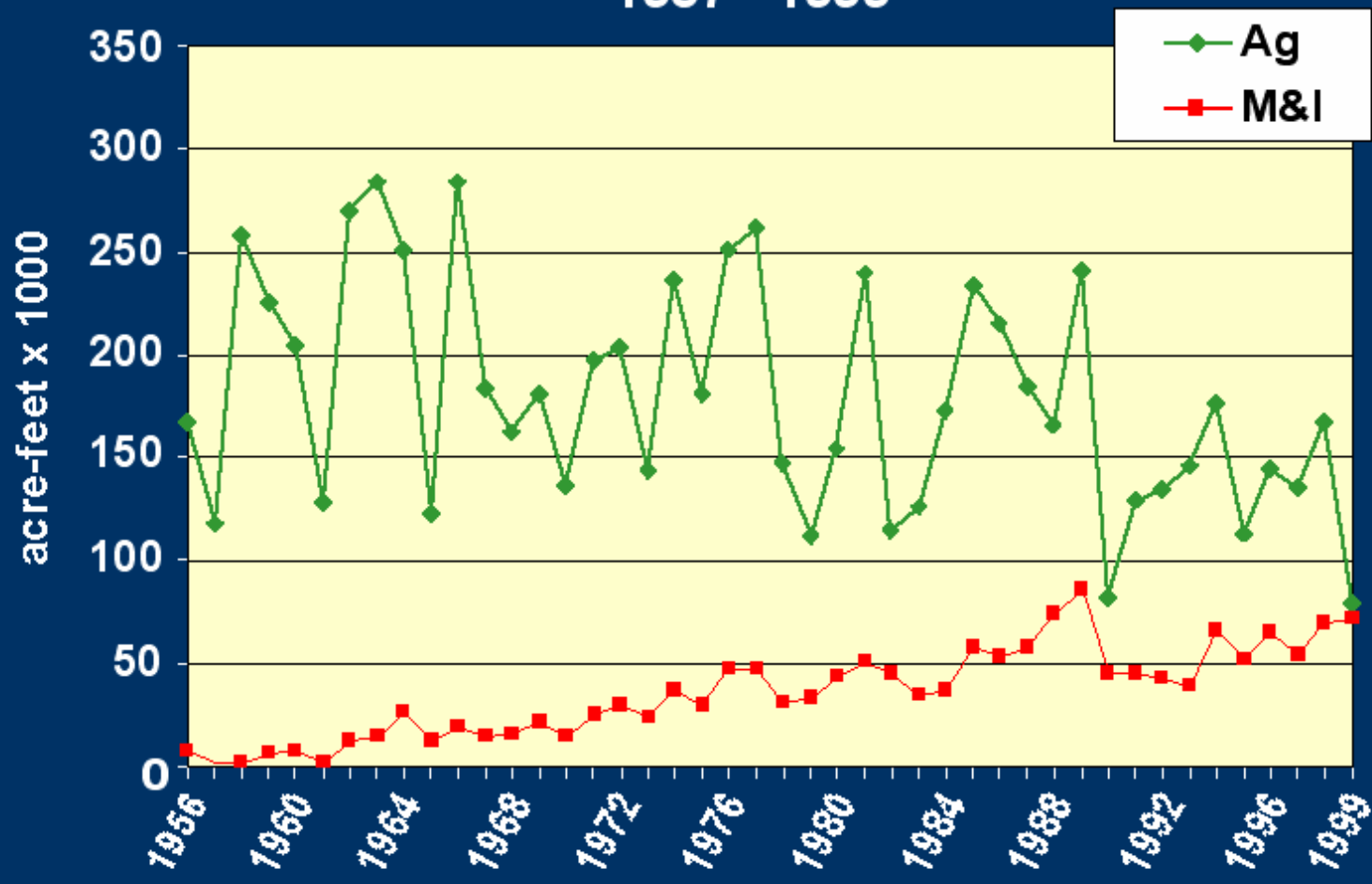


Objectives in Resource Allocation

- Maximize net social benefits from current and future allocations of water
 - Efficiency versus equity
 - Water (and the right to water) should move from low valued uses to high valued uses.



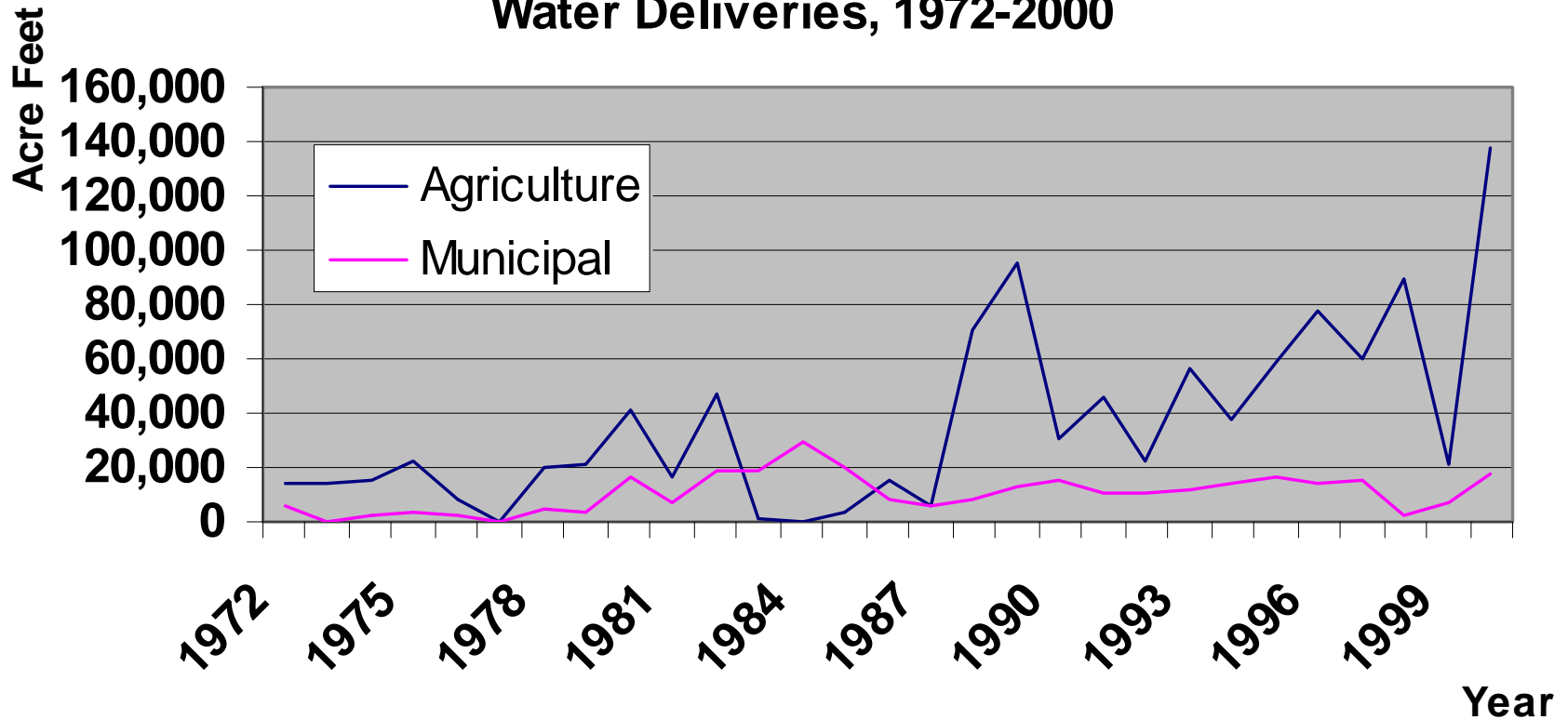
Colorado-Big Thompson (C-BT) Water Deliveries 1957 - 1999



Source: Northern Colorado Water Conservancy District



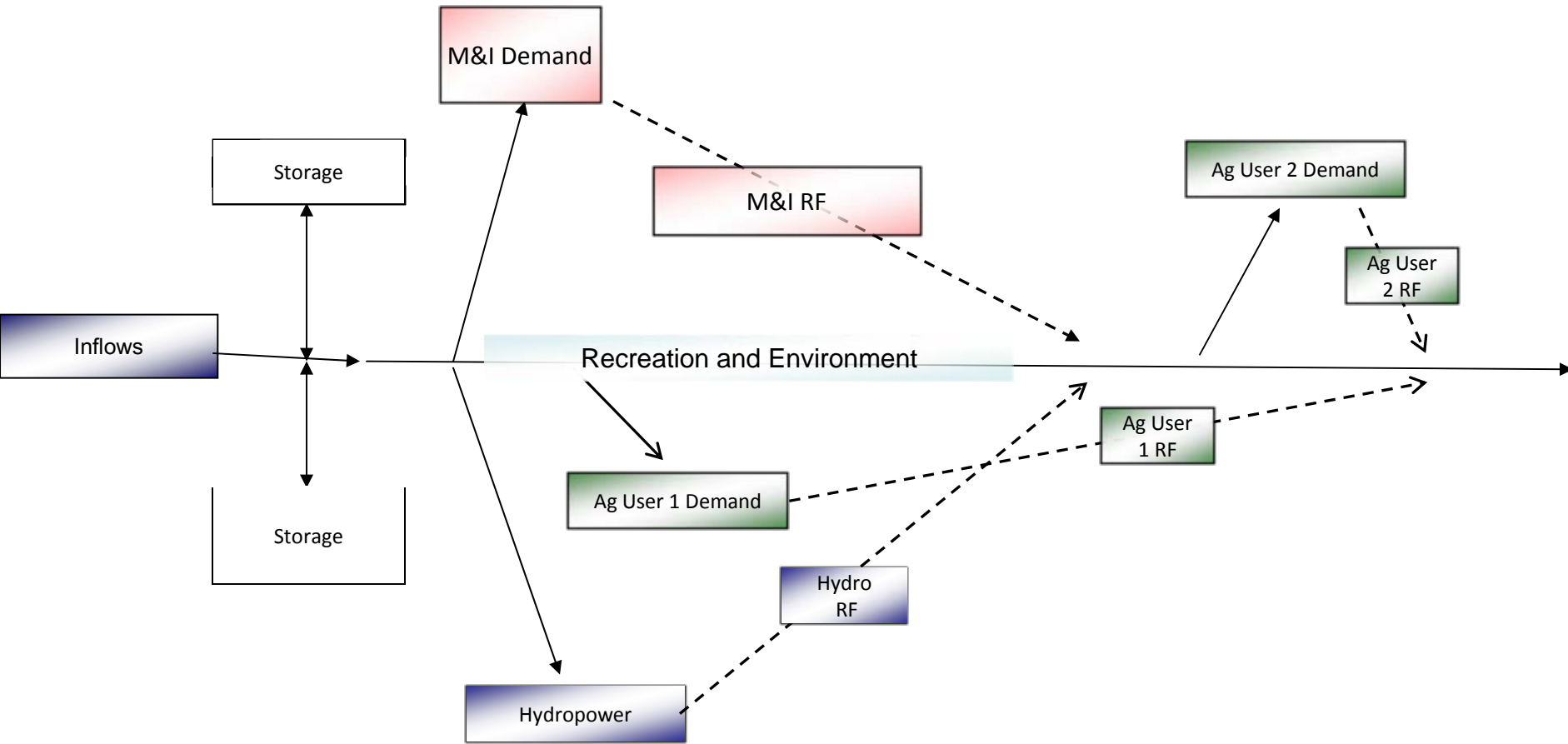
Southeastern Colorado Water Conservancy District Water Deliveries, 1972-2000



Observations

- Diversions versus consumptive use:
 - Opportunity costs could be associated with diversions for activities that don't consumptively use any water
 - Reducing the amount diverted doesn't necessarily increase net social benefits
- Location and amount of return flows matter
 - Water should not necessarily be diverted to the activity with the highest value use





What are Water Markets?

- The phrase “water markets” is widely applied to describe a variety of settings which involve the buying and selling of water or the right to divert/consume water. Examples include:
 - “Water banks”
 - Markets for permanent shares
 - Markets for ditch company shares
- Water markets define the conditions under which buyers and sellers can exchange water related property
- A particular market can be characterized by answers to the following:
 - What is being bought/sold?
 - How are prices determined?
 - Who are the buyers and sellers? What rights do they have?



Why Water Markets?

- Provide incentives that can lead to the efficient re-allocation of water
 - *“It is commonly argued that reallocating just 10 percent of agricultural water to municipal uses could boost municipal supplies by 50 percent West-wide.”* Nichols et al. (2001)
- Provide “flexibility” in the ownership of water rights
- Provide alternative source of supply for users with increasing demands
- Incentives related to the opportunity cost of water will impact:
 - Investment in production and consumption technologies
 - Types of activities/industries that develop
 - Patterns of growth
- Water Rights owners benefit



Defining Property Rights for Water

- Water rights typically specify: the owners right to divert/consume a particular quantity of water
- Details often include:
 - Location of use
 - Type of Use
 - Time of Use
- Specifying the right to transfer
- Additional Issues
 - Priority versus Proportional
 - Right to divert versus right to consume



When will Exchanges Occur?

- Buyers will purchase when the value of the resource received exceeds or is equal to the *total* cost of the good
- Sellers will sell when the value they receive is greater than or equal to the benefits they would have received from the resource if they did not sell
- Exchanges are most likely to occur across uses and regions (when allowed)
- A lack of transactions, by itself, does not necessarily imply that markets are not functioning properly





Water Markets and Rights in New Zealand

- Two levels of governance: RMA and Regional Councils
- The RMA
 - Typically reported that RMA allows transfers conditional on regional approval of transfer

RMA- Section 136

(1) A holder of a water permit granted for damming or diverting water may transfer the whole of the holder's interest in the permit to any owner or occupier of the site in respect of which the permit is granted, but may not transfer the permit to any other person or from site to site.

(2) A holder of a water permit granted other than for damming or diverting water may transfer the whole or any part of the holder's interest in the permit—

(a) To any owner or occupier of the site in respect of which the permit is granted; or

(b) To another person on another site, or to another site, if both sites are in the same catchment (either upstream or downstream), aquifer, or geothermal field, and the transfer—

(i) Is expressly allowed by a regional plan; or

(ii) Has been approved by the consent authority that granted the permit on an application under subsection (4)



Water Markets and Rights in New Zealand

- Regional plans characterized by
 - Uncertainty in what the objective is
 - Variability in how property rights are defined
 - Different “types” of rights. Example:
 - Specification of Type “A” and Type “B” water rights
 - Specification of explicit seasonal limitations
 - Tremendous Variability in the extent to which markets for water are covered, ranging from no mention to:
 - Regional plans that specifically outline the conditions of the water market
 - Place restrictions within the consent
 - Example of differences in markets across regions
 - Restricted to irrigators only during periods of low flow

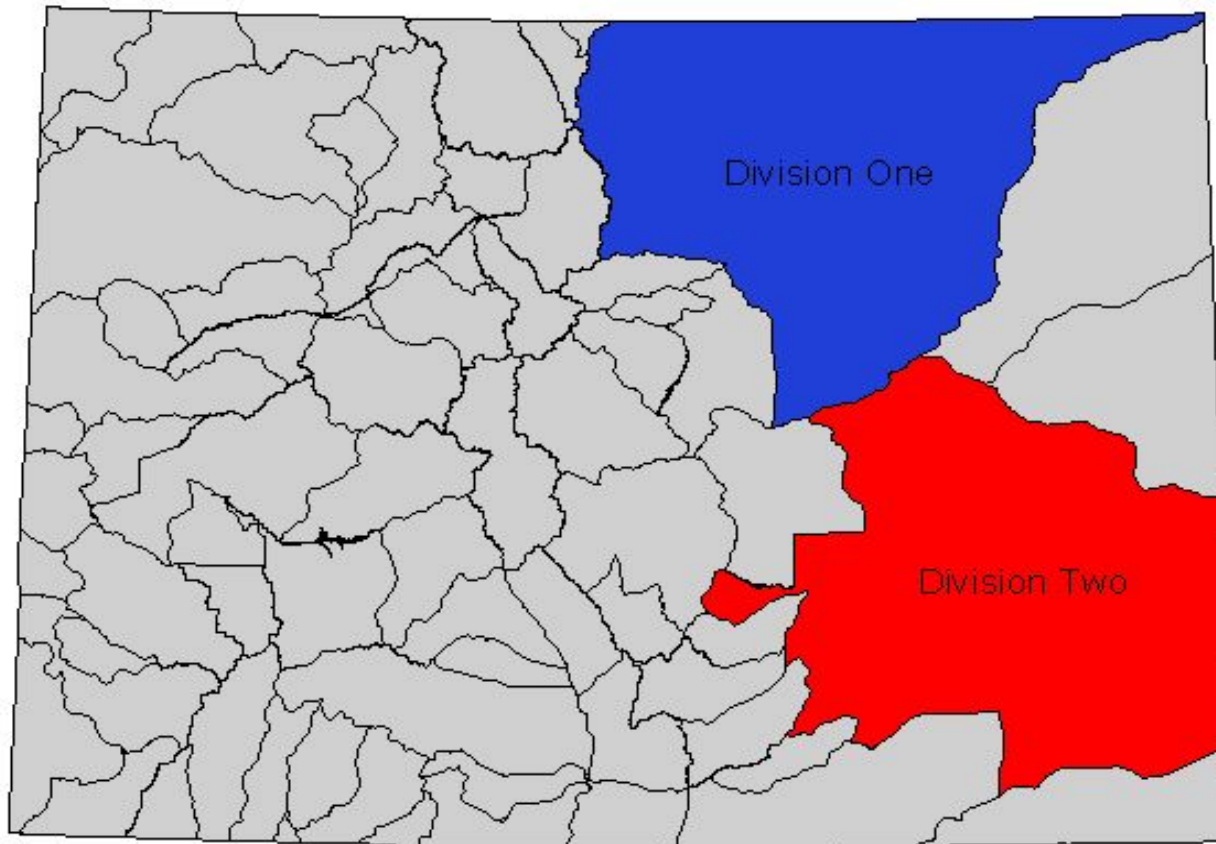


Concerns Regarding the Use of Water Markets in New Zealand

- “there is a reluctance to participate in anything that might speed up change in land and water use within a catchment.” Robb et al. (2001)
- “Irrigators believed that water allocations would be bought up by towns and/or big industrial users, it would not come back to rural.” Kerney and Sinner (1997)
- “General consensus that no individual user should be able to make a windfall gain by selling permits they do not need.” Kerney and Sinner (1997)



Markets for Water Rights in Colorado

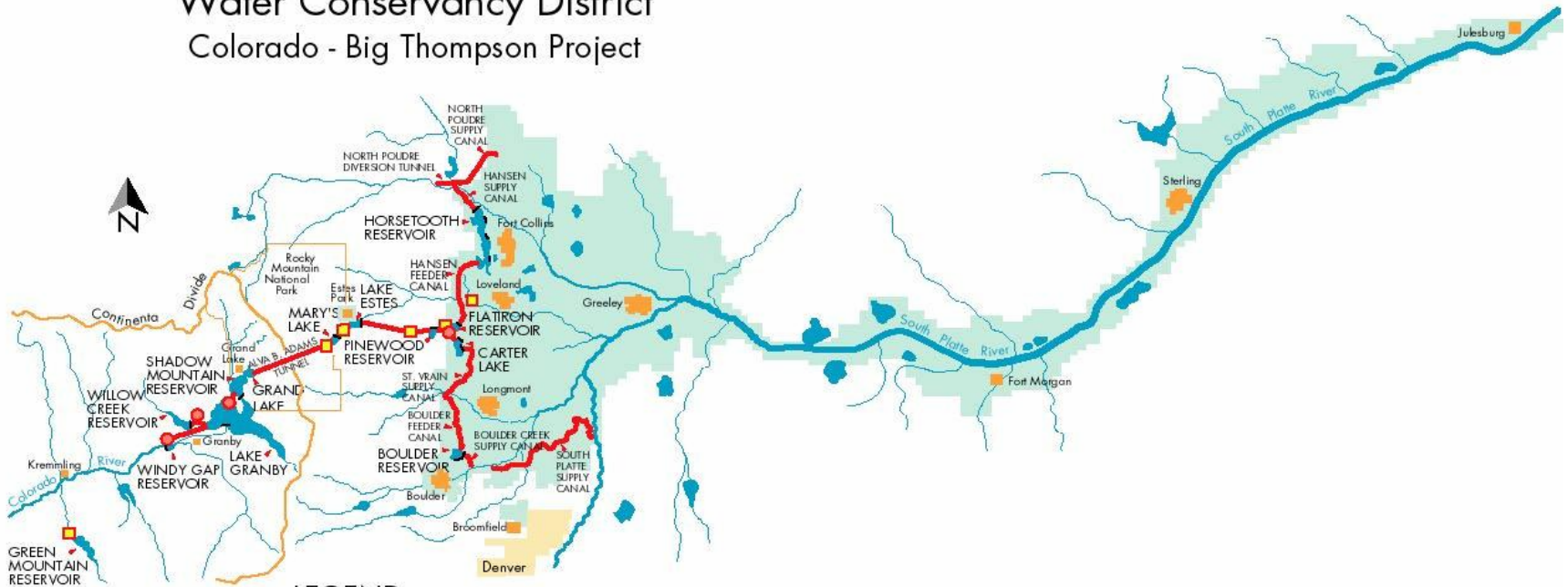


Markets for Water Rights in Colorado






- Markets for Permanent Shares
 - Colorado Big-Thompson Shares
 - Proportional Allocation
 - Homogenous Shares
 - Owner has right to return flows
 - Minimal transactions costs associated with transfer of shares
 - Native water
 - Allocation based on priority system
 - Property right defined based on historical use
 - Location, type, and timing of use
 - Owner does not have right to return flows
 - Transfers allowed conditional on no-injury to other users
 - Transfers must be approved by court



Northern Colorado Water Conservancy District Colorado - Big Thompson Project



LEGEND

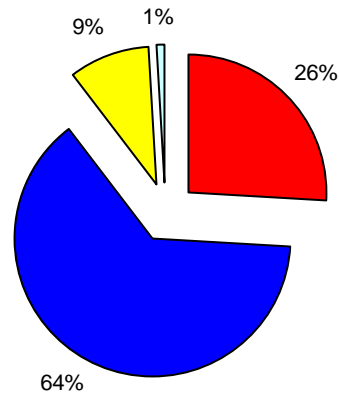
-  Dam
-  Canal, Pipeline, Conduit, Tunnel
-  Power Plant
-  Pump Plant
-  District Boundaries



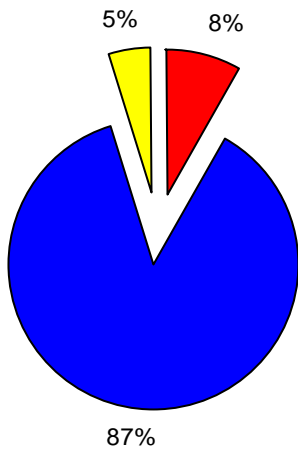
NEW ZEALAND INSTITUTE FOR THE STUDY
OF COMPETITION AND REGULATION INC.

■ Ag to Ag ■ Ag to Non Ag ■ Non Ag to Non Ag □ Non Ag to Ag

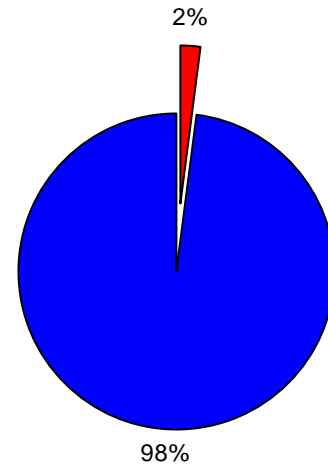
NCWCD
PERCENTAGE OF WATER TRANSFERRED BY TYPE



DIVISION ONE
PERCENTAGE OF WATER TRANSFERRED BY TYPE



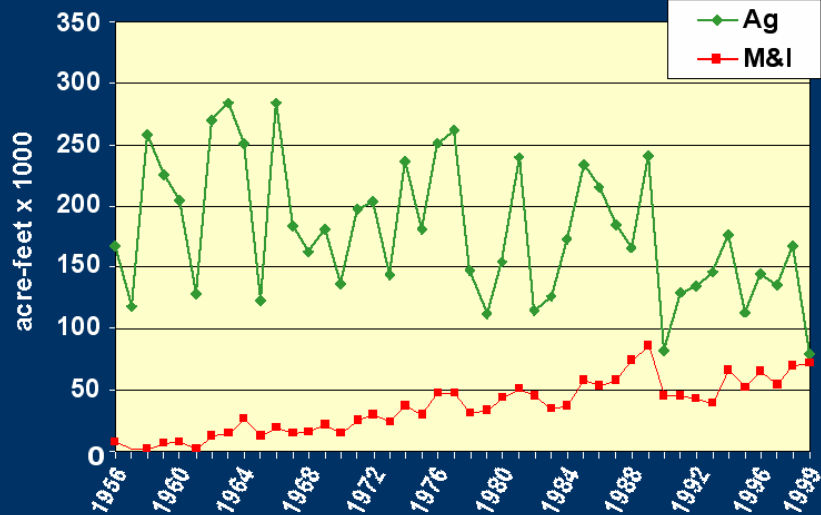
DIVISION 2
PERCENTAGE OF TRANSFERRED WATER BY TYPE



NCWCD

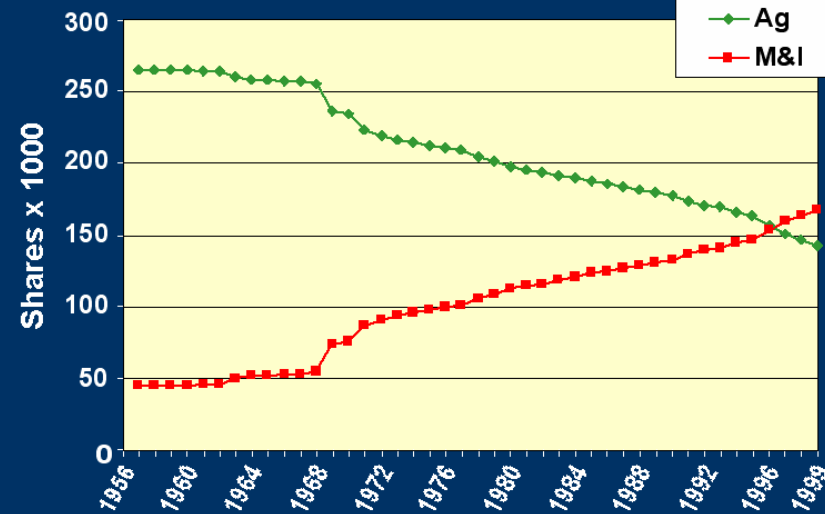
Water Use versus Ownership

Colorado-Big Thompson (C-BT) Water Deliveries
1957 - 1999



Source: Northern Colorado Water Conservancy District

Colorado-Big Thompson (C-BT) Shares Owned
1957 - 1999

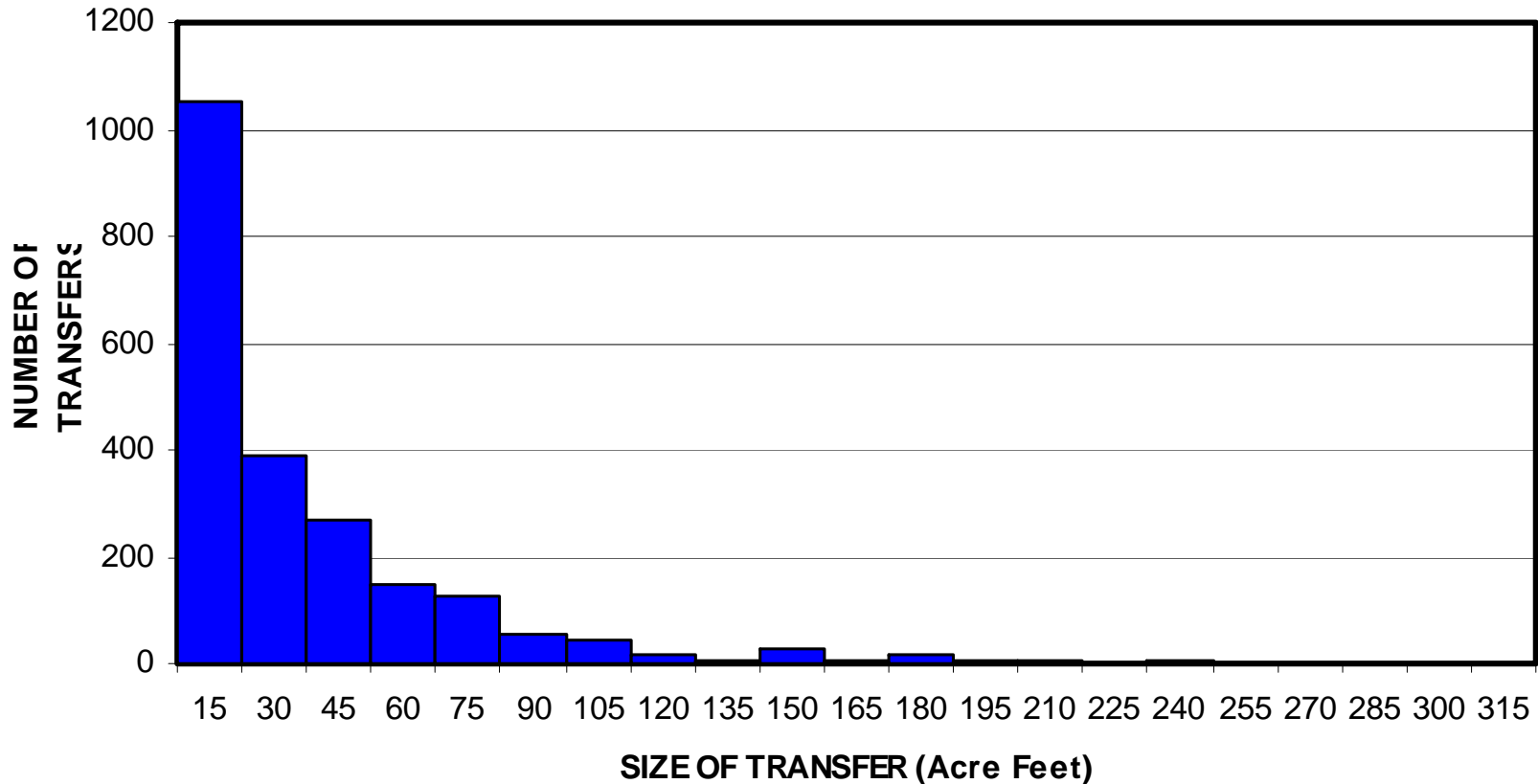


Source: Northern Colorado Water Conservancy District

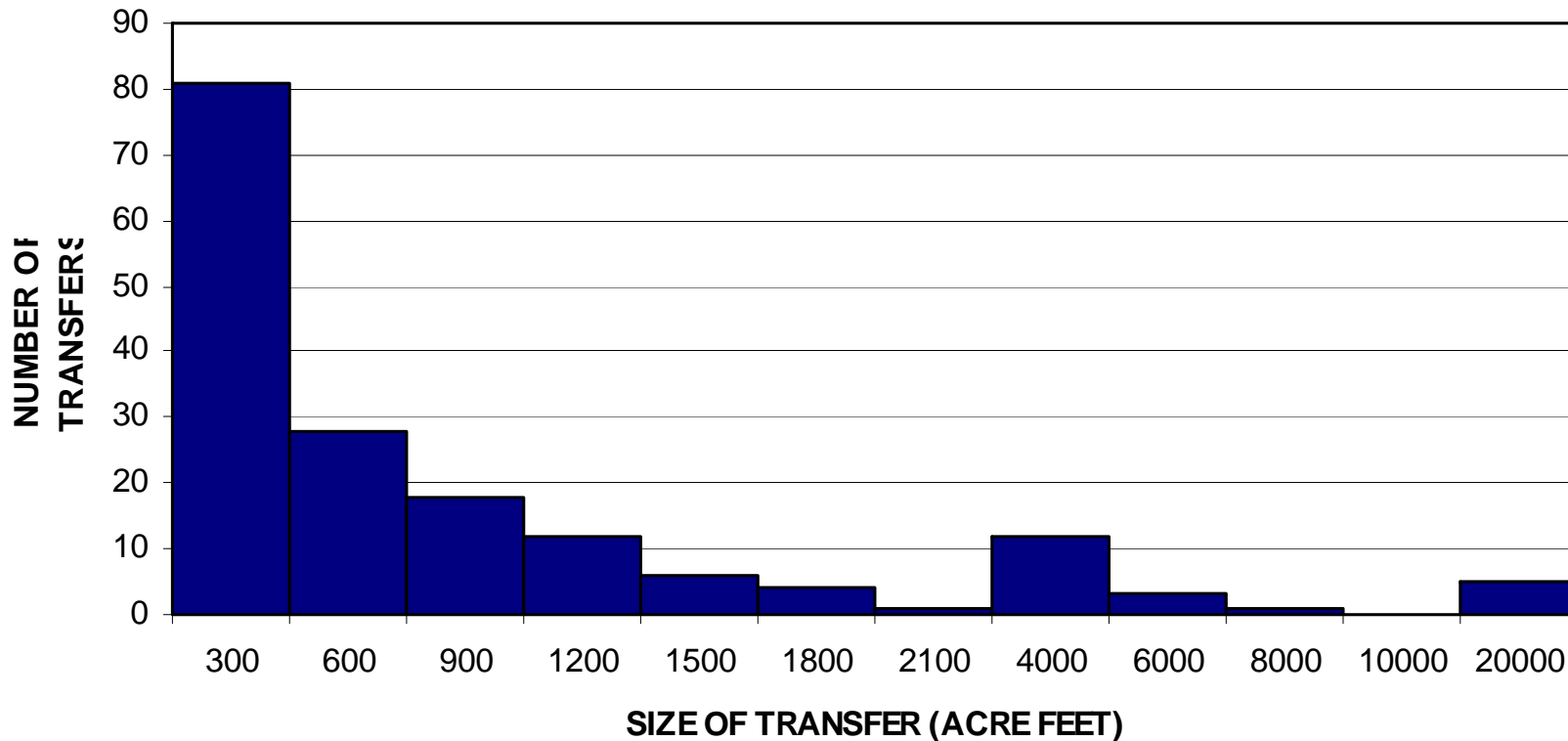


NCWCD

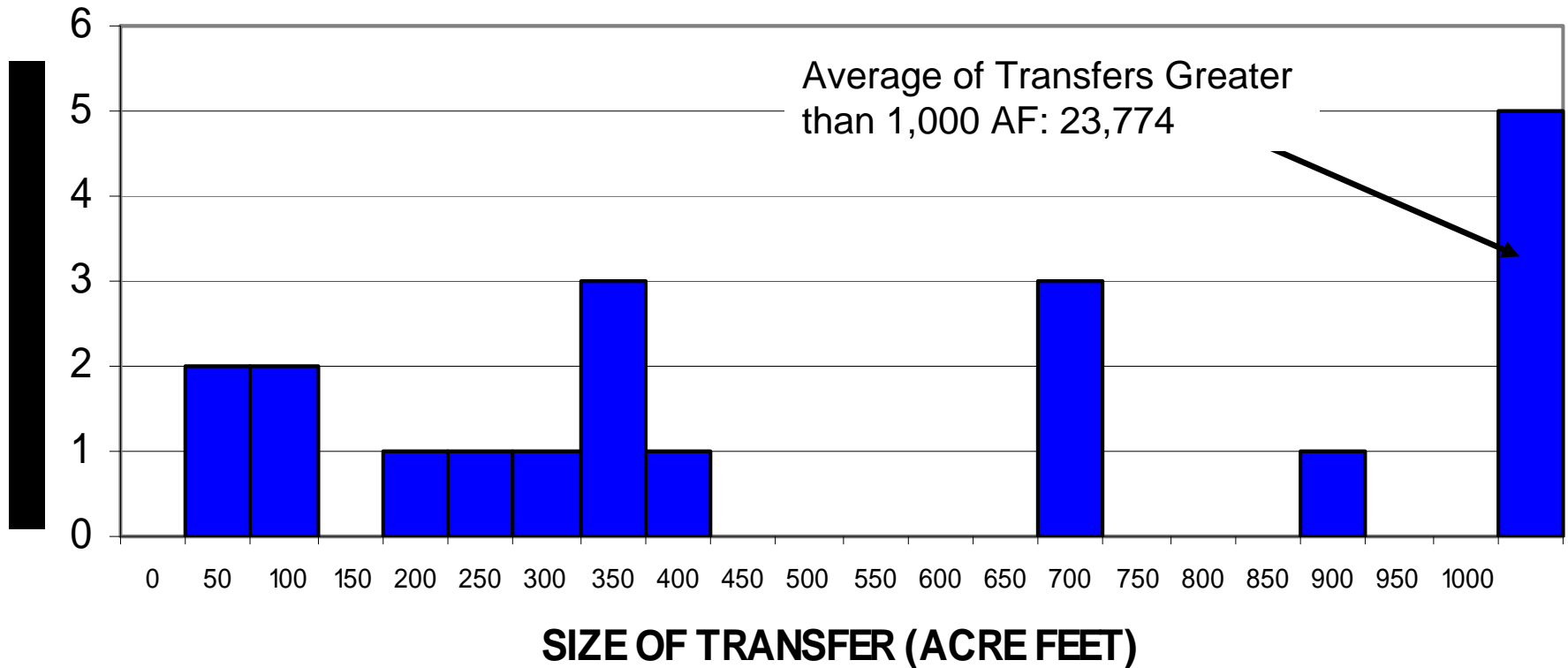
Distribution of Transfers, 1979-2000



South Platte River Basin Distribution of Transfers, 1979-2000



Arkansas Valley River Basin Distribution of Transfers, 1979-2000



Example: Water Banks in Colorado

- Objectives
 - Provide an alternative to permanent transfers of water out of agriculture and out of basin
 - Reduce transactions costs associated with temporary exchanges of water
- Arkansas River Basin Water Bank (Co)
 - Established in 2001 (active 2003) to allow for the temporary lease of water (1 year)
 - Format:
 - Online bulletin board postings
 - Price determined through interaction of buyer and seller
 - Must be approved by State Engineer's Office
 - Water offered to in-basin sellers first



Example: Water Banks in Colorado (cont.)

- Activity
- Reasons no longer active
 - Uncertainty associated with impact on permanent rights
 - Difficulty using internet
 - Time taken for approval too long (min 2 months)

2003

Seller	Quantity	Offer Price (per AF)	Transaction
Ag	47.32	\$800	No
Ag	140.00	\$800	No
Ag	135.51	\$500	No
Ag	8.02	\$1000	No



Example: Water Banks in Idaho

- Objectives
- Water District 1 Rental Pool
 - Established in 1979
 - Prices determined by administrative board
 - Prices differ depending on (a) location of buyer and (b) availability of supply

Reservoir Level	Price per AF
Full	\$5
Not-Full Category 1	\$12
Not-Full Category 1	\$18



Example: Water Banks in Idaho (cont.)

Quantity Rented for:

Percent of Total Offered

Year	Quantity Offered	Irrigation	Hydro-power	Augmentation	Total Rented	Percent of Total Offered
1990	306,000	152,000	68,000		220,000	72%
1991	205,113	85,677	99,000		184,677	90%
1992	9,954	9,954	0		9,954	100%
1993	408,240	38,974	249,000		287,974	71%
1994	432,171	75,888	356,282		432,170	100%
1995	582,405	37,197		255,000	363,290	62%
1996	636,586	19,024		250,000	269,024	42%
1997	693,305	11,328		224,500	235,828	34%
1998	764,699	7,890		223,221	231,111	30%
1999	727,461	9,136		148,397	157,533	22%
2000	336,934	60,333		215,650	275,983	82%



Concluding Thoughts and Future Areas of Research

- The potential for water markets in New Zealand lies in the ability to carefully define water rights and outline the conditions of transfer
- It is important to allow both markets for water and rights
- Uncertainty in how water rights are defined likely limits their value and reduces incentives to be more efficient

