

The Economics of Water Conservation

**Irrigation Association of British
Columbia**

5 December 2012



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Water in the Okanagan

- The Okanagan is defined by “Abundant water in a desert”.



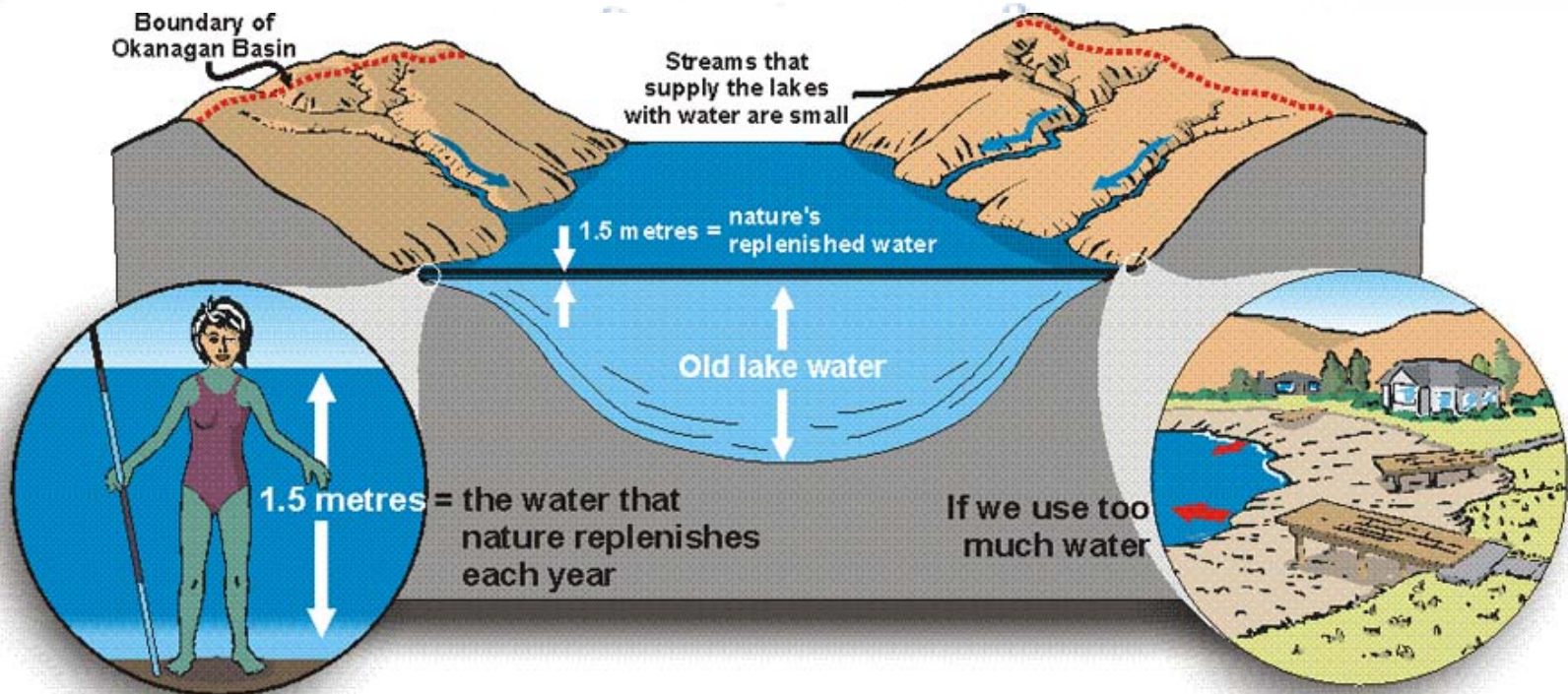
Image from
InvestOkanagan.com



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Water in the Okanagan

- Provided we don't use it!

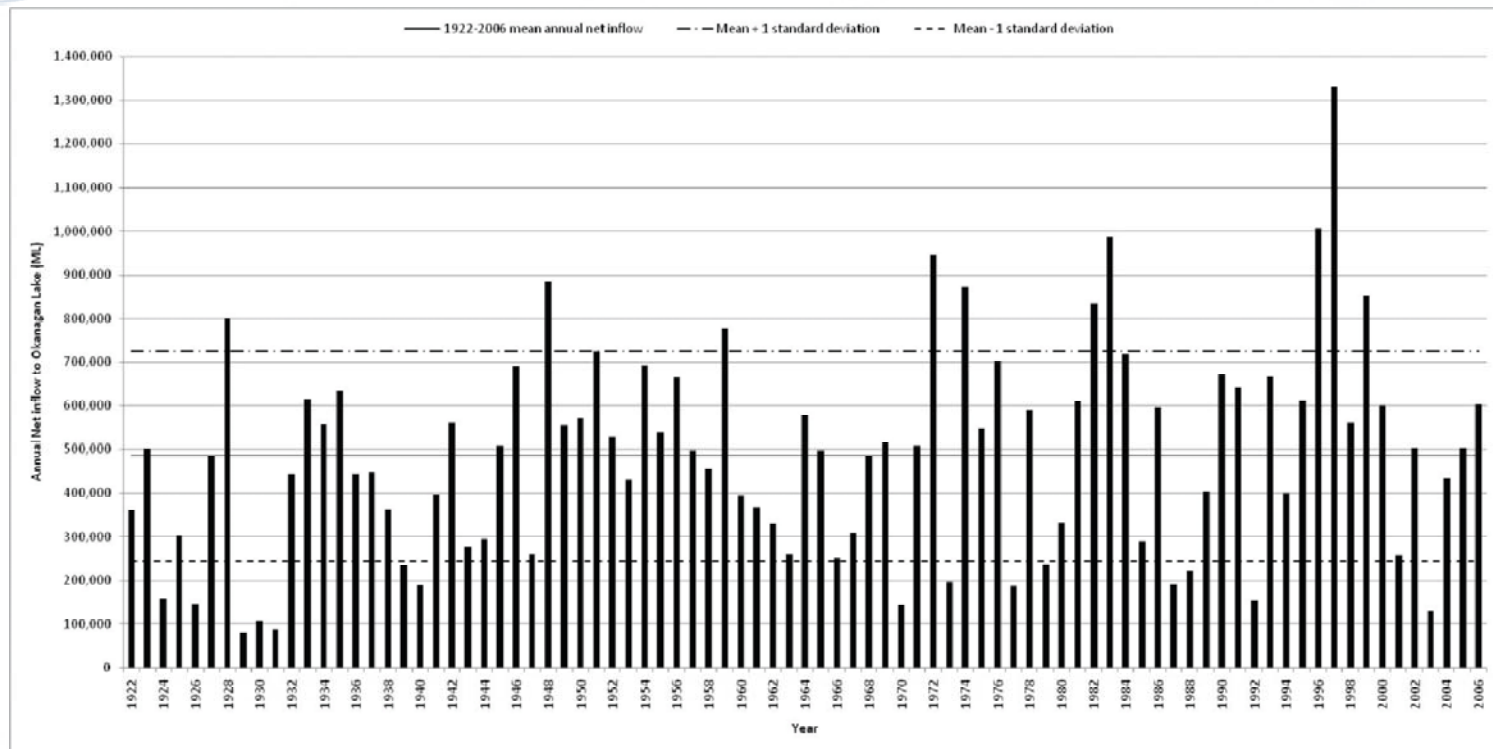


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Water in the Okanagan

- The water we get is highly variable.

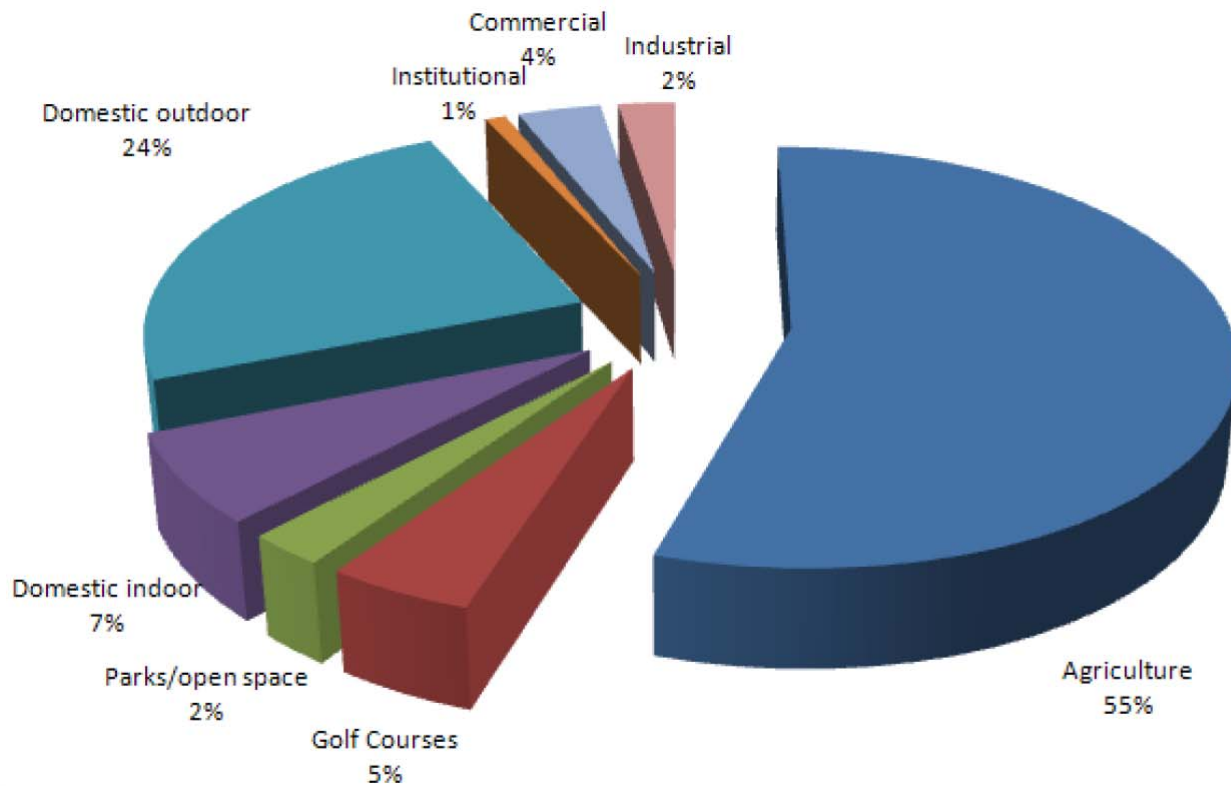


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Water in the Okanagan

- And this is how we typically share it.



Water in the Okanagan

- And if the environment is lucky, there is some left over.



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The Challenge

- How can we share the limited water we have in the face of ...

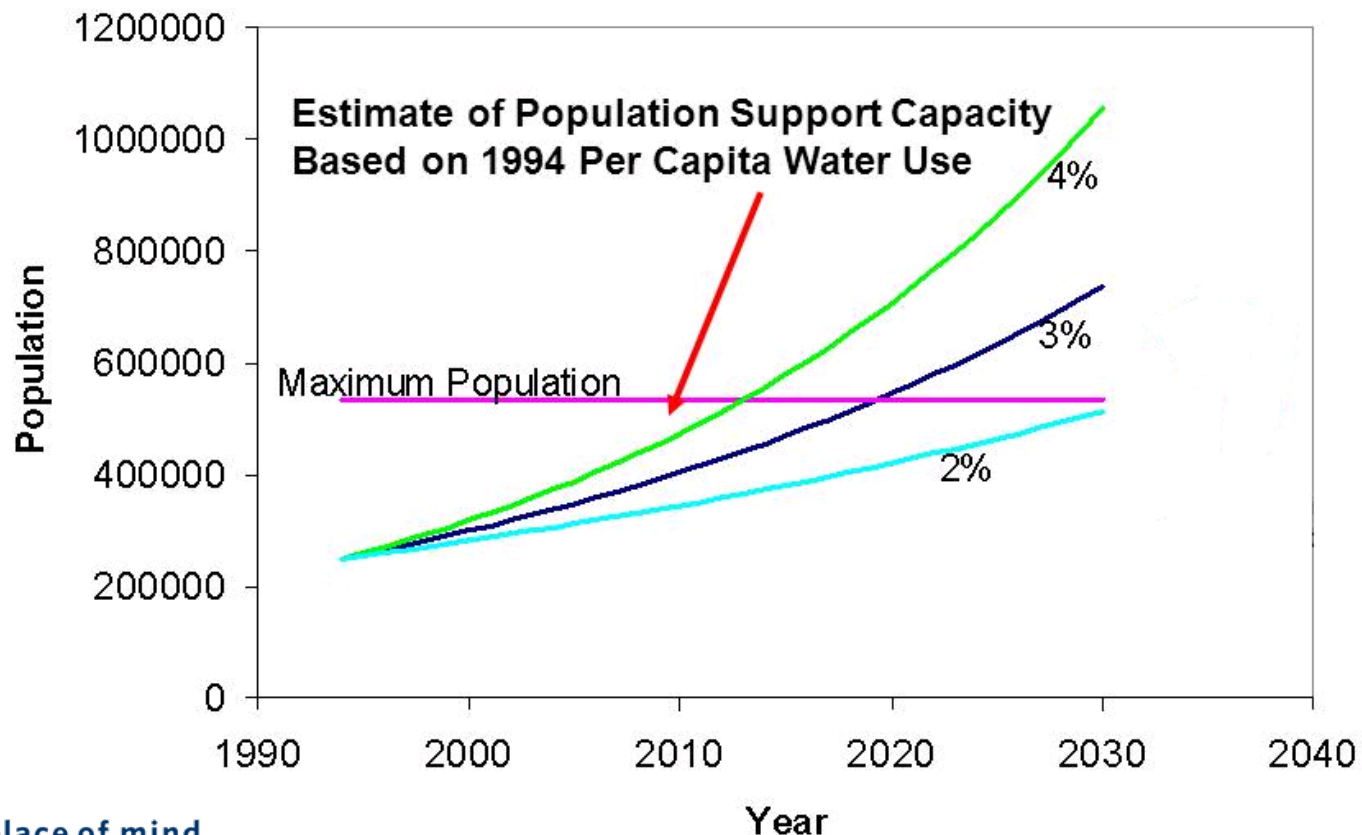


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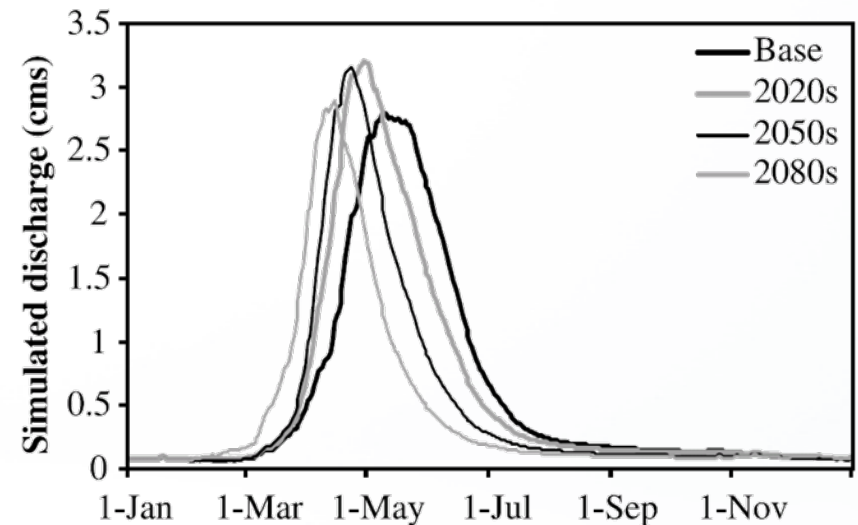
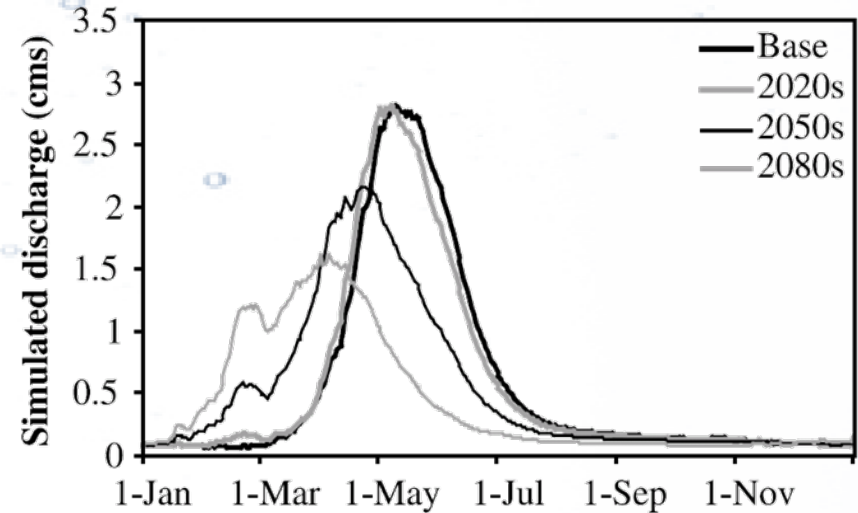
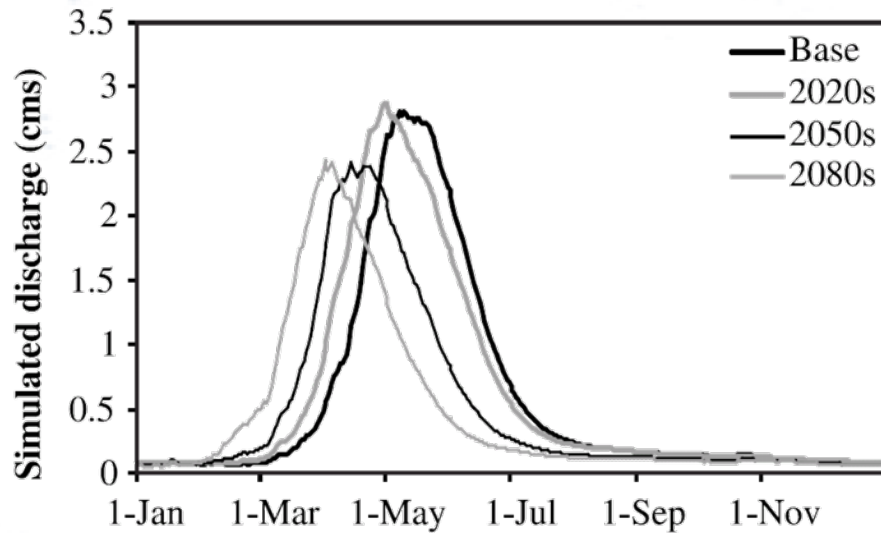
The Challenge

- Population Growth



The Challenge

- Climate Change



The Challenge

- Economic Change (RDCO)
 - Agriculture is about 4%!
 - Construction and Real Estate are more than 30%!
 - Professional services (financial, health, legal, ...) near 30%!



**OUR ECONOMY DEPENDS ON
IMMIGRATION AND GROWTH!!!**



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The Challenge

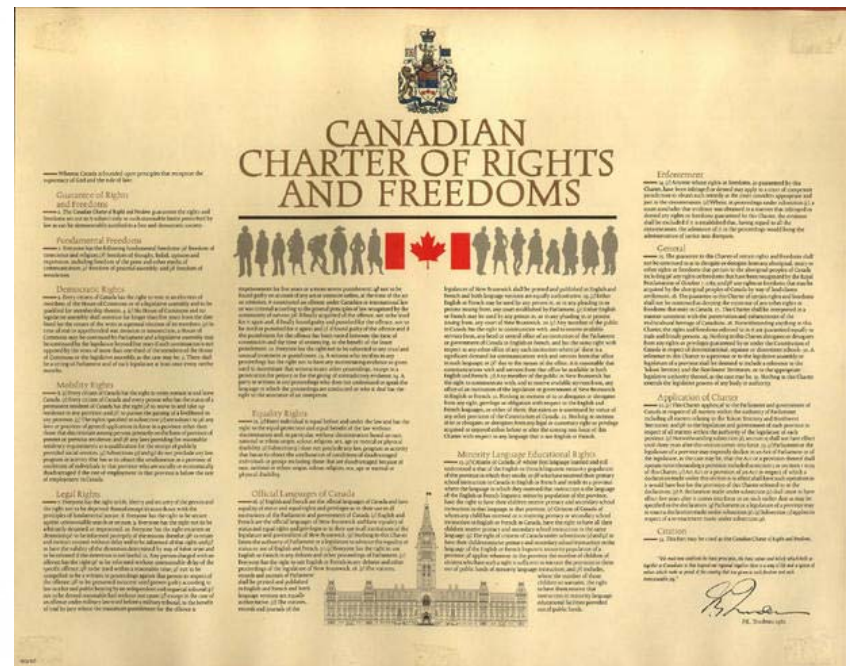
- Changing Values and Desires



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The Challenge

- Aboriginal Rights and Title
 - 1982 Constitution Act.
 - Delgamuukw vs British Columbia, 1997



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The Challenge

Can we find new ways to share
our limited water such that
nobody is made worse off?



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Economics and Water Conservation

- We use water for
 - Essential needs – drinking and basic hygiene
 - Convenience uses – frequent bathing, cloths laundering, ...
 - Luxury uses – swimming pools, jacuzzies, car washing, ...
- A mix of needs and wants
 - Affordability, enjoyment, culture, ...



Economics and Water Conservation

- For the household:
 - Reduce the water bill, but inconvenient / unpleasant.
- For the utility:
 - Delay costly expansion of infrastructure.
 - Accommodate growth without increasing bill.
- For the environment:
 - More water to provide ecosystem services.



Price

- Different ways to price water
 - Free, fixed, by volume (increasing, flat, decreasing, two part), ...

RESIDENTIAL RATES (SINGLE FAMILY DWELLING)	PRITCHARD	WKE	SUNNYSIDE	WID	LID
Water Flat Single Family	\$228.00	\$228.00	\$228.00	\$346.00	\$168.00
Up to four SFD Equivalent/unit	\$228.00	\$228.00	\$228.00	\$346.00	\$168.00
Secondary Suite or Equivalent	\$91.20	\$91.20	\$91.20	\$115.20	\$67.20
Metered: 0-100 cubic metres/m ³	\$0.20/m ³	\$0.20/m ³	\$0.20/m ³	\$0.27/m ³	\$0.20/m ³
101-300 cubic metres/m ³	\$0.38/m ³	\$0.38/m ³	\$0.38/m ³	\$0.51/m ³	\$0.38/m ³
301 + cubic metres/m ³	\$0.61/m ³	\$0.61/m ³	\$0.61/m ³	\$0.82/m ³	\$0.61/m ³



Price

- Price Matters

- People use less water when they pay by use.
- **BUT** the effect isn't large.
- 10% price increase leads to 3-4% less use.

(Olmstead and Stavins, 2007)

- Income Matters

- People use more water when they are wealthier.
- People are less sensitive to price when wealthier.



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Price

- Turn off that shower when soaping up!
 - 2 min saved, ~12 litres / shower, ~4 meters² / yr.
 - Saving \$0.80 – \$3.28 per year per person.
 - No more than one nice Starbuck's coffee!
- Low flow showerhead!
 - ~60 litres / shower saved, ~20 meters² / yr.
 - Saving \$4.00 – \$16.40 per year per person.
 - New shower heads start at \$30 (Home Depot).



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Price

- Comparison to income.
 - Median income, West Kelowna, \$30,000 / yr.
 - Average Okanagan water use, ~675 litres / day
 - ~250 cubic meters per year.
 - 2/3 on lawns.
 - Two person household, WID, ~\$521 / yr.
 - My fairly basic phone, more than \$600 / yr
 - My cable and internet, almost \$1,000 / yr
 - Water bill just a routine expense.



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Price

- Don't pay when using water
 - Gasoline, pay when fill up, know cost of a trip,
 - Food, pay when shopping, know cost of eating,
 - Water, pay long after use
 - Delay between use and pay.
 - Distance from step?
- Smart meters with display?
 - Provide regular feedback.



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Price

- ... but people get angry if bill increases.
 - Water essential, access a right!
 - Water needed for economic growth.
 - Poor can't afford price increase.
 - ...

Tuscon 1977 Recall Election

In 1975–1976, a majority of **city council** members, labeled New Democrats, campaigned on issues of controlled growth, planning, and environmental protection. Faced with a financial crisis in the water department because of a high rate of growth in water-delivery facilities, the **council** members adopted much higher water rates. To finance expansion of the water system, these rates included an assessment of lift charges to houses in the higher areas of the **Tucson** valley and higher rates for higher water use.

The higher rates proved enormously unpopular with the general public, partly because the **council** failed to inform the public adequately prior to the rate hike. Further, the new billing began in June, when water use is normally quite high. Some residents received bills that were as much

THE DAILY COURIER

Residents dump SEKID water upgrade

FRIDAY, 26 OCTOBER 2012 02:00 RON SEYMOUR

The future of a major upgrade to a Kelowna water system is in limbo after property owners overwhelmingly rejected the \$22 million price-tag.

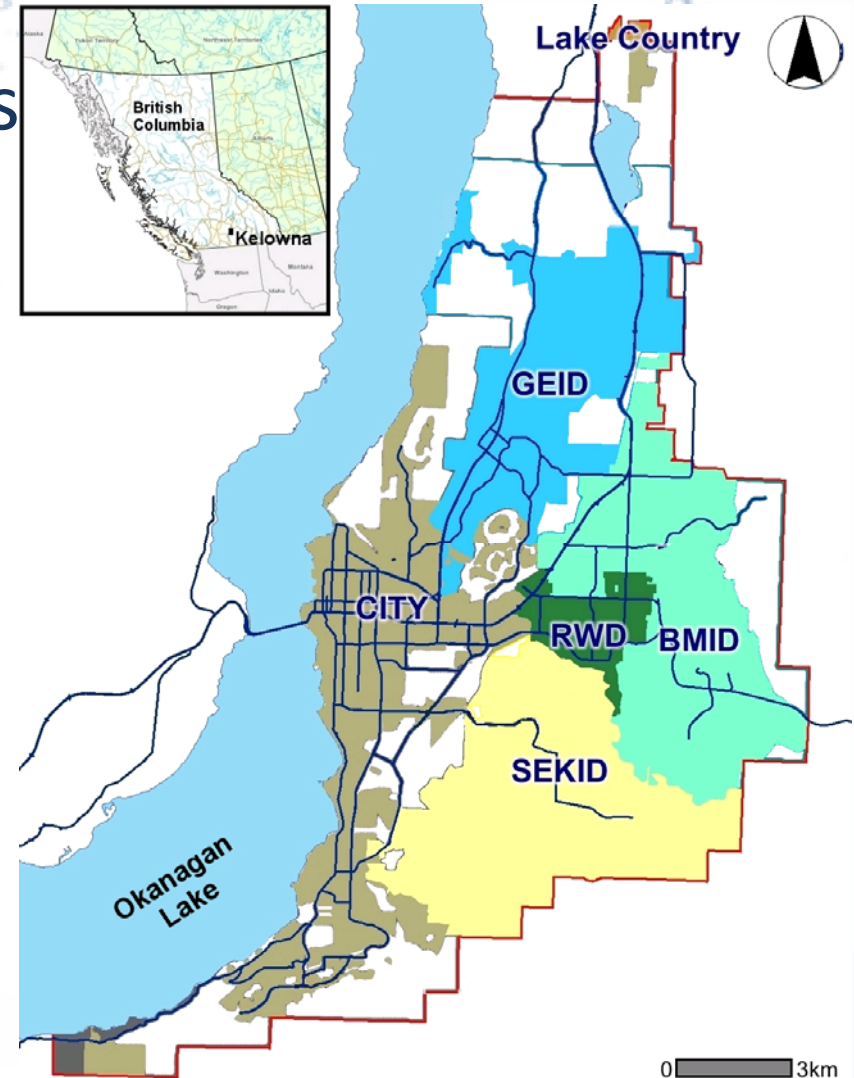


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Price

- Kelowna, 5 big providers
 - CITY, RWD, meter
 - Rest, fixed fee
- Is there a difference?
 - Knowledge, no
 - Values and attitudes
 - Maybe (SEKID)
 - Behaviors, no



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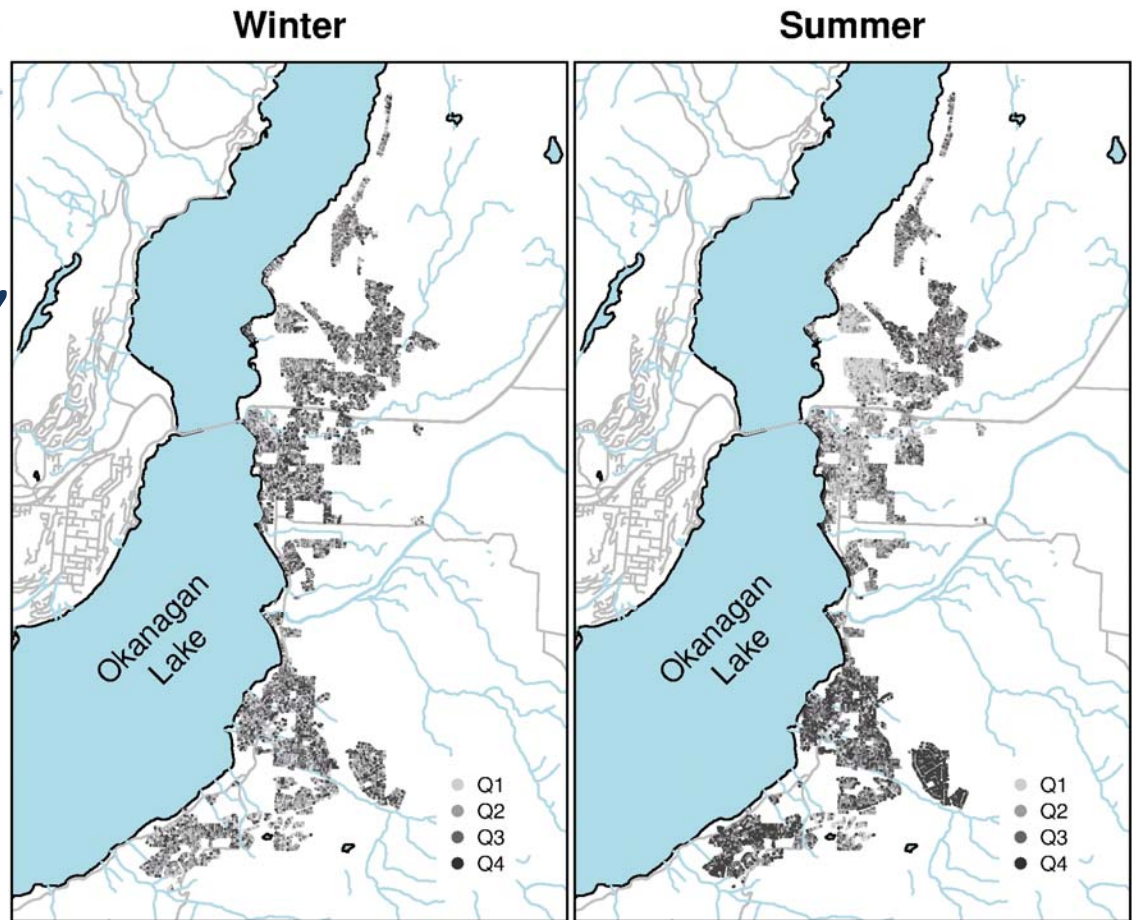
Subsidies

- Reduce cost of saving water
 - Give away low flow shower heads.
 - Rebates for dual flush toilets.
 - Grants for xeriscaping yards.
- Results
 - Rebound effect – showers, laundry, ...
 - Savings minimal (low water price), so uptake minimal.



Subsidies

- Neighbours are similar.
 - Some from size, age, etc.
 - Some just act like their neighbours.
- Distribute subsidies?



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Mandatory Restrictions

- Mandate behavior changes.
 - Lawn watering restrictions.
 - Bans filling pools.
- Can be effective but ...
 - Inspire opposition.
 - Need enforcement.
 - People not making own choice.

THE GLOBE AND MAIL 

Outraged pool owners help overturn water restrictions in North Okanagan

ADRIAN NIEOCZYM, Monday, May. 10 2010

Restrictions on water use in Vernon, instituted because of low reservoir levels, have been lifted after just two weeks following an outcry from local pool owners.



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Building Codes

- Require new buildings have water efficient technologies installed.
 - Doesn't change existing buildings (except for retrofit).
 - Slow, long term turnover.
- Easier to force changes on people not here yet!



Education

- Two purposes:
 1. Show people how to save water.
 2. Convince people that they should save water.
- Can be effective.
 - Good short term response (in crisis).
 - Effectiveness wears off with time.
 - Public can tire of repeated crisis messages.



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Education

- Kelowna survey – 502 households across city.
 - From all purveyors.
- Asked for conservation actions
 - Indoor and outdoor
 - Investments and behaviors
- Looked for drivers
 - Not knowledge, bit from values, income
 - Messages heard strong, social for outdoor



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Social Pressures

- “Take one for the team”
 - Positive message, feel good because we are in this together.
 - Negative message, activate guilt about not doing what ‘should’ be done.
 - Can be effective.
- Way of messaging important
 - Appeal to cooperation, weak.
 - Compare to neighbours, strong.



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Conclusion

- We face a challenging future for water management decisions,
 - esp. environment and agriculture
- Household water conservation can play a part
 - Financial incentives weak
 - Other approaches also challenging
- Combined strategies most likely successful.
 - Politically and practically!



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