The Cost of Water Reuse: An Economic Perspective

USF Workshop II: Engineering, Ecosystem Impacts & Financial Considerations

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What are the Economic Questions?

- What are the benefits?
- What is the direct cost?
- What is the indirect cost?
- What is the opportunity cost?
- What are the unknowns?

What are the Economic Questions?

- What are the benefits?
  - Is this less strain on ecosystems, natural systems that support existing water supply and economy?
    - To the extent that less raw water is depleted as a result of reuse
    - Conceptual only, as existing supply plans locally are designed to support healthy ecosystems
  - Greater flexibility in economic growth
    - Again, to the extent that a constraint is removed
    - If new water permits = more costly new development
    - In AU, developers have to bring water
      - Or don't bring development plan
  - Lower cost source water?

What are the Economic Questions?

- What is the direct cost of reuse as indirect potable use?
  - As components of a mix of sources; i.e., not consumer's cost
- At least equal to Reverse Osmosis costs in spectrum of treatment costs, if not R.O. + Aquifer Recharge

	$/1,000 Gallons Min	Max
Current Potable Uses		
Conservation: Public	0.05	4.76
Conservation: Utilities	0.05	0.35
Fresh groundwater	1.24	2.25
Alternative Surface Water	4.70	7.80
Desal (Reverse Osmosis)	5.66	7.61
Surface water	6.56	9.08
Brackish groundwater	7.91	8.20
Current Nonpotable uses		
Reuse: Agricultural/Industrial uses*	0.69	0.96
Reuse: Aquifer Recharge	4.39	7.06
Reuse: Residential Irrigation*		1.35

* Incremental distribution costs only (does not include treatment cost)

Sources: PBS&J 1999, Manatee Utilities 2009, Black & Veatch 2008

What are the Economic Questions?

- What is the indirect cost?
  - Potential cost: managing increased salinity and heavy metals
    - Direct costs include treatment for most of the pollutants, piping
  - Energy draw

What are the Economic Questions?

- What is the opportunity cost?
  - What could you do otherwise?
    - 1958 UN: "No higher quality of water, unless there is a surplus, should be used for a purpose that can tolerate a lower grade"
  - Can the public tolerate a lower grade?
    - Conceptually, treatment of reuse provides water as clean or cleaner than raw water
    - Uncertainty
  - Can other options achieve the same result at lower cost?
    - Conservation
    - Requires political will, change in lifestyle

What are the Economic Questions?

- What are the unknowns?
  - Long-term effects of emerging pathogens, endocrine disruptors, antibiotic resistance
    - *Potentially,* are also present in other source waters
    - Uncertainty is difficult to quantify
  - Indirect potable use is occurring
  - Opportunity to quantify effects based on history of others' experience
    - Drinking water standards were intended for water obtained from conventional, relatively uncontaminated sources of fresh water, not for reclaimed water
    - Requires analysis
- Vulnerable to political suasion
  - Toowoomba AU "You'll grow breasts" campaign

Summary

- Economic costs are relatively straightforward
  - Requires Analysis
  - Opportunity Costs are subjective and vulnerable to politics
  - Uncertainty requires place-specific analysis to quantify
- Public perception is expensive
  - Political capital