Value of water: A commodity <u>and</u> a resource?

Basic Water Science Seminar

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Commodity and resource?

- Commodities: articles of trade or commerce
- Resources: factors, including land and water, that sustain a community or society

http://www.youtube.com/watch?v=v2y2kdylmgo

Key questions

- What is the legal status of water in Oklahoma?
  - Does current Oklahoma law adequately protect the public's interests?
  - … protect private interests?
- How will we strike a balance between competing private/public interests?
  - Balance adjusted over time
  - Changing social, economic, environmental and climatic conditions

Why does this matter?

- US Supreme Court ruled water is a commodity *Sporhase v. Nebraska* (1982); they struck down Nebraska's water transfer reciprocity statute as a burden on interstate commerce
- However,
  - In *Illinois Central Railroad v. Illinois* (1892), the Court held that water resources of the Great Lakes are subject to a public trust
  - Other decisions held that water is not a commodity unless the state legislature has chosen to make it '**an article of commerce**.'

Legal status of water

The three “forms” of water

- Groundwater
  - fresh water under the surface of the earth regardless of the geologic structure in which it is standing or moving outside the cut bank of any definite stream.
- “Surface” water
  - Water that is either standing on the land’s surface or existing outside a defined stream (think “runoff”).
- Stream water
  - Water in a definite, natural channel, with defined beds and banks, originating from a definite source or sources of supply.
  - Can include intermittent or “ephemeral” streams if that is characteristic of the sources of supply in the area.

"Property" title
↓

Groundwater Law (Okla. Stat. Title 60, §60)

- "The use of **groundwater** shall be governed by the Oklahoma Groundwater Law."
  - "Groundwater" means **fresh water under the surface of the earth** regardless of geologic structure in which it is standing or moving **outside the cut bank of any definite stream**
  - "Fresh water" means water that has less than five-thousand (5,000) parts per million of total dissolved solids

"Waters and Water Rights " title
↓

Groundwater rights (Title 82)

- 1020.3: Any landowner has a right to take ground water from land owned by him for **domestic use** without a permit
- Domestic use:
  - by a natural individual or by a family or household for **household purposes,**
  - for farm and domestic animals up to the **normal grazing capacity** of the land and
  - for the **irrigation** of land not exceeding a total of **three acres** in area for the growing of gardens, orchards and lawns, and for fire protection
  - for such other purposes, specified by Board rules, for which ***de minimis* amounts** are used

Groundwater rights

- Non-domestic use, need a permit from OWRB
  - Must own/lease the surface of the land where the groundwater will be extracted
  - Not allowed if **waste by depletion or pollution** is expected to occur, or water not put to **beneficial use**
  - If aquifer not studied, get a temporary permit that allows 2 acre-feet per acre of land. If studied, use '50% left in 20 years' rule
  - OWRB ***shall*** issue the permit if applicant meets the requirements

Beneficial use restriction

- Beneficial use:
  - "The use of such quantity of stream or groundwater when reasonable intelligence and reasonable diligence are exercised in its application for a lawful purpose and as is **economically necessary for that purpose**. Beneficial uses include but are not limited to municipal, industrial, agricultural, irrigation, recreation, fish and wildlife, etc."

“Surface” water law (Okla. Stat. Title 60, §60)

- The owner of the land owns **water standing** thereon, or flowing over or under its surface but **not forming a definite stream**
  - You can capture runoff that has not made it into a streambed
  - Only ***form*** of water that can be “owned” under Oklahoma law (may have rights to use other forms)
- [The] owner of land [may use a dam] on his land for the **collection or storage of [such] waters** so long as he provides for the continued natural flow of the stream[s]…

Example of captured runoff

Stream water law (Okla. Stat. Title 60, §60)

- Water running in a **definite stream**… may be used by the owner of the land **riparian** to the stream for **domestic uses**…
  - "definite stream": a watercourse in a **definite, natural channel**, with defined beds and banks, originating from a **definite source** or sources of supply… may flow intermittently …
- … may not prevent the natural flow of the stream… as such water then becomes **public water** and is subject to appropriation…

Stream water - legal doctrine

- Riparian doctrine: property owner that is “riparian” (owns property bordering) the stream has superior rights to the water
- Prior appropriation doctrine: the first person to claim a use for the surface water has the superior right
- Hybrid “California” doctrine: a hybridization of the riparian and prior appropriation, and the rule in Oklahoma

Stream water rights

- Riparian owner can take as much of a stream they need for **domestic use** (same definition as for groundwater)
- For non-domestic uses, "appropriated" by OWRB similar to the groundwater
  - Unappropriated water must be available
  - Beneficial use
  - Proposed use does not interfere with domestic or existing appropriative uses
  - Additional rules if transporting the water for use outside the stream system (Okla. Admin. Code 785:20-5-6)
- OWRB has wide discretion to consider impacts on other users, etc
- No "shall" language requiring the issuance of a permit

Moratorium on interstate sale or export

- 5 years starting Nov. 1, 2004
- Joint Committee on Water Planning shall study, investigate, examine and analyze issues relating to a comprehensive statewide water study and plan
  - Principles for protection, management, conservation, development and utilization of water resources in this state
  - Existing resources
  - Infrastructure needs
  - Long-term ***sustainability*** of our water
  - Review beneficial uses, ***seek a balance between public interest and private property rights***
  - Etc…

Policy statement: Conservation districts

- Title 27A "Environment and Natural Resources" §3-1-102:
  - … it is hereby declared to be the policy of the State of Oklahoma to… conserve and develop water resources and quality, prevent impairment of dams and reservoirs, ***preserve wildlife, preserve natural beauty, promote recreational development, protect the tax base, protect public lands and protect and promote the health, safety and general welfare of the people of this state.***

Policy statement: Water plan

- Title 82 “Waters and Water Rights” §1086.1A Policy of State as to use of Surplus and Excess Water - State Water Plan
  - All of the people have a primary interest in the orderly and coordinated control, protection, management, conservation, development and utilization of the water resources of the state.”

Commodity and resource*

Factor	Commodity	Resource
"Surface" water owned	X	
Stream water beyond domestic use held in public trust		X
Groundwater beyond domestic use held in public trust, but "shall" language on permit issuance	X	X
Beneficial use		X
Moratorium language		X
Water plan language		X
Conservation districts language		X

* Subjective determination

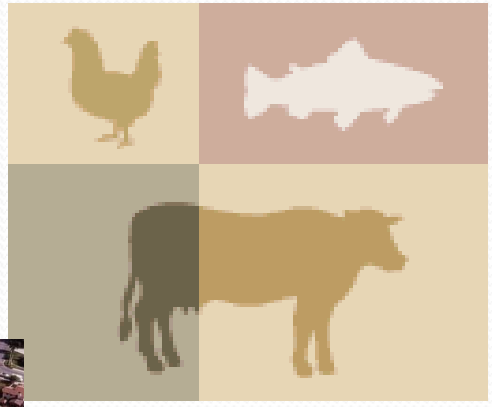
Striking a public/private balance

Water as a resource

- Regardless of what the law currently says we ***can*** do, what ***should*** we do with our water?
  - Water is more vital to life than air
  - The state is rapidly changing
  - Water is scarce and becoming scarcer
  - Converting water into a commodity – like trading fundamental rights for economic gain?
  - Market forces (sometimes) more efficient users
  - What is water worth?

What is water worth?

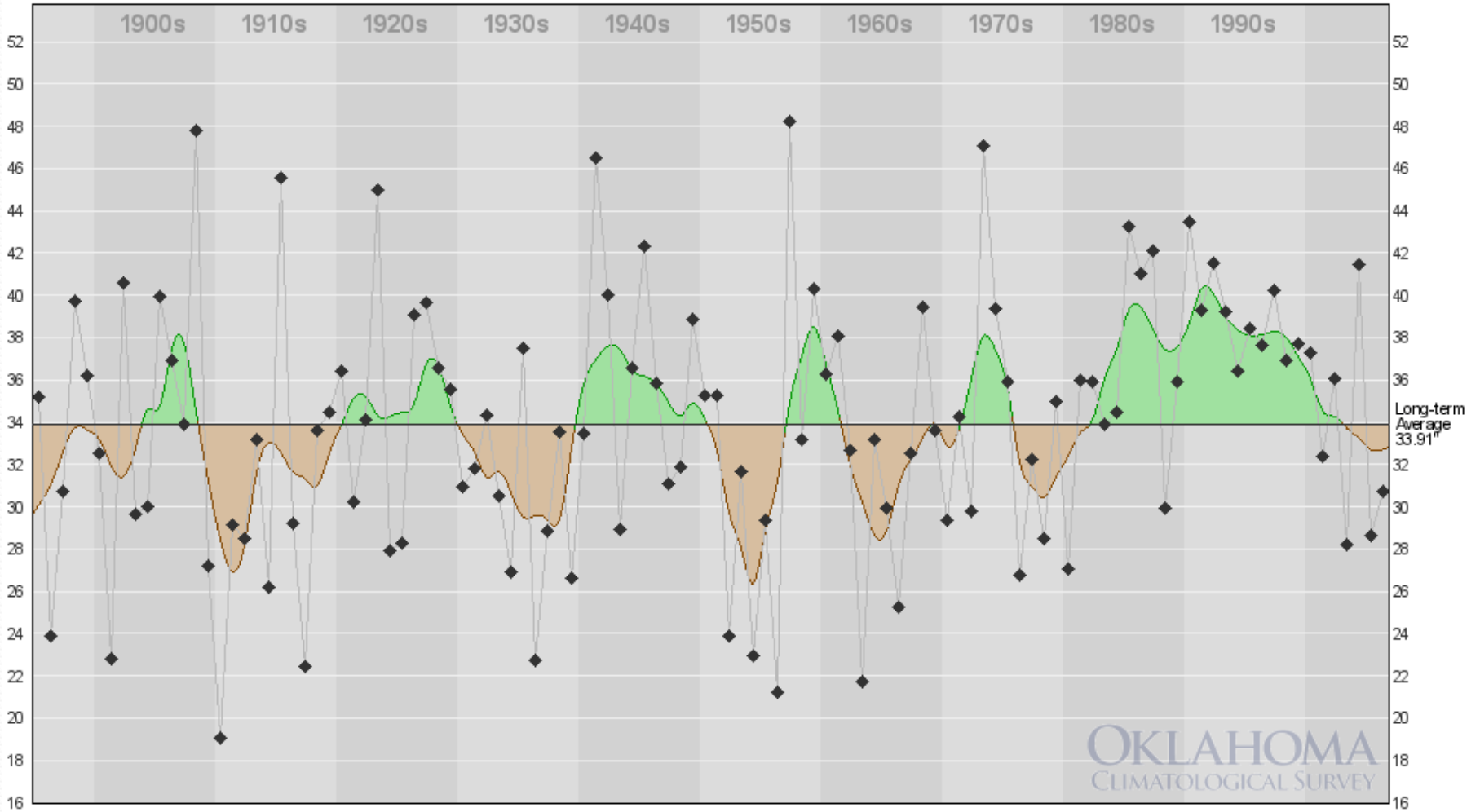
- Depends on its use, location, cost, availability



Supply factors

- Weather volatility (climate change)
- Aging infrastructure
- Changes in water rights (tribal rights, conjunctive use, minimum flows and levels)
- Water quality
- New sources (desalination, purple pipe)
- Invasive species
- Unexpected events

Supply, historically-speaking



USDA ars

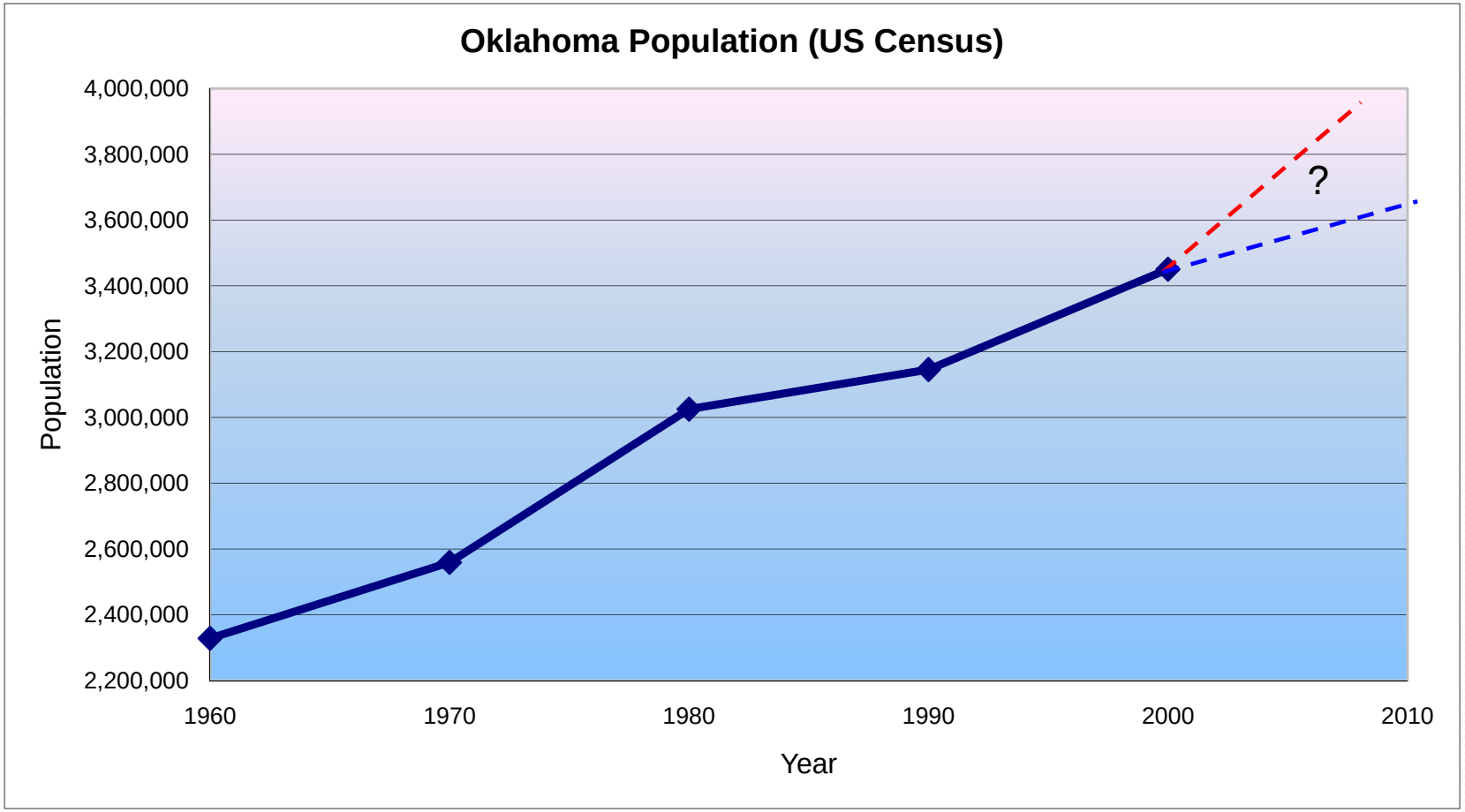
Annual Precipitation History with 5-year Tendencies
Oklahoma Statewide: 1895-2006

Wetter historical periods
Drier historical periods
Individual Annual precipitation value

Demand factors

- Population growth
- Biofuels
- Water conservation
  - Irrigation systems, infrastructure, retrofits
  - Attitudes about waste
  - Drought tolerant plants
- Water prices
- Thirsty neighbors (interstate transfers and sales)
- Recreation, environment

Changing demand for water

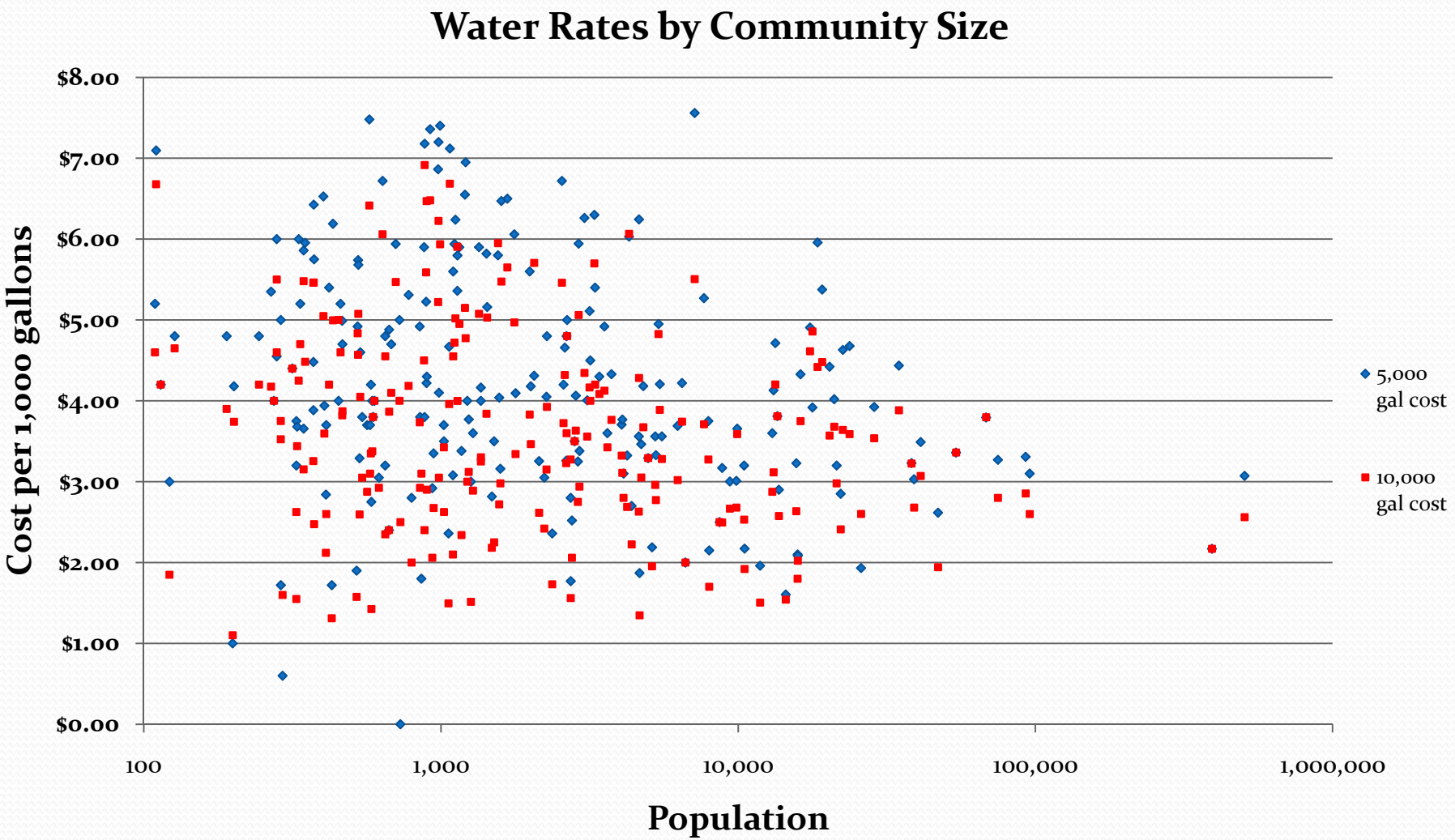


Water prices

- Supply/demand (How much is available? Who else wants it? For what use?)
- Direct costs
  - Capture
  - Transportation
  - Storage
  - Treatment

  Transportation, Storage: Aging infrastructure
- Water pricing – not driven (completely) by market forces

Municipal rates



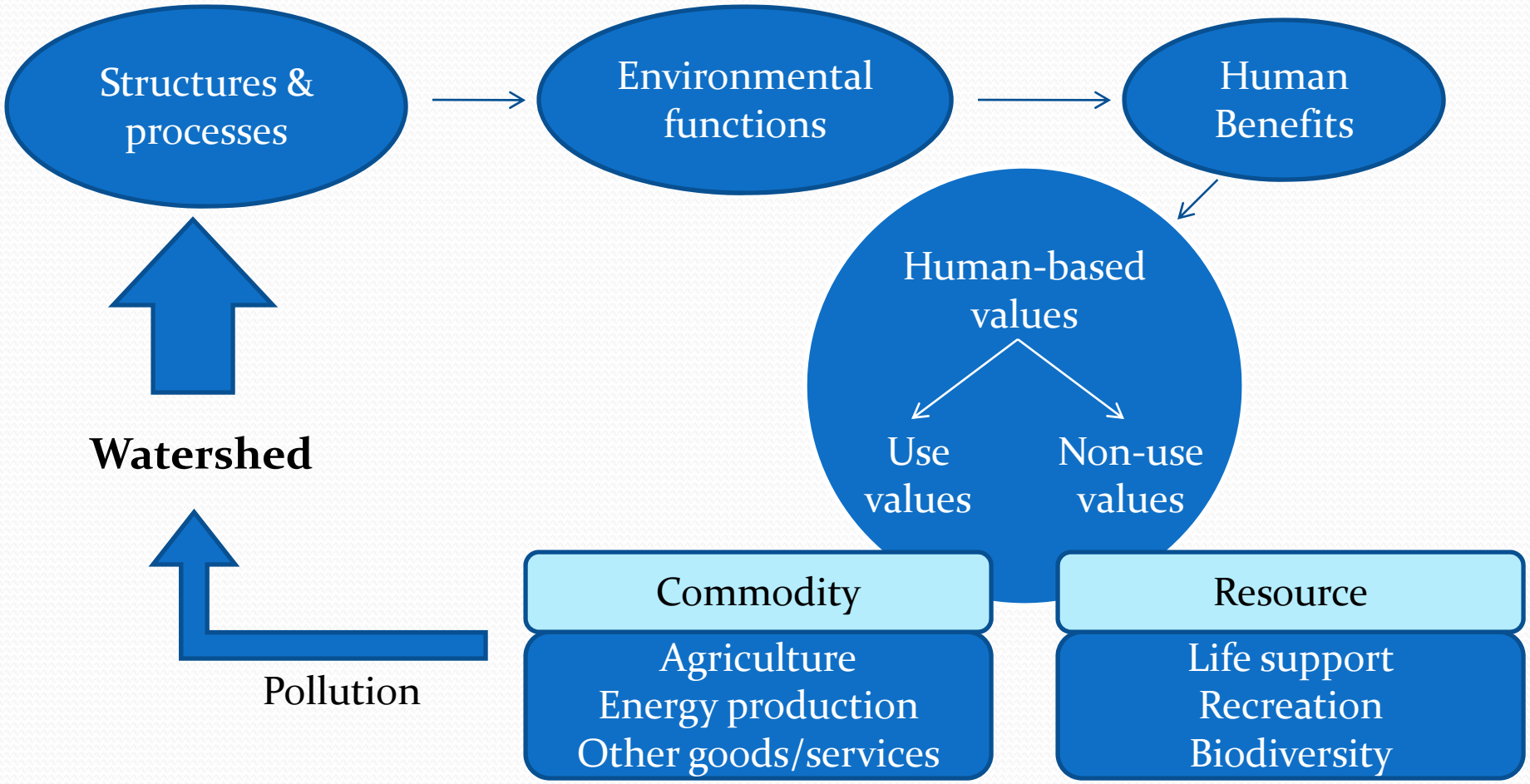
Examples from elsewhere

- National average (2005)
  - US average $5.78/1000 gallons
  - Range $1.76 to $12.17/1000 gallons
  - Rise 5.3% per year
- Other countries(2007)
  - Denmark & Germany: $8.52, Guatemala City: $18.40/1000 gallons
- Price increases over 5 years (2002-2007)
  - US by 27%, United Kingdom by 32%, Australia by 45%, S. Africa by 50%, Canada by 58%

Water scarcity

- ‘You never miss the water ‘til the well runs dry’
- “…demand for water for people is running up against…agriculture and industry” and “…aquifers cannot recharge fast enough to replace what is being pumped out.” (Stillwater Newspress, March 21, 2007)

Value of water (more than its price)



Value of water: Agriculture

- Higher production = higher land value, rents

	Land value ($) per acre, 2008			
State	**Non-irrigated**	**Irrigated**	**Water value ($)**	**Water value (%)**
Texas	1,620	1,830	210	13%
Arkansas	1,700	1,980	280	16%
Oklahoma	1,100	1,400	300	**27%**
Kansas	1,130	1,660	530	47%
Colorado	1,000	3,500	2,500	250%
New Mexico	500	6,500	6,000	1200%

USDA (2008), "Land Value and Cash Rents 2008 Summary"

Value to different users

- Four riparian users
- Acre-foot of water worth $10 (Low value) or $40 (High value)
- 40% return flow

	Withdraw	Returns	Value 1		Value 2		Difference
User 1	1.0	0.4	Low	$10.00	High	$40.00	$30.00
User 2	0.40	0.16	High	$16.00	Low	$4.00	($12.00)
User 3	0.160	0.064	High	$6.40	Low	$1.60	($4.80)
User 4	0.064	0.026	Low	$0.64	High	$2.56	$1.92
Total	1.624	0.650	-	$33.04	-	$48.16	**$15.12**

Value of water: Environmental

Wetland type	Function	Service	Economic value
Forest	Tree growth medium	Commercial timber harvest	Private net economic value of timber
Fisheries	Fish habitat	Commercial fish harvest	Private net economic value of fish
Recreation	Wildlife habitat	Recreational, fishing, waterfowl harvest	Mixed net economic value of hunting/fishing/ recreating
Flood control	Flood retention	Reduced flood flows/peak (less risk)	Public net economic value of reduced damages
Water quality	Water filtration	Cleaner waters	Public net economic value of reduced damages
Endangered species	Endangered species habitat	biodiversity	Public net option, existence values

Bergstrom and Brazee (1991)

Value of water: Recreation

- Statewide fishing, hunting & wildlife watching worth $953.3 million/year* (US Fish & Wildlife Service, 2001)
  - Fishing: $476.0 mn by residents, $31.3 mn by non-residents, $609/angler
  - Hunting: $284.1 mn by residents, $6.2 mn by non-residents, $1,086/hunter
  - Wildlife watching: $160.2 mn by residents, $33.0 mn by non-residents, $171/participant
- Lower Illinois trout fishery: 18,400 annual visits, $2 mn/year (Crews and Summers, 2002)
- Upper Illinois boating: 94,504 visitors outfitted, $1.4-$1.9 mn/year, $15-$20/person/day for canoeing, rafting (Setters, 2006)

*By comparison, economic impact of Agriculture is >$10.4 billion/year

Conclusion

- Key questions:
  - What is the legal status of water in Oklahoma?
    - Water is both commodity <u>and</u> resource
  - How will we strike a balance between competing private/public interests?
    - Changing social, economic, environmental and climatic conditions
    - Very high value, conflicting uses

THANK YOU!