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# Groundwater, Rivers and Ecosystems: Regulatory and Policy Approaches to Making Links

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# Overview

- Water law and policy tools for managing impacts of pumping GW on SW and GDEs
  - Set **thresholds** of acceptable impact
  - Use thresholds to **prevent/remedy** unacceptable impacts
    - Often restricted to SW context in western US, potential to expand further to GDEs
- Focus on regulatory context – most experience
- Implementation challenges

# Set a threshold of acceptable impact based on:

1. Simple quantitative measure (macro scale rule-of-thumb)
  - Uses volume, distance to stream/GDE or stream conditions
  - E.g. closed basins (MT), presumed impairment distance (OR)



Smith River, MT  
(MT State Parks)

# Set a threshold of acceptable impact based on:

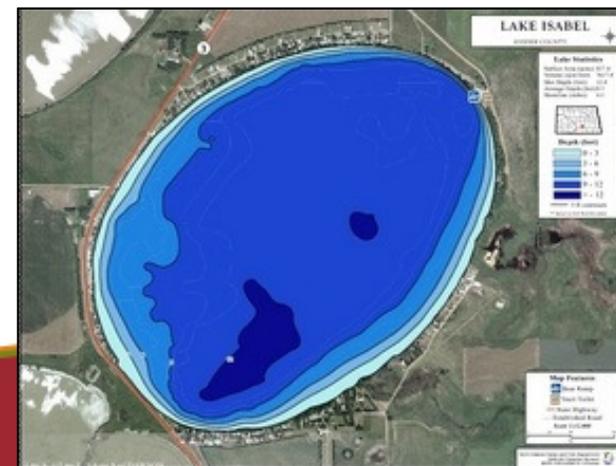
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  - Uses volume, distance to stream/GDE or stream conditions
  - E.g. closed basins (MT), presumed impairment distance (OR)
2. Complex quantitative measure (micro scale, case-by-case)
  - E.g. 0.1%/100 yr stream depletion rule (CO)



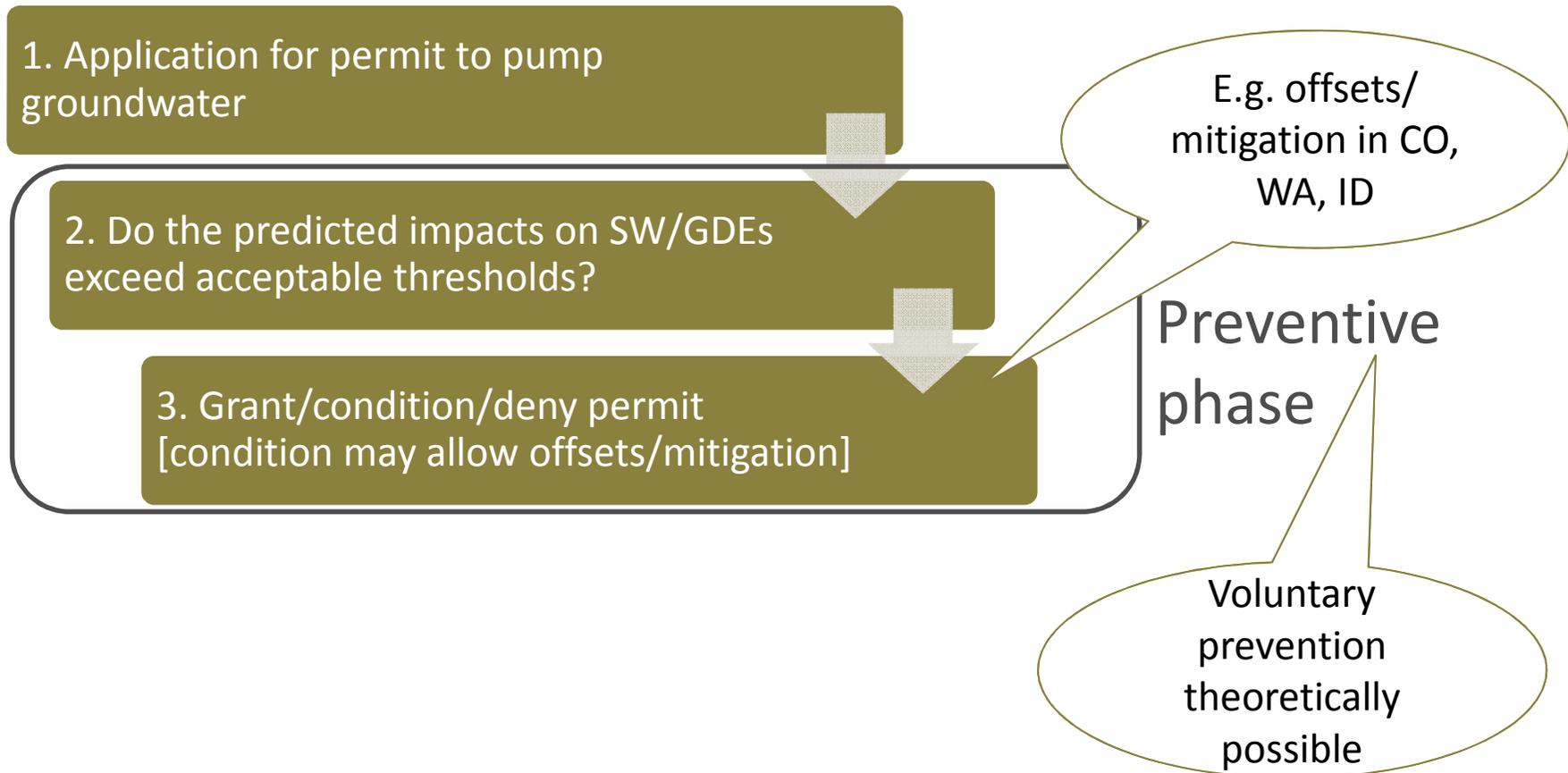
San Luis Valley, CO  
Photo: Fred Bauder, Wikimedia Commons

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2. Complex quantitative measure (micro scale, case-by-case)
  - E.g. 0.1%/100 yr stream depletion rule (CO)
3. Principle
  - E.g. “public interest” (ND), no “unreasonable effects” on the “natural stream environment” (UT)

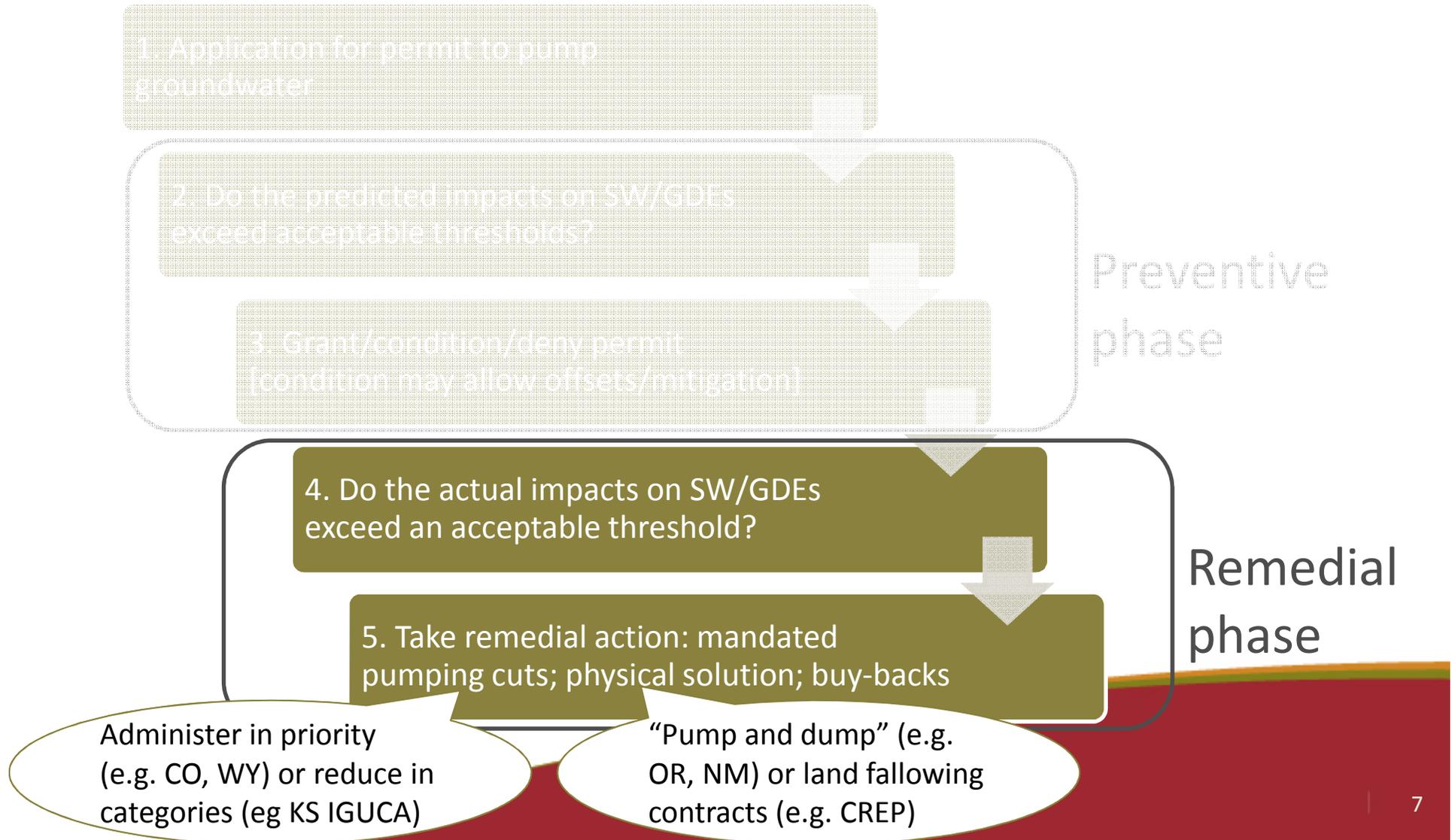


# Linking GW with SW and GDEs in water law and policy

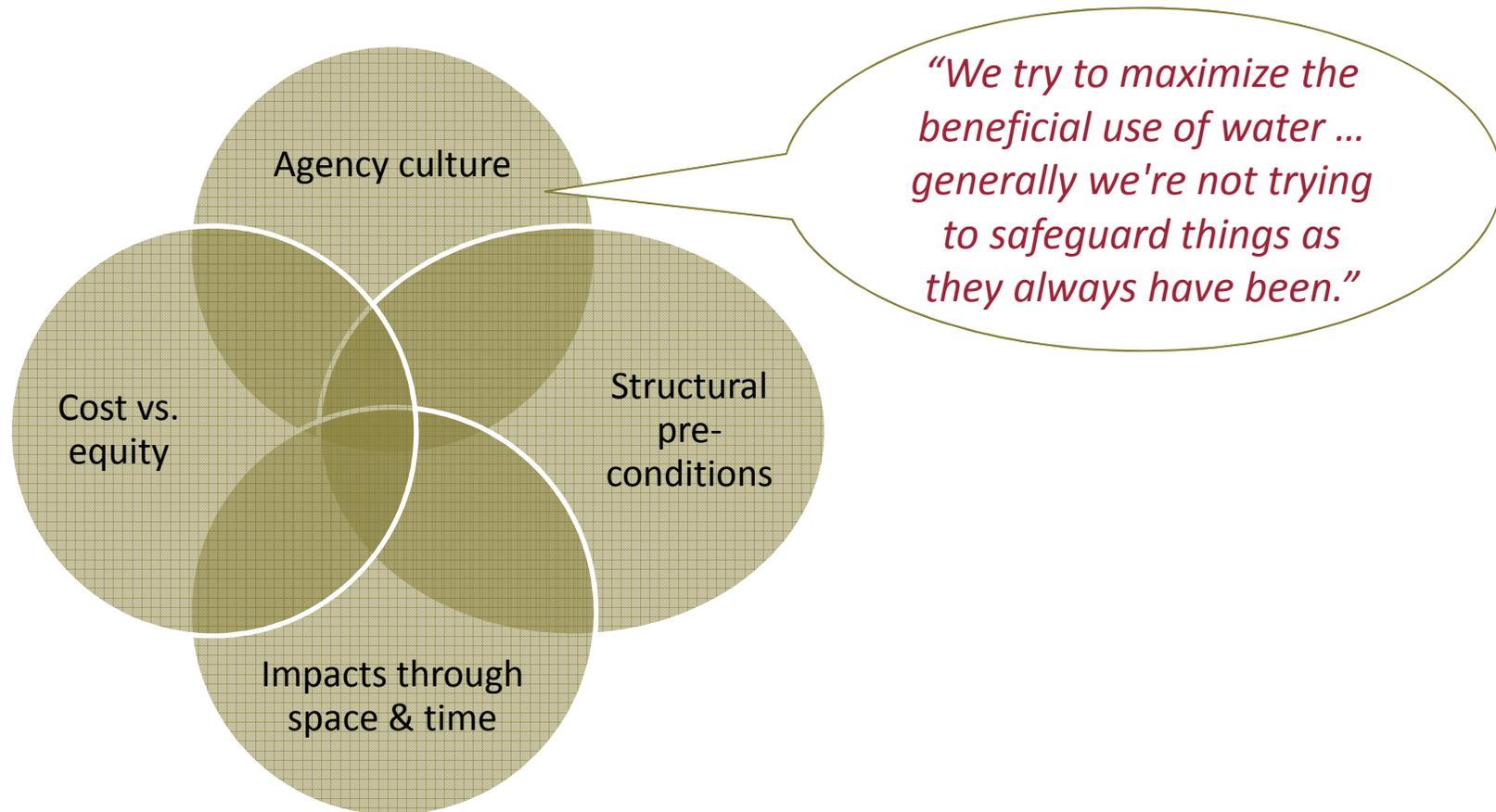


See: R Nelson, "Paying Back the River: A First Analysis of Western Groundwater Offset Rules and Lessons for Other Natural Resources" (2015) 34 *Stanford Env'tl Law Journal* 129-194.

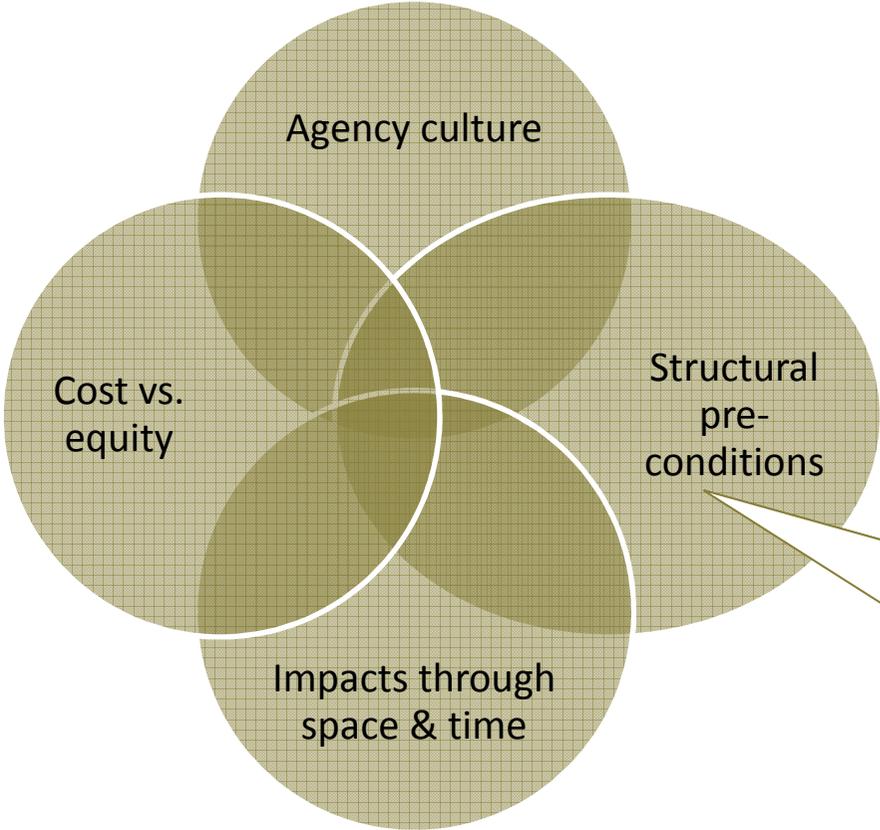
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# Practical implementation issues

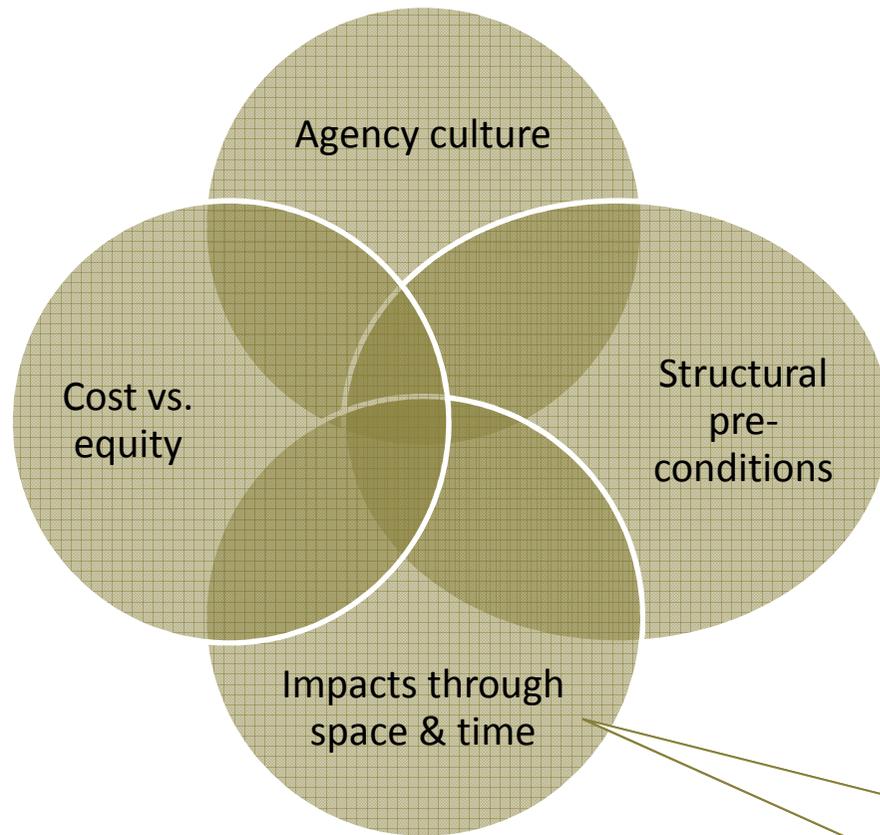


# Practical implementation issues



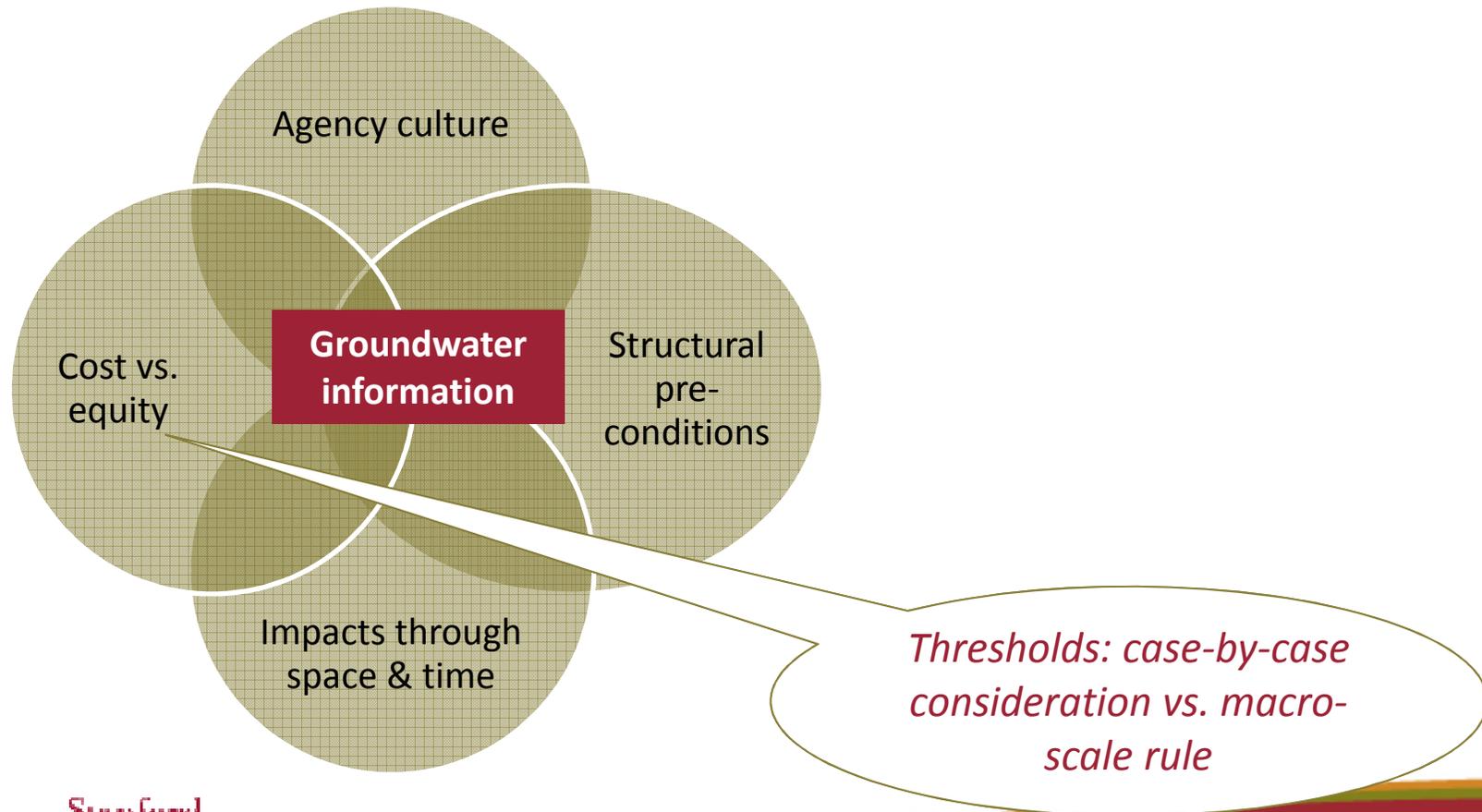
*Active third parties:  
“Frankly, if nobody's screaming, we're not in there looking at it”;  
quantified rights;  
prioritizing GDEs*

# Practical implementation issues



*Cumulative impacts  
(permit exemptions);  
time lags*

# Practical implementation issues



# Reflections in the SGMA context

- Western US water law
  - favors costly, information-intensive, micro thresholds
    - macro-scale thresholds are cheaper, easier to administer, but less precise: a worthy starting point?
  - often considers SW, rarely GDEs w/o water rights
    - thresholds based on macro scale or principles most feasible
    - CA precedents outside water law (e.g. NEPA, GW substitution transfers)  
(see <http://waterinthewest.stanford.edu/groundwater/conflicts/index.html>)
  - GDE information tools needed: prioritization methods, field checklists, inventories

# Australian formula for protecting GDEs

- Prevent impacts using simple rules of thumb in permitting
- Remedy impacts using buy-backs, some mandatory cuts
- GDE data/inventories/“toolbox”
- Prioritizing GDEs in various ways
  - Ecological value; threat level; community values

