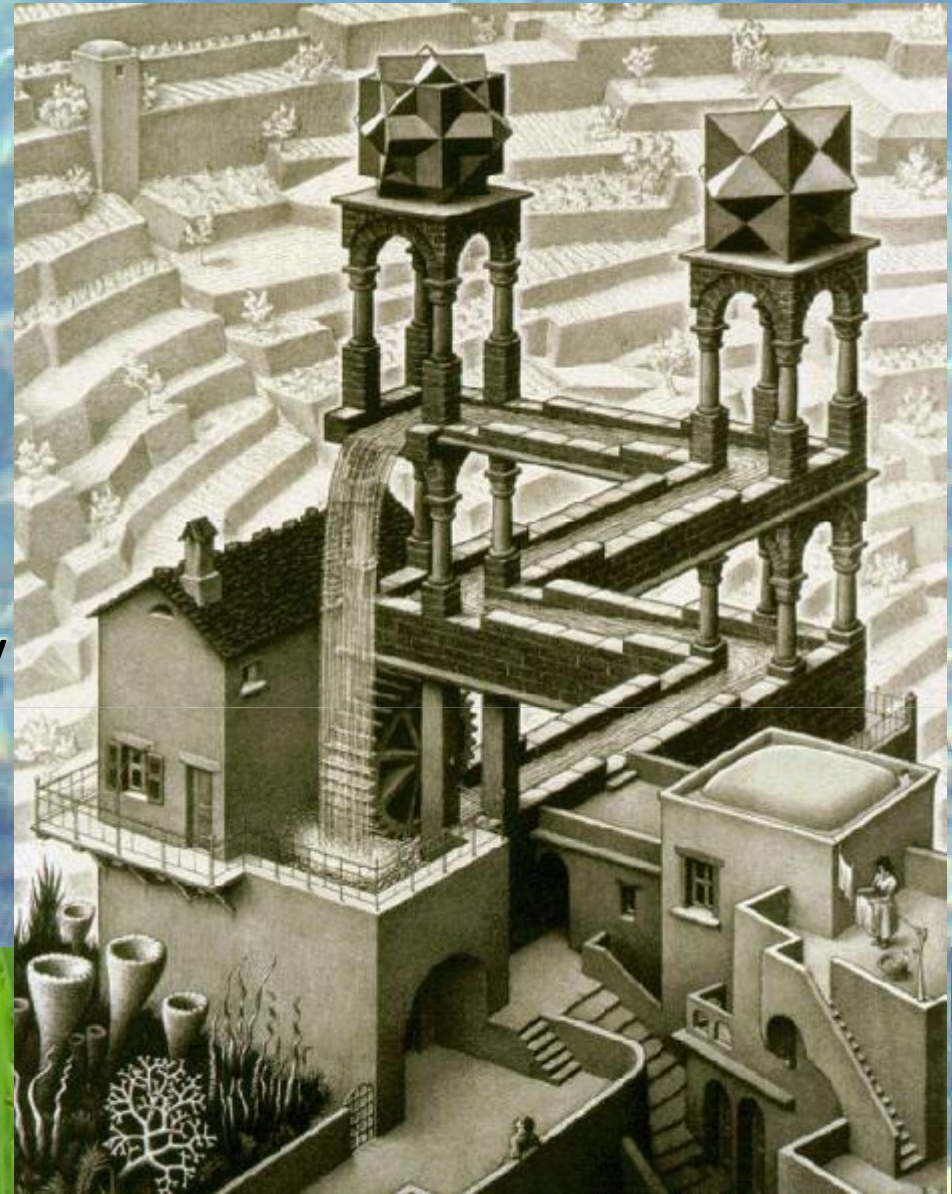


Working Group 2 System Boundaries

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UN Environment Program – Bioenergy and Water Workshop
Paris – 5, July 2010

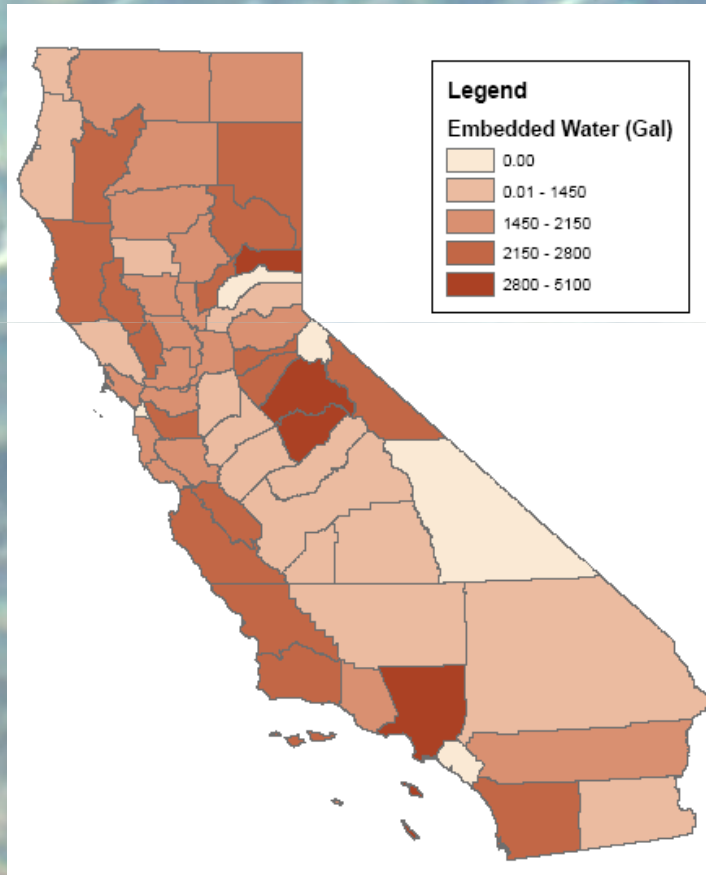
What should we be concerned about?

- Applied water (irrigation)
 - Valuable resource
 - some runs off or infiltrates
 - Rainfed consumes water as well
- Consumption (as ET)
 - Accounts for all consumption – doesn't distinguish
 - “Green” vs “Blue” water
- Industrial consumption
- “Grey” water
- Expanded system
 - Salinity control requirement
 - Transmission losses
- Where/when – resource availability

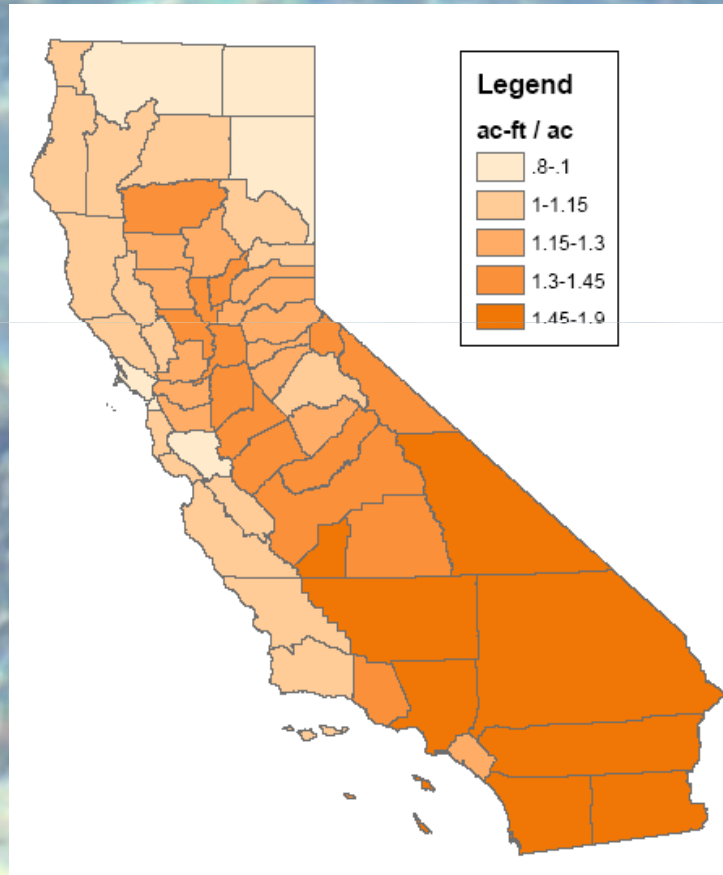
Spatial Problem

Different metrics are important in different contexts

Ethanol Embedded Water
(Liters per liter ethanol)



Per-ac consumption
(ac-ft)



Water consumption (ET) for “low-yield biomass” cellulosic ethanol

Metrics for analysis

“functional units”

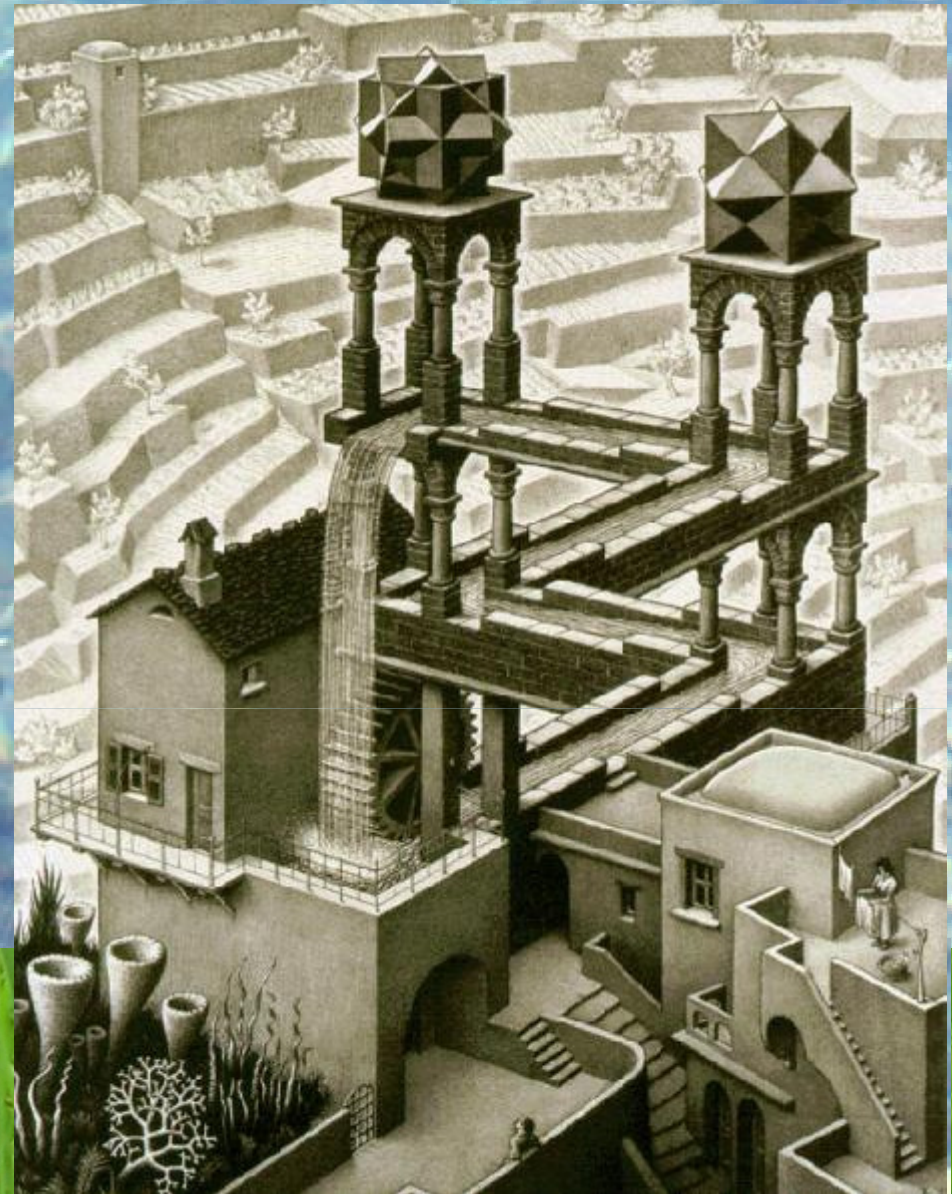
Unit	Analytical utility	Context	Scale	Embedded assumptions
For use as a basis for optimization				
L H ₂ O consumed/ MJ fuel produced	Compare to overall water resource base with other energy carriers	Water Productivity (\$ per m ³ consumed); “water footprint”	Basin, region	All water consumed is of equal importance
L H ₂ O applied/ MJ fuel produced	Compare to alternate uses of the resource	Irrigated regions with stressed irrigation resources; Energy inputs to fuel production	Field, basin, irrigation district	Irrigation water is of primary importance. Rainfed crops consume no water
L H ₂ O consumed/ha	Compare to precipitation to determine irrigation demand or environmental flows	Where resource is limited for environmental flows/groundwater	Field, basin	Water conservation is more important than maximizing derived value
L H ₂ O applied/ha	Compare to regional average water demand	Where many farms/farmers rely on the same resource	Basin, irrigation district	Equity of distribution is of greater value than overall optimization of water productivity
Pollution impact/ MJ fuel produced	Evaluate life cycle pollution impact insofar as this can be quantified	Resource/environment stressed by industrial effluent or agricultural runoff	Field, basin, region	

Report chapter

- Boundaries are comparatively simple, metrics are more complex and perhaps important
 - Should we use other phrasing?
- Types of water use
- Local impact vs. life-cycle value
 - Percent of water resource base
 - Water Stress Index, etc.

Thank You!

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