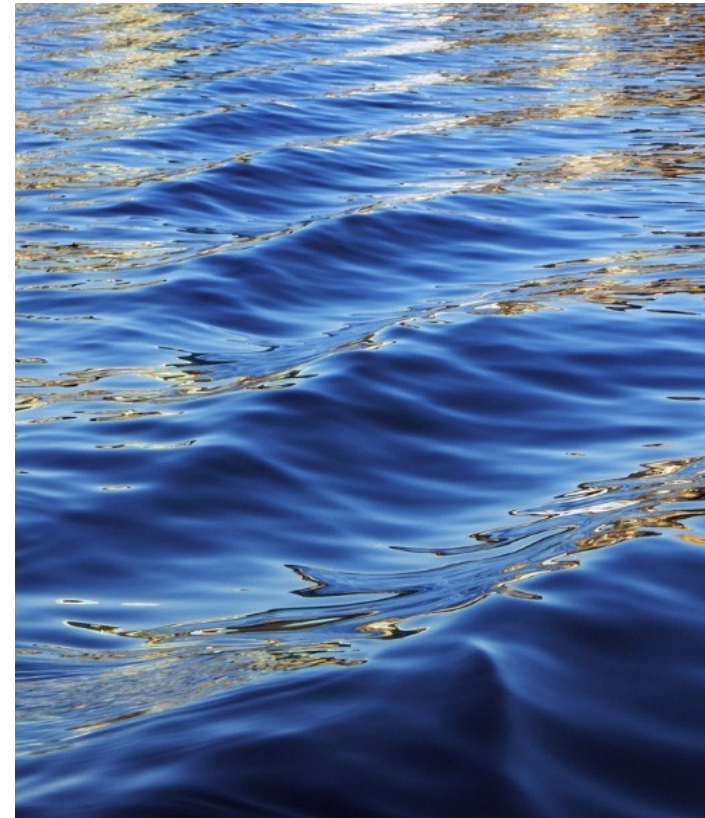


Water & Colorado Basin Agriculture

George Frisvold
University of Arizona

Constructing Strong Foundations:
A Basin Sectors Panel Discussion

2023 CRWUA Annual Conference
December 14, 2023, Las Vegas, NV



There is a scientific consensus: improving irrigation efficiency, does NOT conserve water

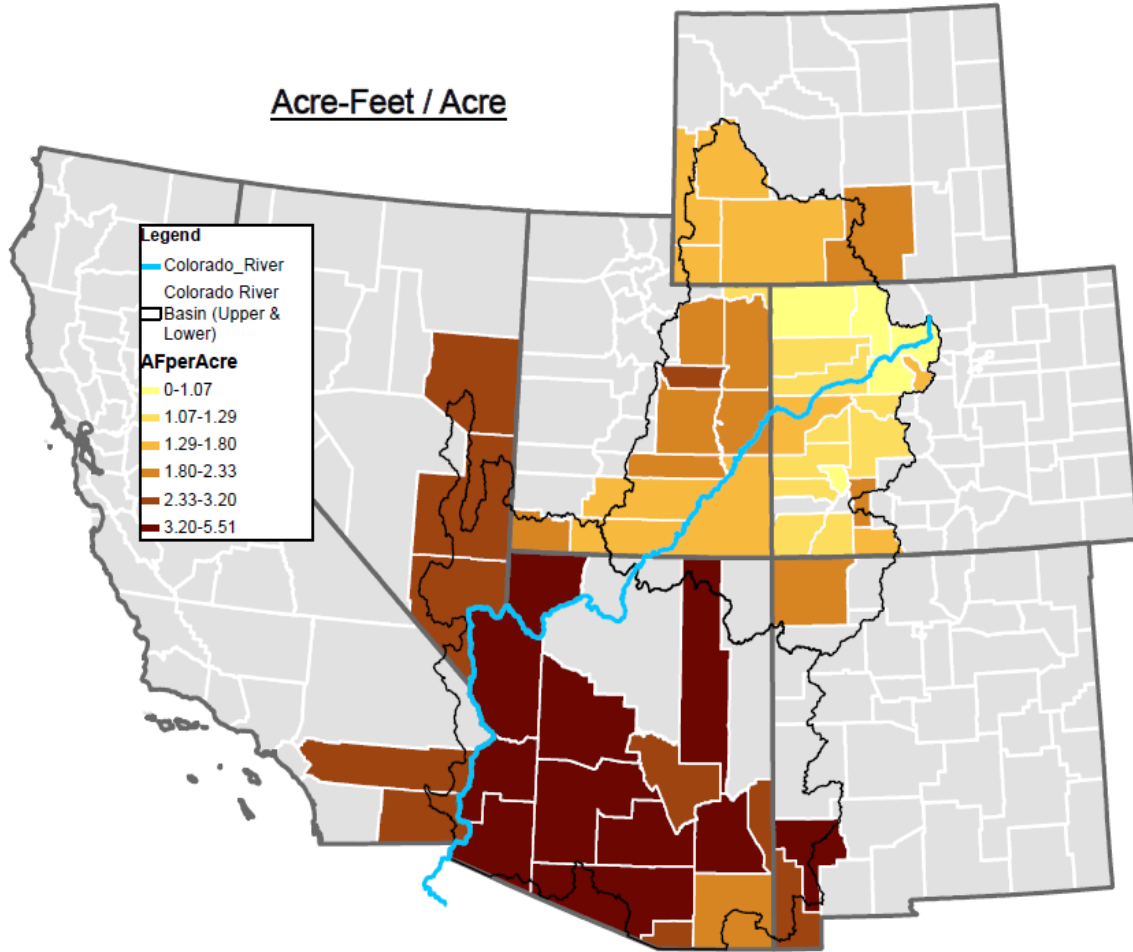
- This is a “zombie idea” – an idea **repeatedly** refuted by analysis & evidence, that should have died, but stills clings to life
- Perez-Blanco et al.* provide a comprehensive review of 230 studies finding that the norm is for improved efficiency to increase water consumption
- Improved efficiency
 - by definition reduces return flows , groundwater recharge, or both
 - can lower costs of institutionally-imposed constraints in water supplies (but it is the institutional constraints that achieve conservation)
 - There are rare special cases, but these are **not** the norm
 - Can have unintended negative consequences for riparian ecosystems

* Pérez-Blanco, C. D., Hrast-Essenfelder, A., & Perry, C. (2020). Irrigation technology and water conservation: A review of the theory and evidence. *Review of Environmental Economics and Policy*.

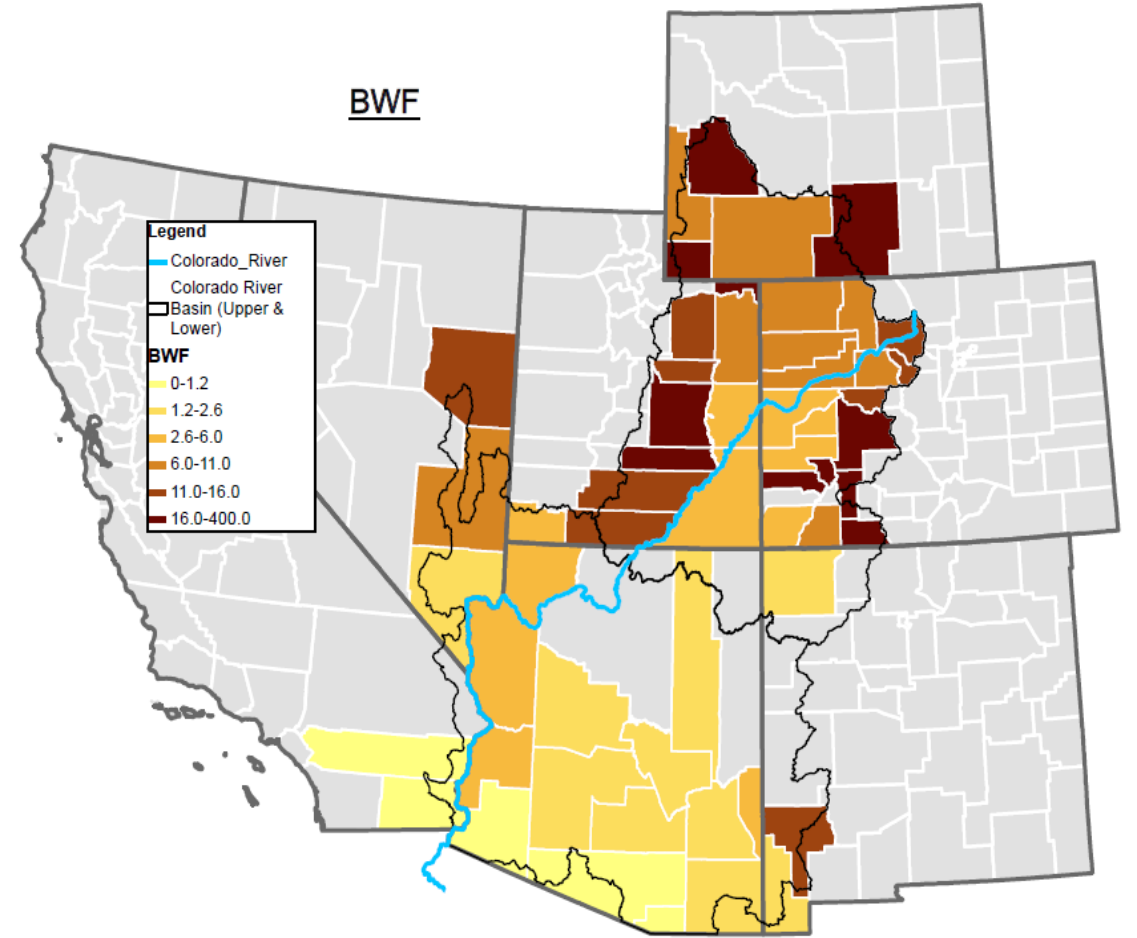
Less “water-intensive” cropping systems in the Basin have larger water footprints

- “Water-intensive” usually used to refer to water use per acre
- Water footprint refers to the amount of water needed to generate a quantity or \$ value of a crop (think of acre-feet per \$1K in crop sales)
- Or, you could think in terms of “economic water productivity” – dollar value of crops produced per acre-foot of water consumed
- Basin counties with *lower* water intensity have *higher* water footprints and vice versa

Acre-Feet / Acre



BWF



Water use intensity (acre feet of water consumed per acre) for crop production among Colorado Basin counties

Blue Water Footprint (BWF) for crop production among Colorado Basin counties

Hobby farms (those with <\$25K in gross farm sales) ...

- Applied >0.8 MAF of irrigation water in the Upper & Lower Colorado Basin in 2018 (most recent USDA data)
- Applied >2.3 MAF across the entirety of the 7 Basin States
- As a group, have had net farm income losses of -\$1.2 billion per year across the entirety of the 7 Basin States
- Have farm income **losses of more than -\$500 per acre foot** of water applied
- Account for less than 1% of gross farm revenues across the 7 Basin States