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# Supply & Demand: How Do They Relate to Water Budgets

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# Introduction & Objectives

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- Consider what constitutes a water budget
  - Considerations of scale
- What are components of a water budget for the Middle Rio Grande?
- Are there really sources of “new” water that can be considered for augmenting supplies?
- Objective of this presentation is to consider the concepts of scale in preparing a water budget
  - Explain in context of stormwater as a potential resource

# What is A Water Budget?

(Water Balance)

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- A quantitative analysis that shows:
  - All sources of water to a basin (i.e. control volume)
  - All sinks of water from the basin
  - How water moves through the basin
- A basin is in balance when the sources and sinks of water are equal
  - What time period should be used for determining balance (1 year, 5 years, longer)?
  - Is it really necessary that a basin be in balance?

# Definitions

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- Withdrawal = Diversion = Water withdrawn from surface or ground water
- Depletion – Ambiguous
  - Surface water – Depletion = Consumptive Use
  - Ground Water – Depletion = Amt. pumped from wells
- Consumptive use = Water lost to atmosphere through ET
  - **Consumptive Use = Withdrawal – Return Flow**
- Conjunctive management = Mgt. of surface & ground water as single, connected resource
- Sustainability = Actions taken today do not compromise needs of future generations
- 1 AF = 1 acre-ft = 325,829 gal

# Issues of Scale

- Household water
- Urban water utility
- Middle Rio Grande watershed
- State of New Mexico



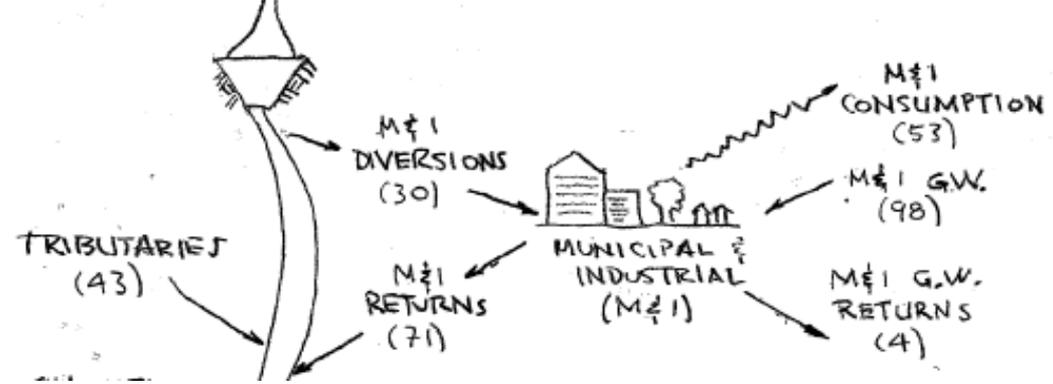
# Household Water Budget

- Principal objectives:
  - Support desired quality of life
  - Reduce monthly water bill
- Constraints
  - Cost of implementing water savings
  - Impacts on neighborhood
- Strategies
  - Water saving appliances
  - Rainwater capture & use
  - Grey water reuse
  - Curtail outdoor watering
- Example:
  - Urban use in ABQ has decreased from ~250 gpcd (1995) to ~130 gpcd (2014)
  - But lots of dead trees in my neighborhood

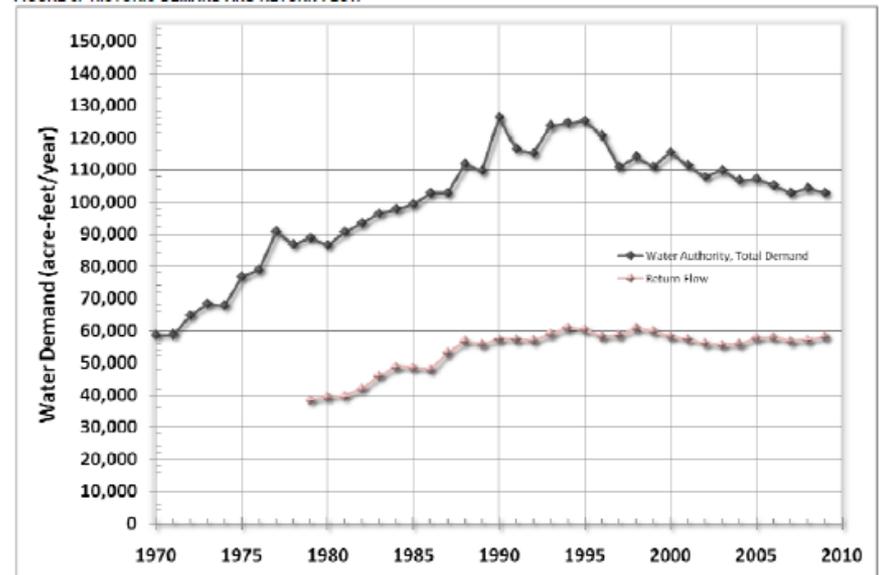


My 50¢ rain barrel

# Urban Water Budget

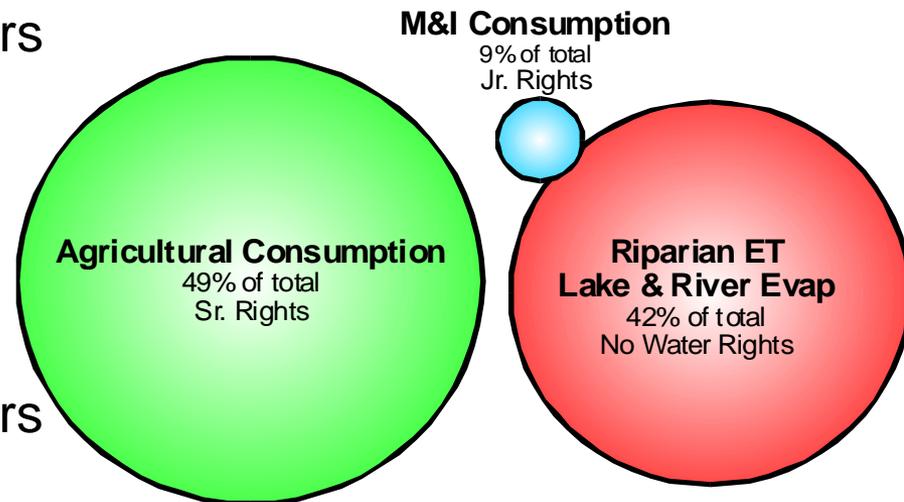


- Principal objectives:
  - Provide reliable high quality water supply for M&I needs
- Constraints:
  - Obtaining supply in over allocated basin
  - Costs must be acceptable to customers
- Strategies
  - Purchase new supplies (ag, interbasin transfers, brackish/saline sources)
  - Stormwater capture
  - Wastewater reuse
  - Conservation?
    - Extends supplies (+)
    - Decreases revenues (-)



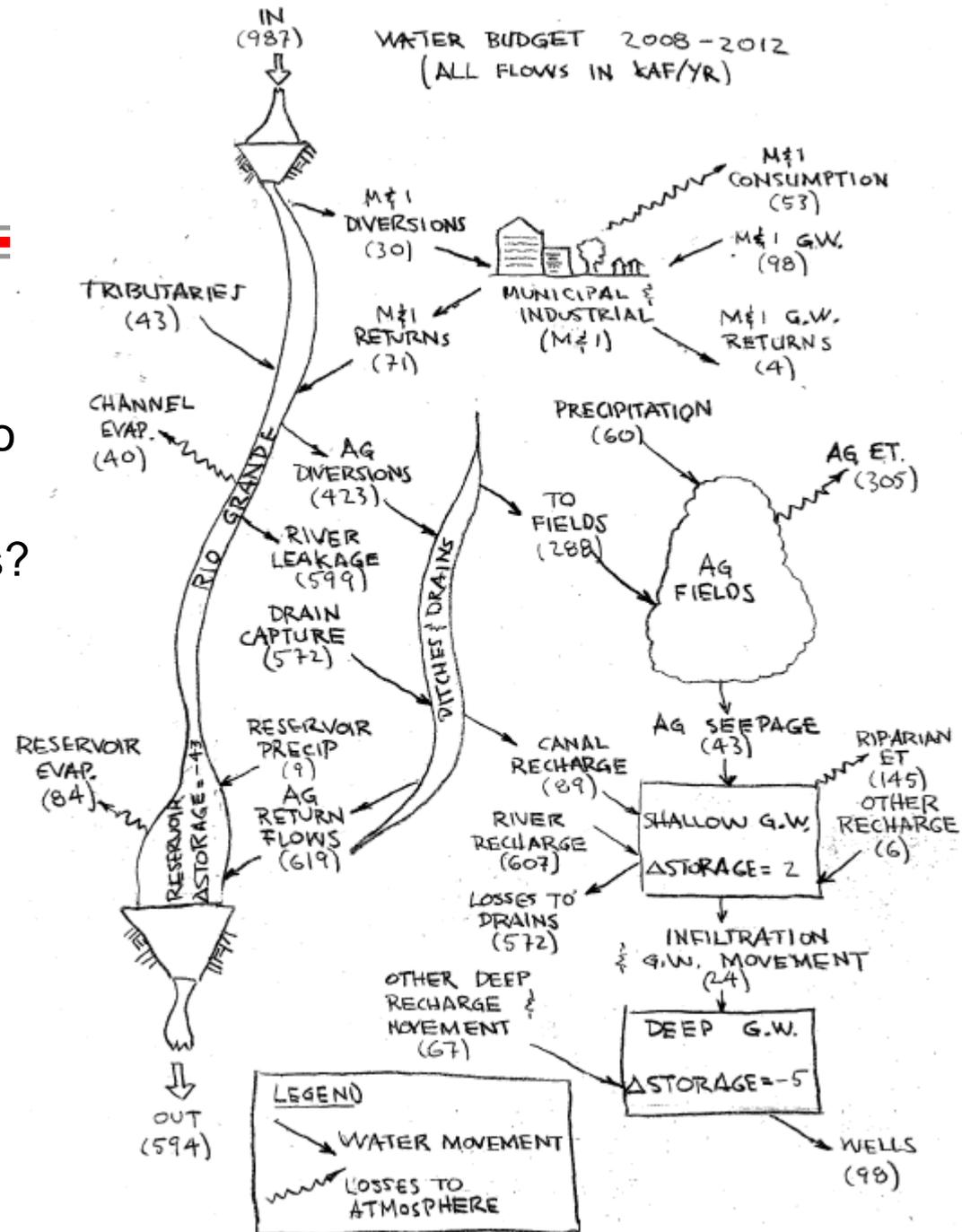
# Regional Water Budget

- Principal objectives:
  - Assure supply for all users (ag, M&I, environment)
- Constraints:
  - State water law (water rights & priority administration)
  - Conflicting objectives between users
  - No regional funding sources
- Strategies
  - Interbasin transfers
  - Conservation
    - Limited incentive for senior users
    - Reuse
    - Limit evaporation & evapotranspiration
  - New supplies (stormwater(?), brackish water, etc.)



# The Grand Challenge: 3 Questions

- What changes can be made to bring basin into balance?
  - What knobs can be turned to change consumptive use?
- Who has authority to turn knobs?
- What are the incentives to change water use?
  - What are consequences of not changing?



# State Water Budget



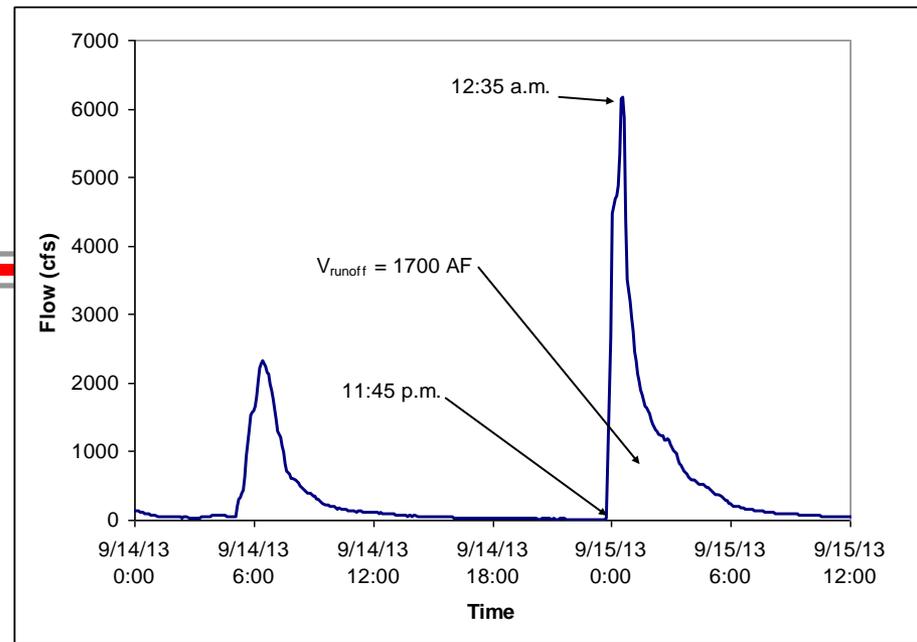
- Principal objectives:
  - Assure sustainable supply for all users (ag, M&I, environment)
- Constraints:
  - Comply with interstate compacts & treaties
  - Administer state laws
    - Most basins not adjudicated
- Strategies
  - Require regions to develop & comply with a balanced budget
    - Limited success
    - Limited authority & incentives
  - Active Water Resource Management

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Example: Urban Stormwater as New Source

# Stormwater for Public Water Supply?

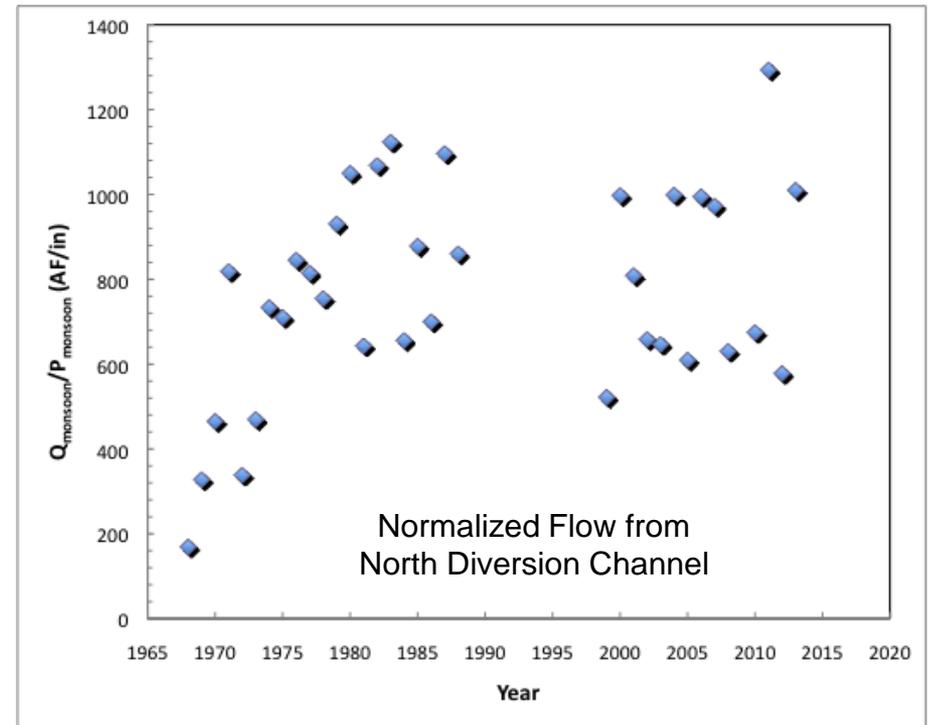
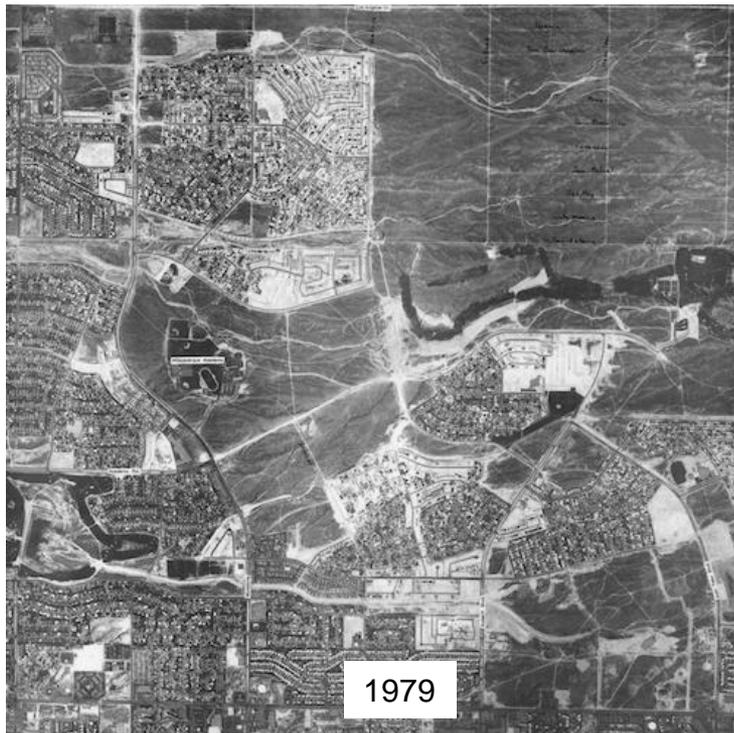
- Stormwater appears available
  - We can see it
  - Nobody owns right
  - Can imagine capture & use
  - Potential supply for residential, utility & regional use
- But:
  - Comparatively small volume (~5,000 AF/yr in NDC)
  - Capture & storage is complicated, difficult & costly



San Juan Chama Water  
Treatment Plant

# Urban Stormwater Runoff

- State Engineer allows on-site collection of stormwater above that which occurred prior to urban development
- Conventional wisdom says urbanization increases runoff – this doesn't occur in Albuquerque
  - Cinder block walls retain stormwater



# Notable Example of Issue of Scale

- EPA issued new regional permit (MS4 permit) requiring storm water retention to protect water quality in Middle Rio Grande
- Interstate Stream Commission (ISC) objects because of impacts to surface water
- Example of “Green vs. Green” conflict (R. Berrens)

## NEW MEXICO INTERSTATE STREAM COMMISSION

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February 26, 2015

Mr. Ron Curry  
Region 6 Administrator  
Environmental Protection Agency  
1445 Ross Avenue  
Dallas, Texas 75202-2733

**Re: Middle Rio Grande (MRG) Watershed Based Municipal Separate Storm Sewer Permit, Environmental Protection Agency (EPA) NPDES General Permit No. NMR04A000**

Dear Mr. Curry:

The New Mexico Interstate Stream Commission (ISC) was recently provided a copy of the above-referenced Permit. The Permit provides authorization to parties in much of Bernalillo County, New Mexico and a part of Sandoval County, New Mexico to discharge stormwater under the National Pollutant Discharge Elimination System. Based upon our review of the Permit, as well as discussions with local stakeholders, we are concerned that the permit may result in actions that reduce the volume of stormwater that reaches the channel of the Rio Grande in parts of Sandoval County and much of Bernalillo County, New Mexico.

The ISC is authorized by law to “investigate water supply, to develop, to conserve, to protect and to do any and all other things necessary to protect, conserve and develop the waters and stream systems of this state, interstate or otherwise.” Section 72-14-2, New Mexico Statutes Annotated, 1978, 1980, 1982, 1984, 1986, 1988, 1990, 1992, 1994, 1996, 1998, 2000, 2002, 2004, 2006, 2008, 2010, 2012, 2014, 2016, 2018, 2020.

# Concluding Thoughts

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- Water budgets must consider issue of scale
  - Boundaries selected will affect perspective on potential utility of the resources
- All water in basin provides a service that is important to one or more constituents
- There is no “new” water. We must learn to live with existing resources

# Acknowledgments

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- John Fleck – UNM Writer in Residence
- Bob Berrens – UNM Water Resources Program