RECHARGE

FOR LOW-IMPACT AQUIFER MANAGEMENT

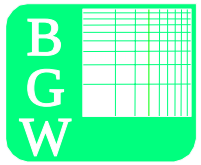
Symposium

Groundwater Infiltration and Injection

Planning for the Next 40 Years

W. Peter Balleau

July 23, 2004



Q. RECHARGE – What is it?

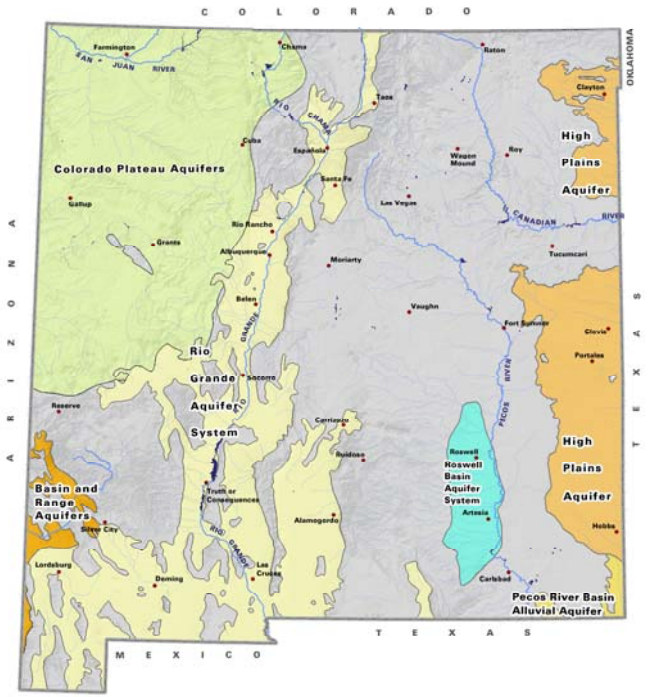
A. *"The addition of water to the saturated zone, naturally…or artificially."*

- Glossary of Hydrology AGI (1998)

≠ soil moisture
≠ well recovery
≠ flow between formations

Q. STORED WATER – What is it in New Mexico USR Regulations?

A. *"The water that has been stored underground for the purpose of recovery."*



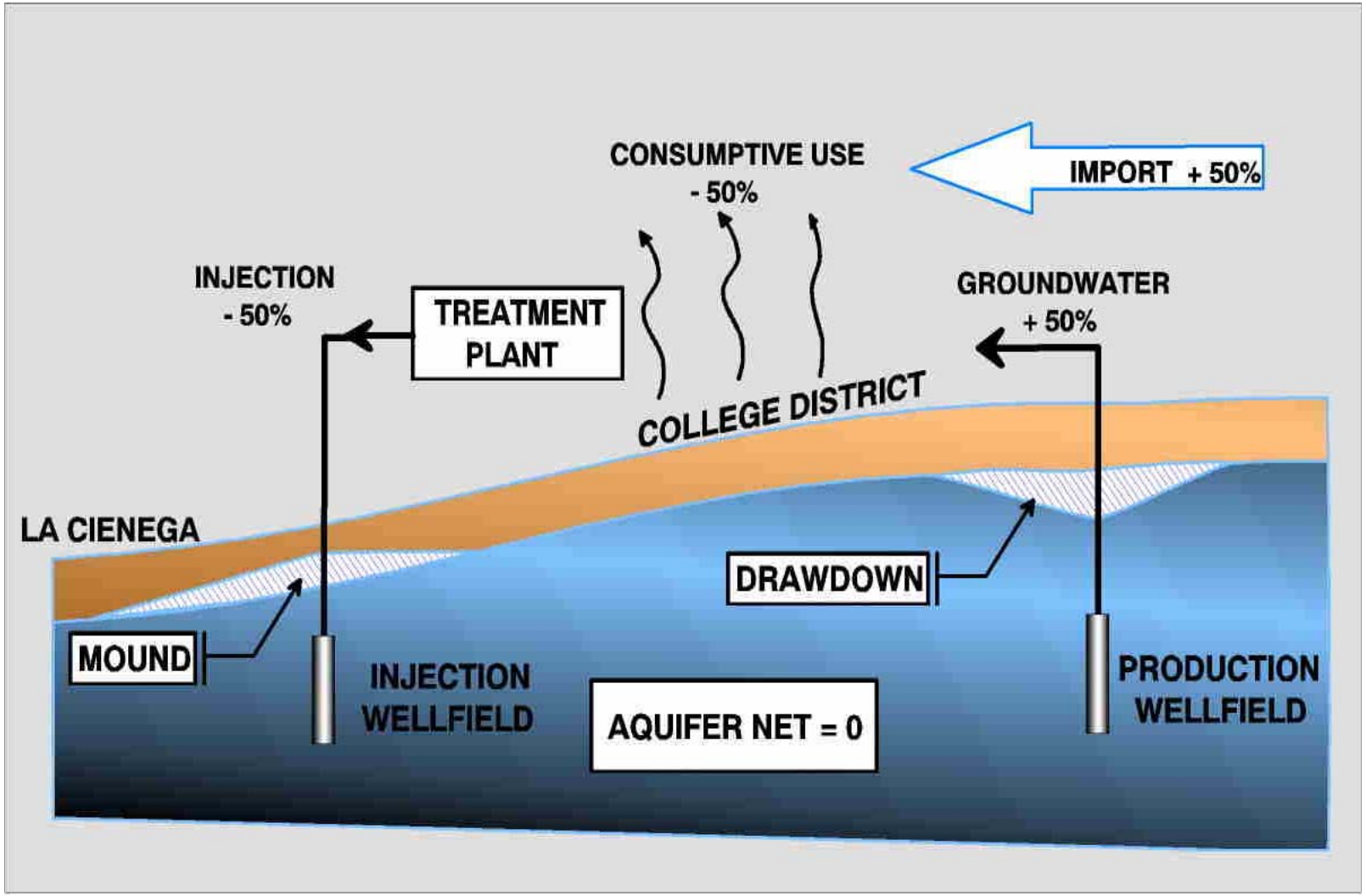
Major Streams and Aquifers

Natural Recharge	=	500,000 AFY baseflow of Major Streams
Major Aquifer Area	=	38,266,000 acres (50% of State area)
Average Rate	=	0.16 inch/year
Natural Storage	=	Aquifer area x 10% x 40 year Guideline allowance of 100 feet dewatering
	=	382 million AF
USR Permits	=	Add to natural condition using existing water rights as benefit to a public managed-water operation

LOW-IMPACT AQUIFER MANAGEMENT OBJECTIVES

- A managed level of acceptable impacts where the sources of water that support development are two components: aquifer operations and surface water.
- Natural recharge persists in sustaining the natural discharge.
- The project relies on surface water to sustain consumptive uses, and on return flow to balance aquifer storage.
- Surface water is used efficiently, and the aquifer impact is small.
- Not necessarily a USR operation.

LOW-IMPACT AQUIFER MANAGEMENT

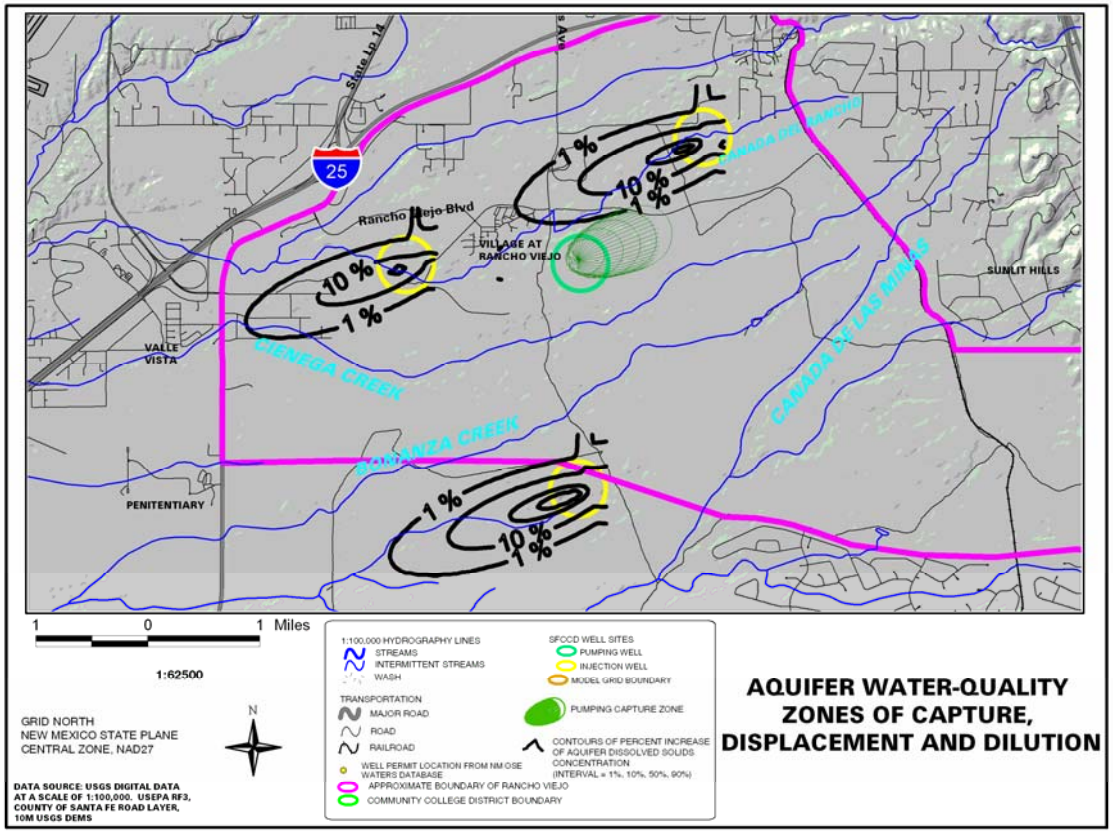


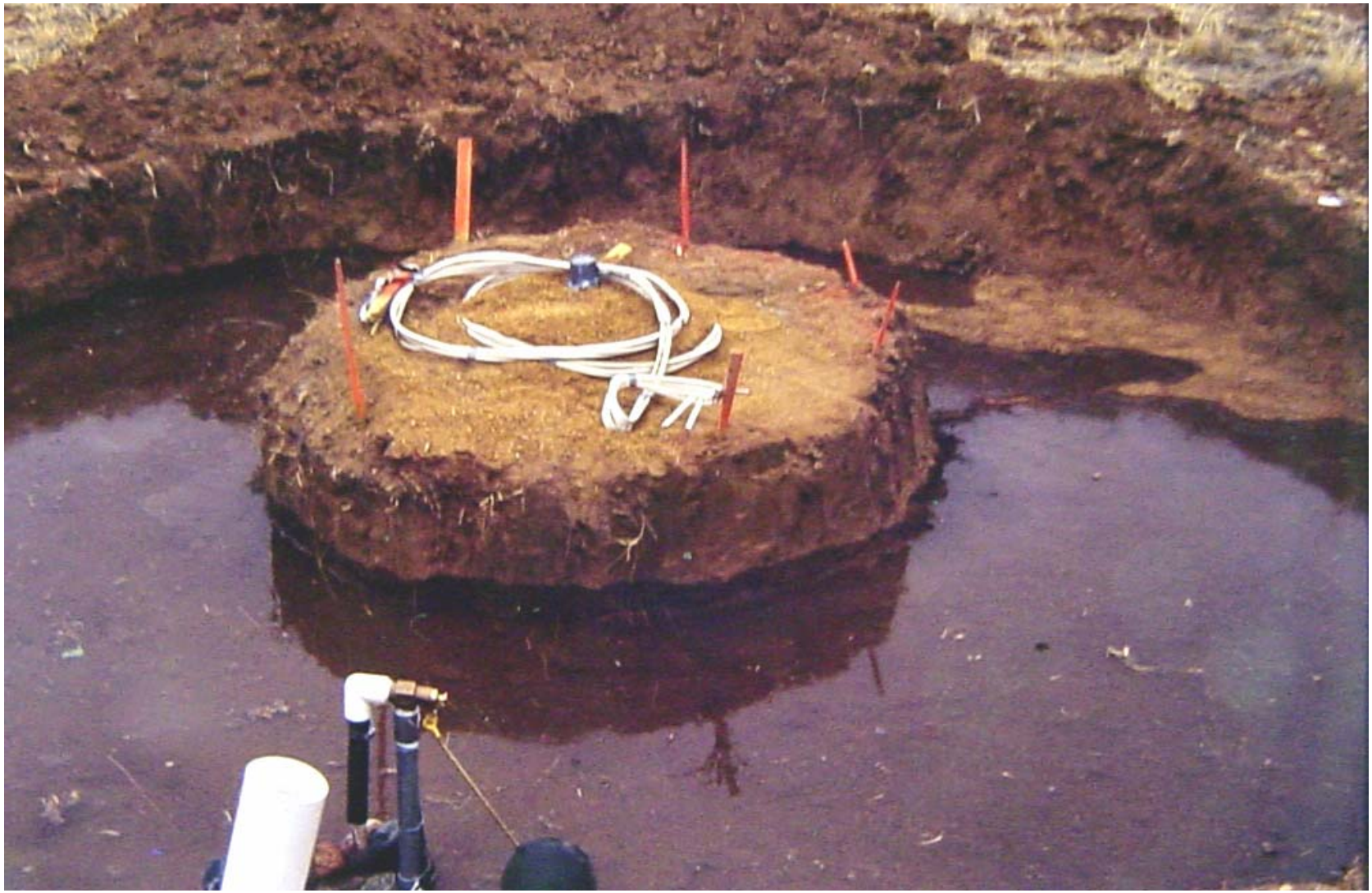
LOW-IMPACT AQUIFER MANAGEMENT BENEFITS

- The aquifer is put to use for peaking capacity, superior quality, economy of pumping lift and conveyance distance.
- Aquifer volume, water levels and flow-through are preserved.
- Aquifer water is not exported from the basin.
- Imported surface water is fully consumed for project purposes.
- Surface-water flow at interrelated streams is protected.
- Administrative issues of aquifer drawdown and stream depletion are minimized.
- Environmental requirements for recharge are satisfied by advanced-treated effluent.
- Water Quality Standards for streams are maintained.

LOW-IMPACT AQUIFER MANAGEMENT ISSUES

- Return-flow accounting is required.
- The dissolved salt load of the imported water is routed to the aquifer, then to baseflow.





Ancha Formation Infiltration Rate 4.3 ft/day

LOW-IMPACT AQUIFER MANAGEMENT OPPORTUNITIES

- San Juan Chama Project water: 55,000 AFY to Rio Grande must be 100% consumed.

Utility of San Juan Chama Project water can be amplified by CU ratio.

55,000 AFY/0.5

= 110,000 AF use with 55,000 San Juan Chama Project consumed and 55,000 groundwater returned.

- Municipal/Industrial Surface Water Consumptive Use Rights: Instead of Waste Water Treatment Facility returning aquifer storage to river, inject to maintain aquifer storage.

LOW-IMPACT AQUIFER MANAGEMENT CONCLUSIONS

1. M & I projects require more water for the process than is consumed.
2. Surface water (direct or imported) is a renewable source that can be dedicated to consumptive use.
3. Groundwater is an operable-storage source that can be utilized to carry non-consumptive process uses, then be returned to the aquifer to continue flowing to natural discharge points while maintaining baseflow and springs.