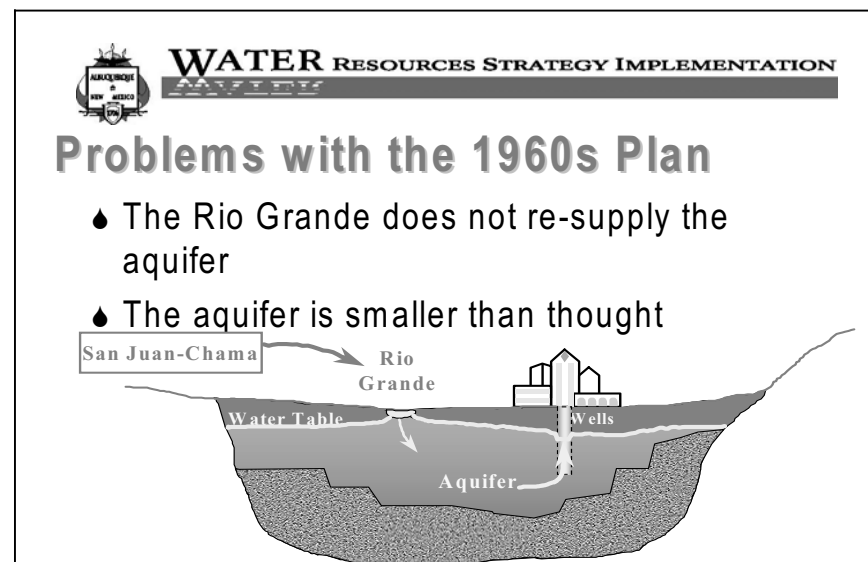
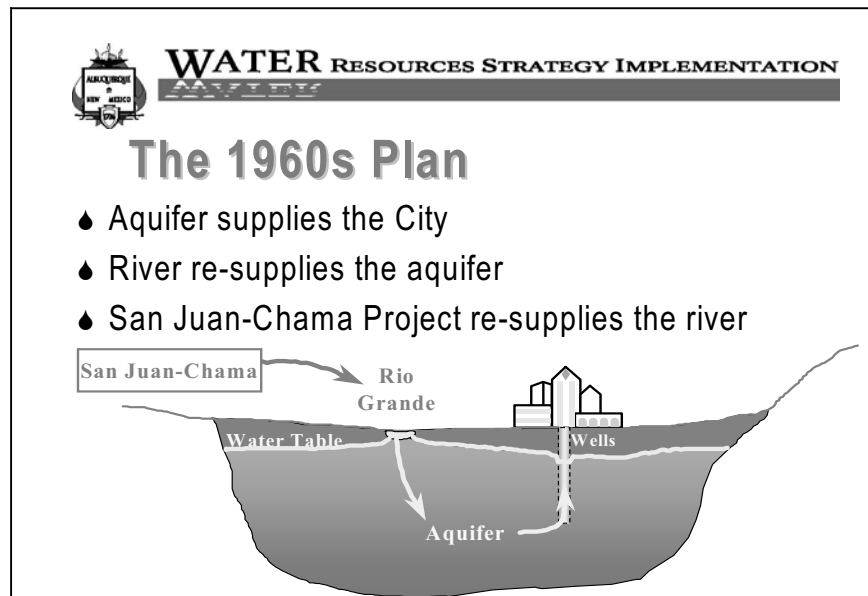


WATER RESOURCES AND TECHNOLOGY: MUNICIPAL PERSPECTIVE

John M. Stomp III, P.E.
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City of Albuquerque

ABSTRACT

The City of Albuquerque will be starting construction on the single largest public works project in its history. The Drinking Water Project includes the construction of a new surface water diversion facility and pump station, water treatment plant, and more than 50 miles of large diameter transmission pipelines. By integrating and fully using the City's San Juan-Chama water under the Drinking Water Project, the City will be preserving and protecting the aquifer for many generations to come. As the new Drinking Water Project comes on-line, new challenges face the City with regard to water quality and treatment, not to mention potential security issues. Although the Drinking Water Project, along with water conservation and reuse, will provide a long-term water supply for the City, we must continue to invest in acquiring new water supplies. The purpose of this presentation is to discuss the potential technological needs for the City as they relate to our current water resources planning. In addition, as we develop and secure new water supplies in the future, technology advancement as it relates to water quality and treatment is vital to municipalities across the west.

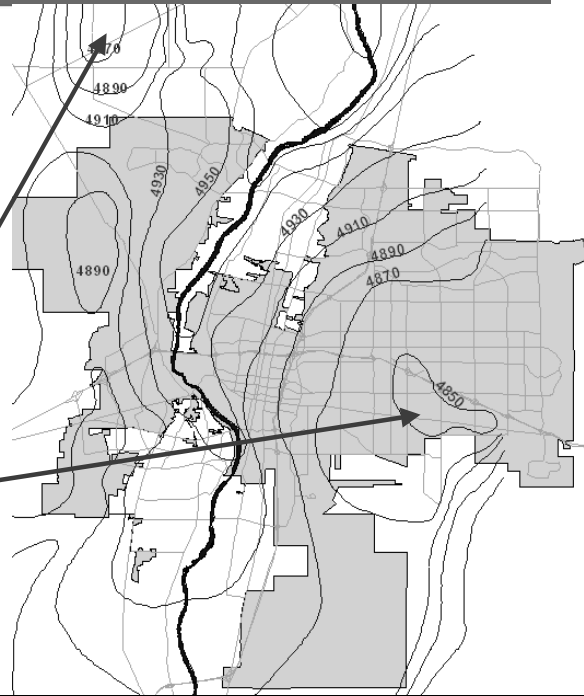




WATER RESOURCES STRATEGY IMPLEMENTATION

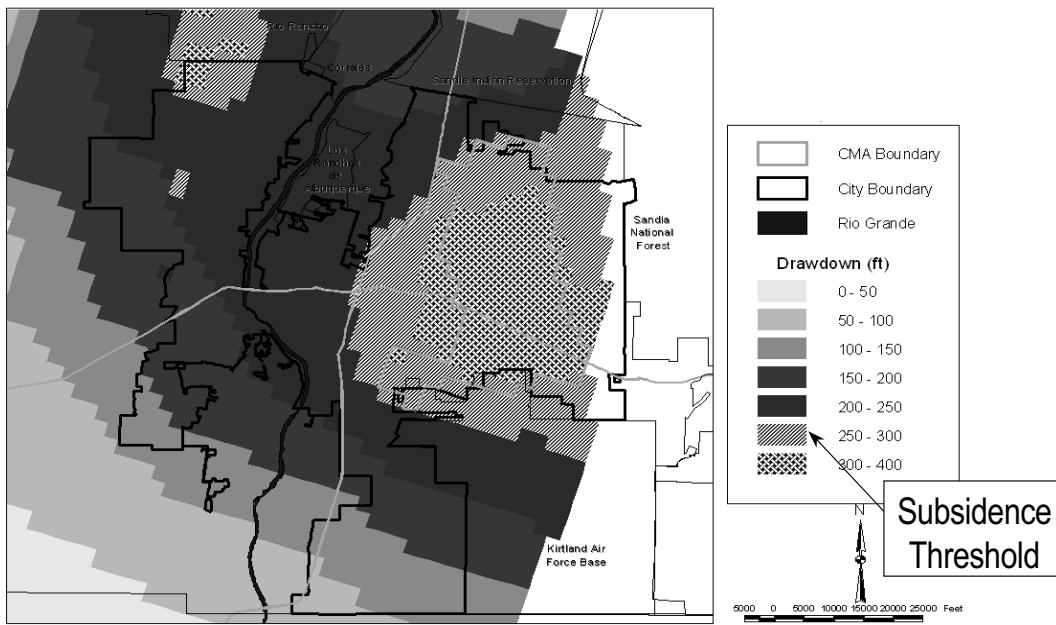
Albuquerque Ground-Water Levels Show Huge Declines

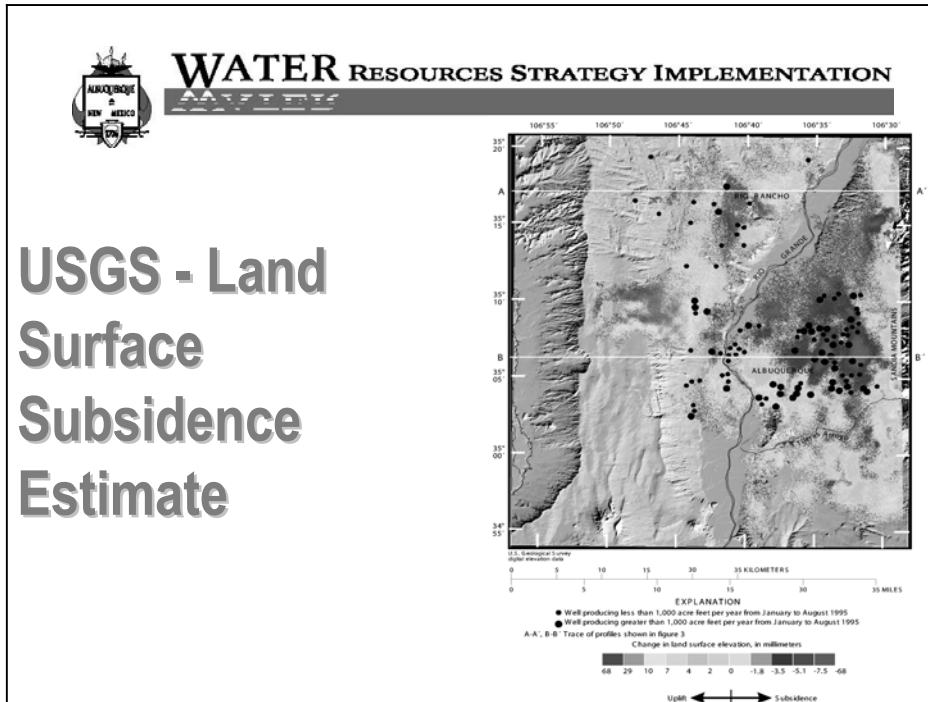
Pumping Cone of Depression in 2002



WATER RESOURCES STRATEGY IMPLEMENTATION

Drawdown in 2060 with Conservation





The need for a new water strategy really surfaced in the 1980s with continued declines in the water table. Some of the major study efforts involved are shown below. But the real finding of all this was that SOMETHING needed to be done.

WATER RESOURCES STRATEGY IMPLEMENTATION

1985-1995: Getting Started

- ◆ New USGS computer model
- ◆ US BuRec study of recharge
- ◆ UNM Value of Water study
- ◆ Water recycling study
- ◆ Conservation Program began
- ◆ Groundwater protection initiative

1/2 of water pumped is not replenished



WATER RESOURCES STRATEGY IMPLEMENTATION

Albuquerque Adopted a New Water Strategy in 1997

- ◆ 7 years of study by many experts
 - ◆ New aquifer model
 - ◆ 32 alternatives evaluated
- ◆ Active ratepayer participation
 - ◆ Customer Advisory Committee
 - ◆ Public forums and outreach
 - ◆ Support of environmental, business, civic groups
- ◆ Interaction with regulators, neighbors
- ◆ Continued Council support for necessary rate increases

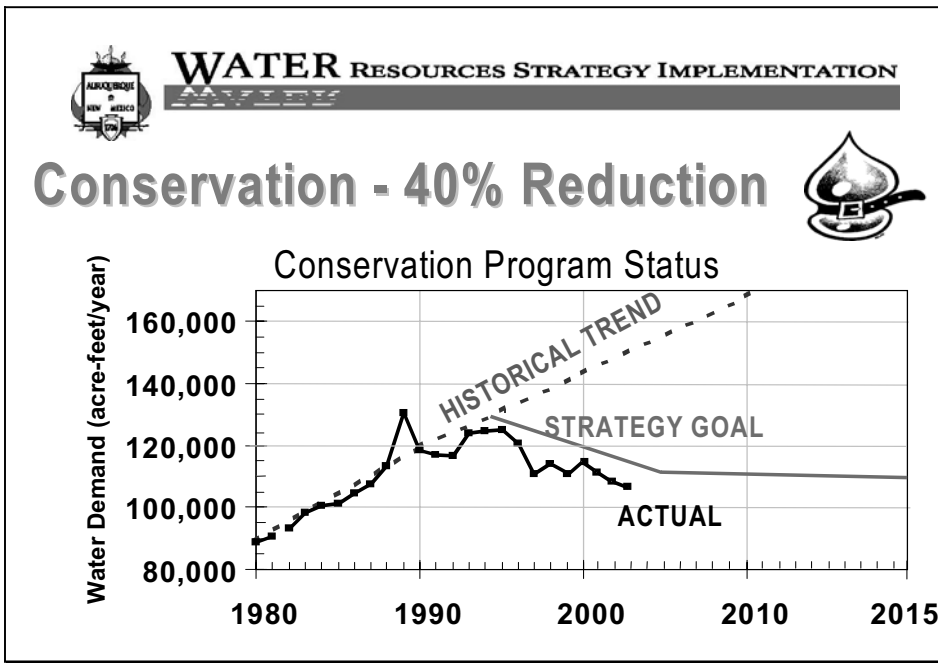
You all have probably heard about or participated in some of the many meetings and outreach activities that the City sponsored as part of the Strategy formulation process. We have not kept an exact count, but we estimate that we have made over 100 presentations to citizen groups. So we are now three years into the implementation process. The overall strategy is outlined in the materials in your packet in a fact sheet called "Our Water Resources Strategy." I would like to show you just how we arrived where we are today.



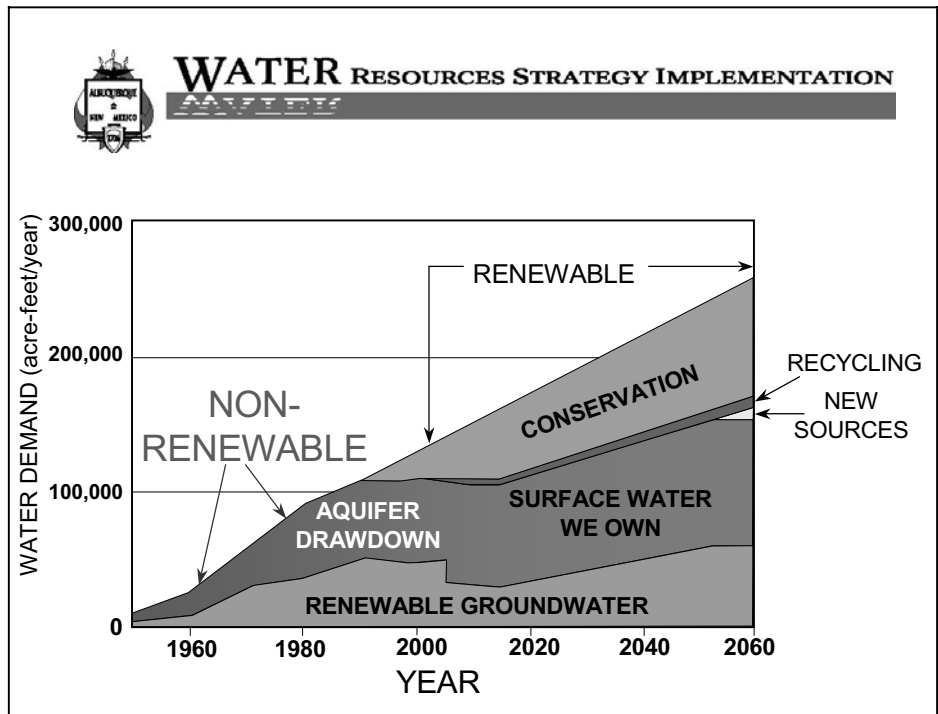
WATER RESOURCES STRATEGY IMPLEMENTATION

Water Conservation Program

- ◆ Began in 1994 with Goal of 30% Reduction in 10 years
- ◆ Currently at year 9 with 26% Reduction
- ◆ New Goal is 40% reduction by 2014



The Conservation Program began before the Water Resources Strategy was even formulated, because the City knew that conservation had to be the first step. This chart shows Actual Water Use as compared to historical trends and the Water Resources Strategy assumptions. You can see that the program has been very successful, but that we are not all the way to our goal yet.



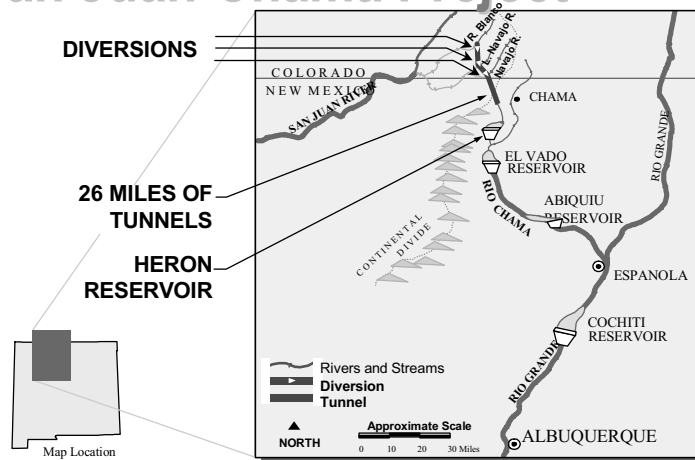


Technology Needs for Albuquerque

- ◆ Water Supply
 - ◆ Desalination technology?
 - ◆ Advanced treatment of groundwater contaminated through industrial or other processes?
 - ◆ Advanced treatment for use of recycled/reclaimed water?
 - ◆ Advances in low-flow appliances



San Juan-Chama Project





WATER RESOURCES STRATEGY IMPLEMENTATION

San Juan-Chama Project

- ◆ Legislative history shows primary purpose was to supply Albuquerque
- ◆ Albuquerque committed contractually in 1963
 - ◆ “A permanent right”
 - ◆ Full repayment of construction costs with interest plus O&M: \$40 million to date, \$100 million + when construction costs paid off
 - ◆ 48,200 acre-feet per year
 - ◆ First took delivery in 1972



WATER RESOURCES STRATEGY IMPLEMENTATION

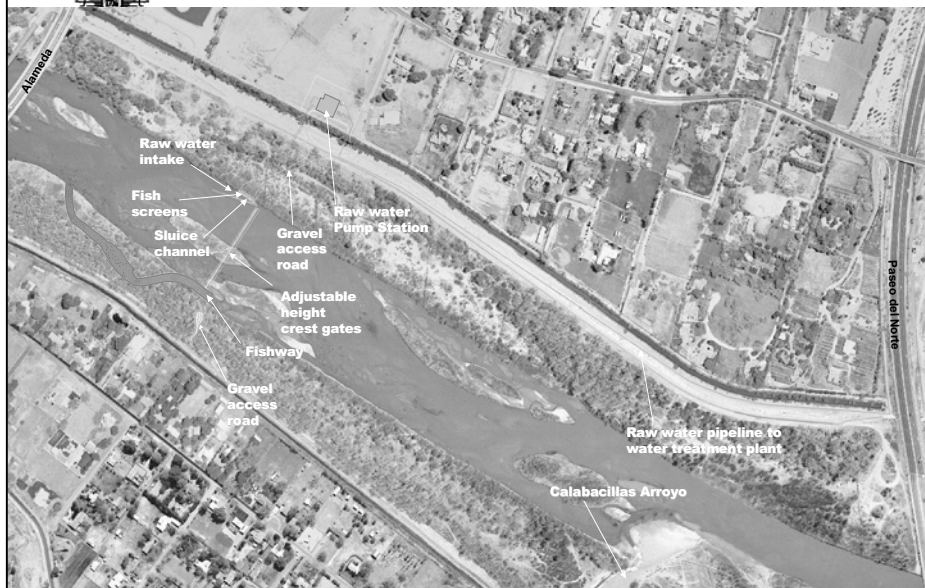
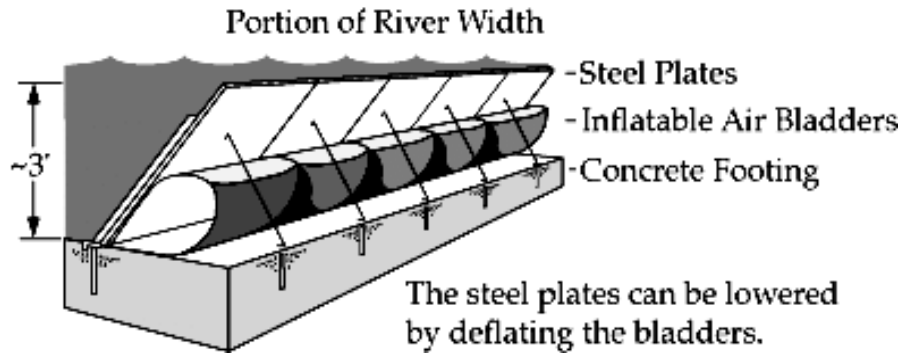


Projects to Use Renewable Supplies

- ◆ Industrial Water Recycling and Nonpotable Surface Water Reclamation
- ◆ Southside Water Recycling
- ◆ Drinking Water Project



Adjustable Height Dam



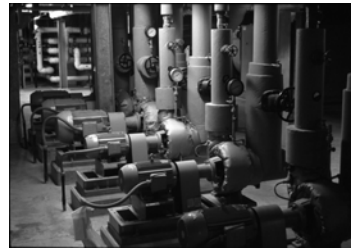


Fish Screens and Intake



Technology Needs for Albuquerque

- ◆ Water Quality - Monitoring
 - ◆ Security monitoring of the Rio Grande?
 - ◆ Security monitoring of distribution/storage?
 - ◆ How do you prevent?
 - ◆ How do you detect?
 - ◆ How do you react?

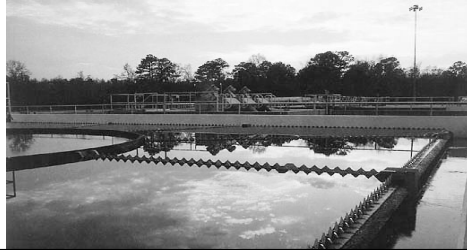




WATER RESOURCES STRATEGY IMPLEMENTATION

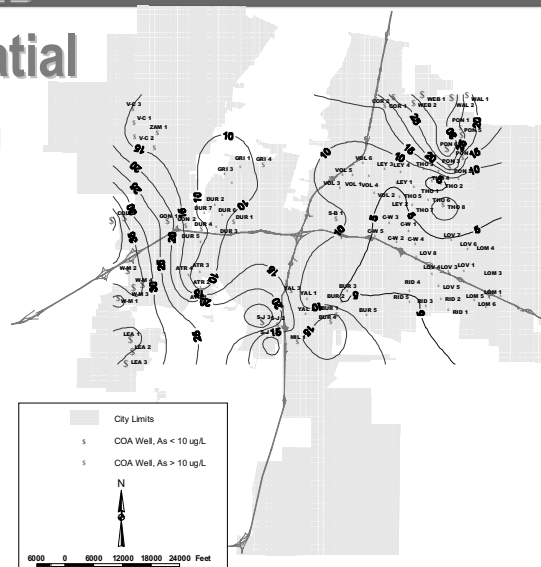
Technology Needs for Albuquerque

- ◆ Water Quality - Monitoring, cont.
 - ◆ Advanced monitoring of treatment processes
 - ◆ Advanced monitoring of distribution system (water age, natural bacteria, etc.)?
 - ◆ Water mixing (surface/ground/industrial/reclaimed/desal)
 - ◆ Advances in distribution system modeling/optimization



WATER RESOURCES STRATEGY IMPLEMENTATION

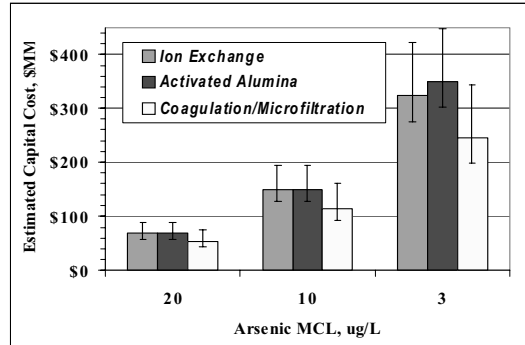
Arsenic Spatial Distribution





Arsenic Rule

- ◆ New Standard (10 µg/L) by committees on:
 - ◆ Health effects
 - ◆ Benefits
 - ◆ Costs
- ◆ Compliance by January 2006



Technology Needs for Albuquerque

- ◆ Water Quality - Treatment
 - ◆ Arsenic removal
 - ◆ Bacteria
 - ◆ Pharmaceuticals
 - ◆ Other contaminants



Technology Needs for Albuquerque

- ◆ Irrigation Efficiency
 - ◆ Advances in metering and monitoring to optimize applications
 - ◆ Scheduling
 - ◆ Delivery efficiency