



Tularosa Basin National Desalination Research Center

Feasibility Study

Presented by

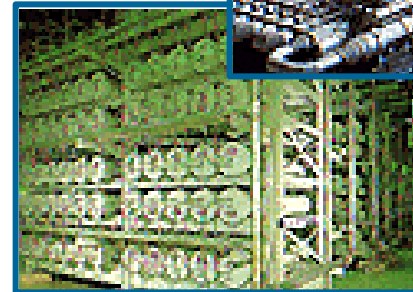
**Mike Hightower, Sandia National Laboratories
Tom Jennings, Bureau of Reclamation**

April 30, 2002



Current Desalination Trends

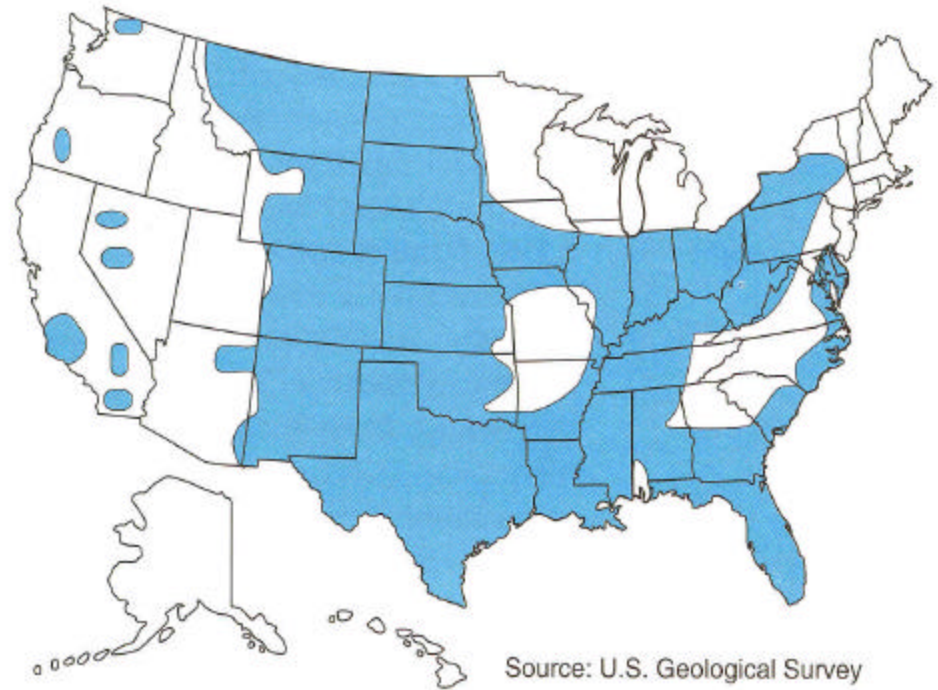
- **12,500 desalination plants in the world**
 - Supply 5.5 billion gallons per day (BGD) 1% of world's drinking water
 - Reverse osmosis and distillation are most common systems
 - Primary applications are for sea water
 - constant supply and easy disposal
- **\$10-15B investment expected in next 5 years to increase desalination by 1.5 BGD**
- **\$70-80B investment expected in next 20 years to increase desalination by 10 BGD (note: 1% increase in drinking water)**
- **Even at this level of investment, desalination will not significantly increase drinking water supplies in 2020**



Inland Desalination Technology Needs

- **Inland desalination is a major need**
 - Energy production, river quality, potable water
- **Issues include brine disposal, saline water variability, energy use, process scale**
- **Desalination costs must be reduced by a factor of 5-10 depending on application**
- **Needs and applications are international in scope, including Mexico border region**

US Saline Aquifers



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Proposed Mission

- **Focus on inland desalination research**
 - evaluate technologies that address environmental issues of inland brine disposal or eliminate brine
 - evaluate pretreatment technologies needed for process efficiencies for range of inland waters, varying water chemistries, varying water contaminants, and produced water
 - cost-effective use of smaller-scale applications
 - application of renewable energy to desalination processes
- **Complement capabilities of other national water treatment research centers**



INTERNATIONAL SPACE HALL OF FAME - SPACE CENTER



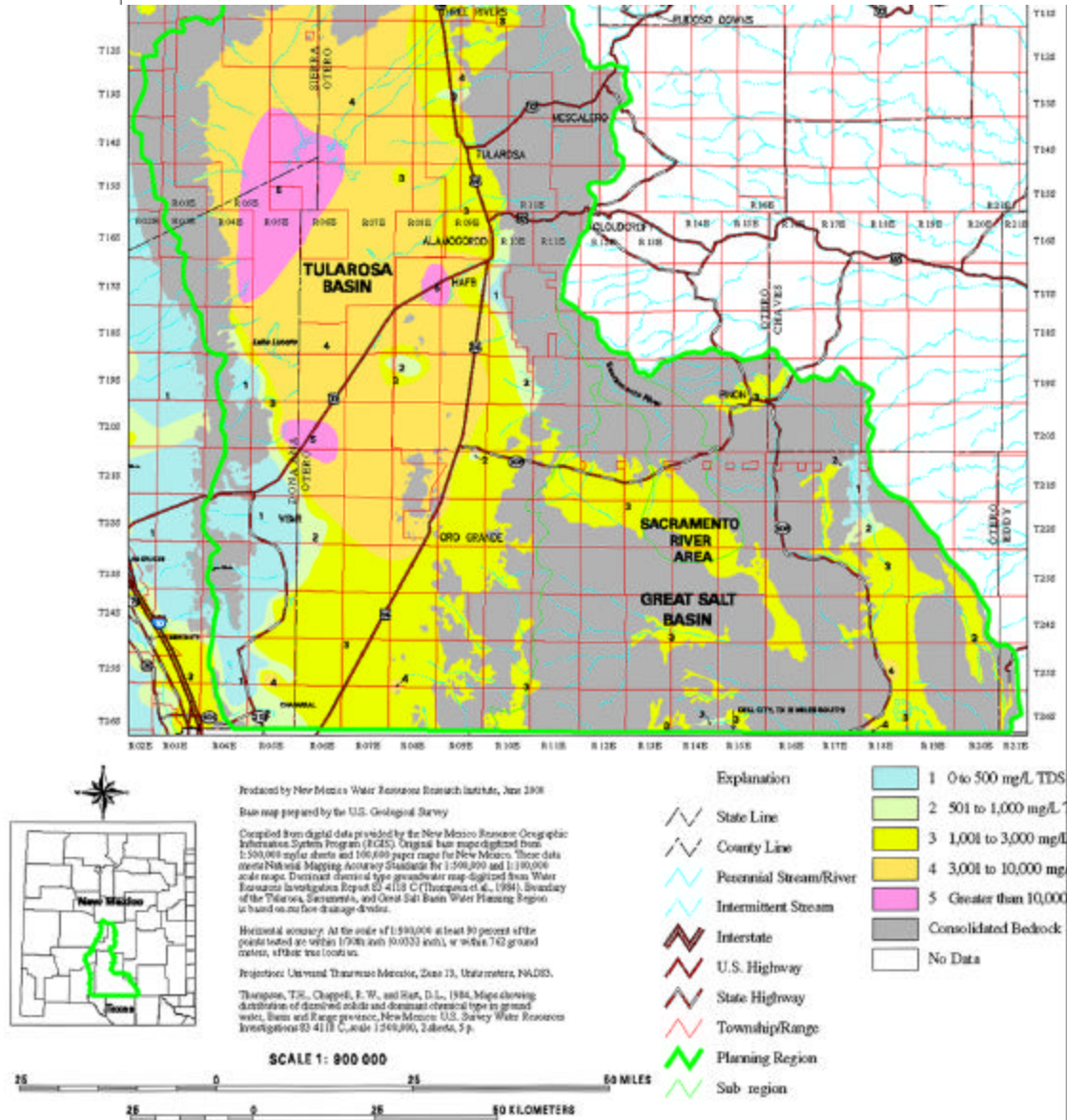
Photo by: Jim Matthews

LINCOLN NATIONAL FOREST



Photos by: Jim Matthews & Michael Charske

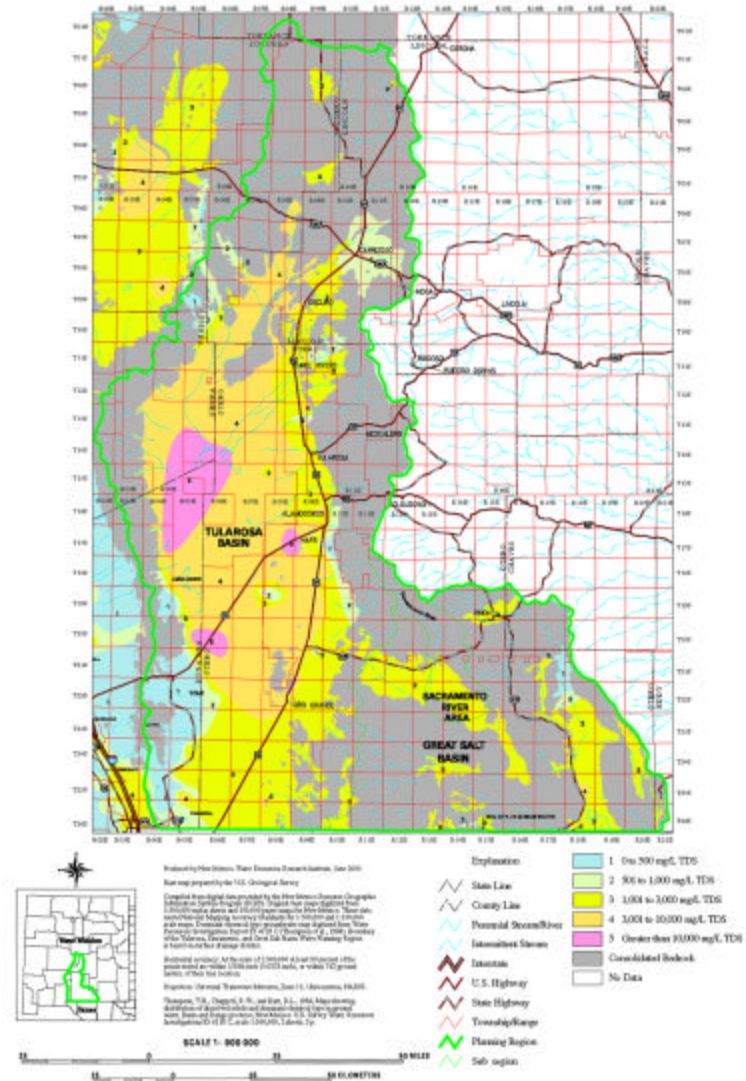
Location of the Tularosa Basin in New Mexico



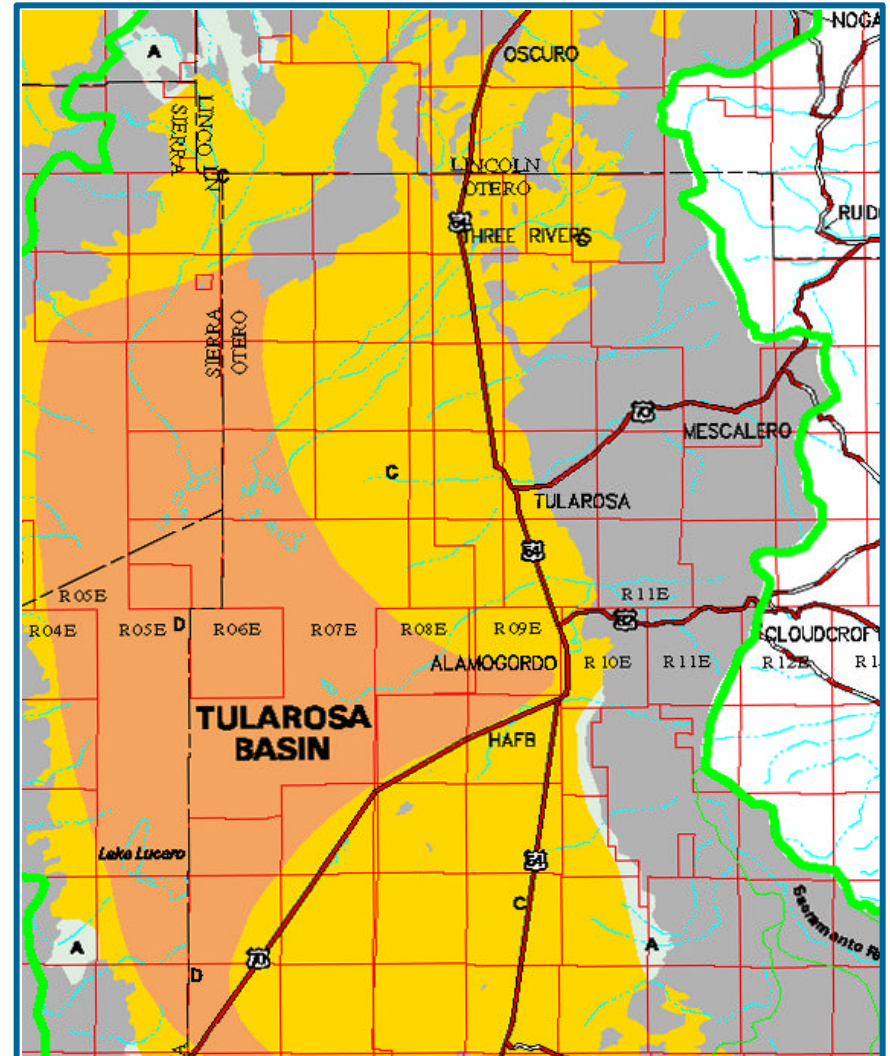
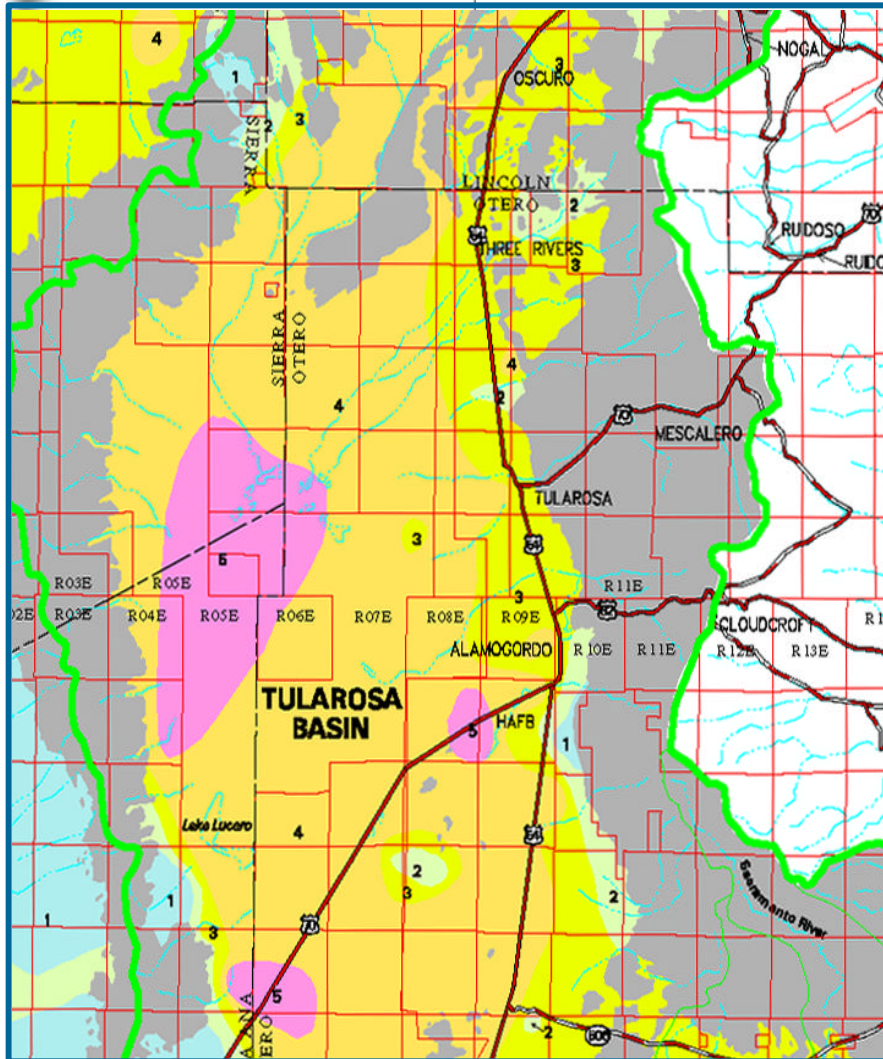
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Location Benefits

- Access to solar, wind, and geothermal energy sources
- Access to large quantity of high permeability, shallow saline groundwater
- Wide range of water quality, water chemistries, and brine concentrations over short distances
- Many brine disposal options



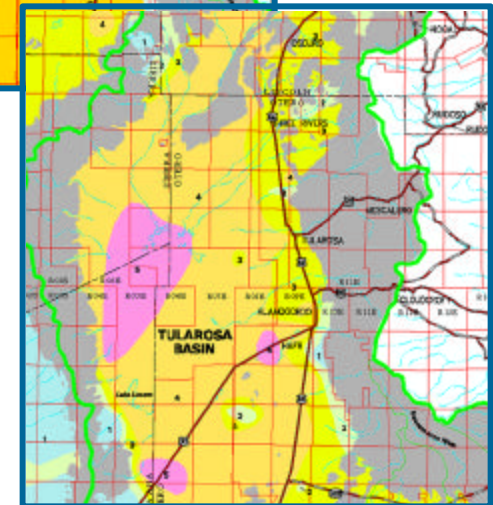
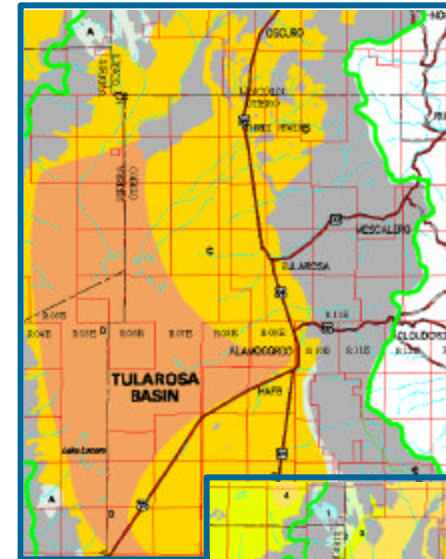
Tularosa Basin Water Quality and Water Chemistry Data



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Feasibility Study Goals and Objectives

- Identify research and development opportunities for a Tularosa Basin facility
- Identify a regional, national, and international role in desalination
- Formulate how Tularosa Basin facility would complement “national water centers”
- Develop technically and economically sound facility design, and operation and management plans
- Complete draft study by June 2002
- Develop facility design/build plan for October 2002 start



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Sandia Roles and Responsibilities

- **Sandia with Bureau of Reclamation/Denver Office is managing the feasibility study**
- **Sandia is coordinating all technical support**
 - Consultant – Livingston and Associates, Alamogordo
 - NMWRRRI – meeting coordination, web access of all public information, public outreach, etc.
 - USGS – resource availability support
- **Establish executive committee of regional and national desalination and water resource experts to guide in the facility vision and conceptual design**



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Executive Committee Members

NM WRI
NM State Engineer
USGS/NM
USGS/Las Cruces

City of El Paso
City of Phoenix
Alamogordo

USBR/Denver Office
USBR/YUMA
USBR/El Paso
USBR/NM

Sandia Labs
Livingston & Associates





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Feasibility Study Status and Schedule

- **Executive committee met in January and March and toured Tularosa Basin sites and pilot desal operations**
- **Consultant has toured Yuma and Sandia for lessons learned on desalination and renewable energy testing**
- **WRRI has started web site and will have information available by June 1**
- **30% design review April 12, 60% design review May 22, and 90% design review in June**
- **Discussions initiated with Physical Science Lab and WERC at NMSU about future operational support**



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Concept Design Highlights

- **3 locations under consideration with easy access, visibility, approximately 20 acre sites**
- **10,000 square foot research facility**
- **Facility: 6 test bays, control room, water lab, research offices, resource/education room, conference room, tour and operations viewing areas, renewable energy use design**
- **30-50 gpm reverse osmosis system for water quality control and site water supply**
- **Shop and chemical storage areas, exterior pads for large scale and renewable energy applications**
- **5 acres of evaporation pond area for brine disposal research and 5 acres for water use research**