

**ACTIVITIES OF THE JEMEZ Y SANGRE
NEW & EXPANDED WATER TECHNOLOGIES COMMITTEE**

Sigmund Silber
Jemez y Sangre Water Planning Council

ABSTRACT

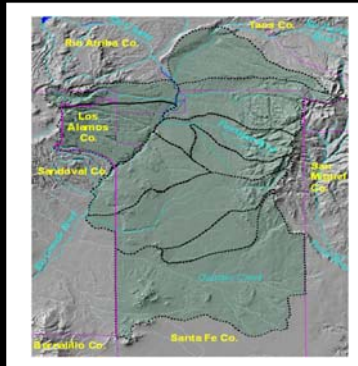
The Jemez y Sangre Water Planning Council, funded to prepare the Region 3 Water Plan, continues as a volunteer organization. Information on the activities of the Jemez y Sangre Water Planning Council can be obtained from Bob Vocke (Vocke@lanl.gov). Much of the work of the Council is conducted through committees of volunteers. One committee is the New and Expanded Water Technologies Committee. Our major effort to date has been in the area of cloud seeding to enhance precipitation. A workshop was held on Jan. 22-23 in Santa Fe; highlights of this workshop will be presented (workshop proceedings are available). As a result of this workshop, new organizations have been formed to carry cloud seeding forward and conduct a pilot project/operational test.

In addition to the work on cloud seeding, we are now looking into other areas (as shown in the table) with a focus on the strategies indicated by an X in the column for each technology. A brief description of each of these initiatives will be presented. We are interested in having additional people join our New and Expanded Water Technologies Committee as well as the new groups organized to move cloud seeding forward. We are also interested in working with other organization and considering the technologies shown below.

Mapping of Technologies to Strategies (as of March 9, 2004)

Technology Strategy	Approved J y S Projects				Unapproved Projects Exploratory Only
	Cloud Seeding	Desalination Surface and shallow and deep wells	Run-off Management	Reuse Technology	Water from oil and gas wells and use of abandoned pipelines
Create "new" water		X			X
Increase the recharge of aquifers	X				
Increase surface flow into streams	X		(X)		
Address erosion, silting, and flood issues			X		
Reduce use of well, river and city water	X		X	X	
Innovative solutions with respect to acquisition of water rights	X	X			X

JyS Water Planning Council



JyS Regional Water Plan

Accepted by Interstate Stream
Commission April 2003

Five Categories of Alternatives

- I. Restore and protect supply for existing demand
- II. Improve system efficiency
- III. Mitigate drought
- IV. Reduce demand
- V. Increase supply by adding or moving water rights to municipal/industrial uses

JyS Implementation Subcommittees

- Education
- State Water Plan
- Technology
- Measuring Status
- Governor's Blue Ribbon Water Task Force
- Legislation
- Growth Management

New and Expanded Water Technologies Committee

- Meets Monthly
- All Invited
- Next Meeting May 19 at 10 AM
Chapman Company 404 Brunn
School Road, Santa Fe

Current Project Portfolio

Technology Strategy	Approved JyS Projects				Exploratory Only
	Cloud Seeding	Desal	Run-off Mgmt	Reuse	Oil and Gas Brines
Create "new" water		X			X
recharge of aquifers	X				
Streamflow	X		(X)		
Erosion, silting, flood			X		
Cons primary sources	X		X	X	
Innovative swaps	X	X			X

Water from Oil and Gas Operations

Technology	Exploratory Only
	Oil and Gas Brines
Strategy	
Create "new" water	X
recharge of aquifers	
Stream flow	
erosion, silting, flood	
Cons primary sources	
Innovative swaps	X

Water from Oil and Gas Operations

- 10,000 AFY NWNM
- 70,000 AFY SENM
- Treatment Options
- Swap Options
- Abandoned Wells
- Pipelines

Oil Field Brine Treatment Options

- Reverse Osmosis
- Microfiltration
- Thermal
- Freeze Thaw/Evaporation FTE
- Electrodialysis ED

Desal, Run-off and Reuse

Technology \ Strategy	Desalination	Run-off Mgmt	Reuse
Create "new" water	X		
Recharge of aquifers		?	
Stream flow		(X)	
Erosion, silting, flood reduction		X	
Conserve Primary Sources		X	X
Innovative Swaps	X		

Precipitation Management

	More Impervious	Increased Retention
ET	↓	?
Run-off	↑	↓
Shallow Infiltration	↓	↑
Deep Infiltration	↓	?

Cloud Seeding

Technology \ Strategy	Cloud Seeding
Create "new" water	
Recharge of aquifers	X
Stream flow	X
Erosion, silting, and flood Reduction	
Conserve primary sources	X
Innovative swaps	X

Our Goal from Cloud Seeding



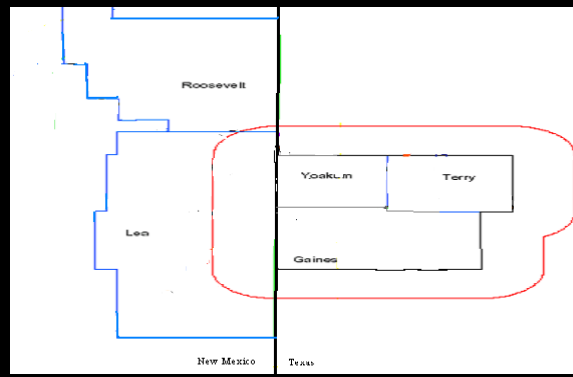
Project Goals

- Enhanced Precipitation
- Usable Water
- Low Cost Water
- Community Support

Jemez Seeding 1968 - 1972

- Seeding periods selected at random
- 13% Increase in precip for seeded areas and sessions
- Potential increase of 30% with full seeding
- Some indication of downwind increases in precipitation

Cloud Seeding in Southeast New Mexico



Why Cloud Seeding is Needed

- Inefficient rain/snow processes
- Man has modified rain/snow processes
- Targeted precipitation is very usable

Inefficient rain/snow Processes

- Supercooled water may not precipitate
- Droplets too numerous and too small
- Updrafts not powerful enough for cloud to grow

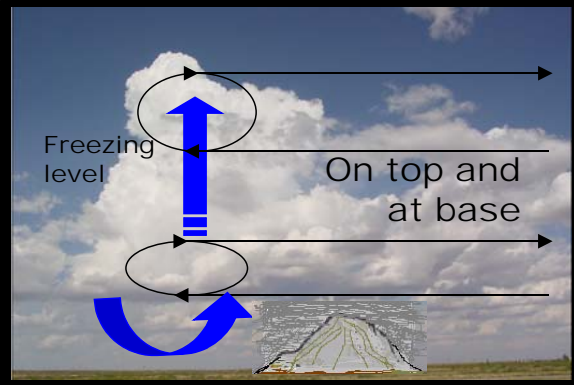
Precipitation Inefficiencies

- 20% of moisture ends up in clouds as droplets
- 30% of the available droplets precipitate. This is only 6% of the available moisture (30% of 20%)
- Goal of Cloud Seeding is to up the 30% to 35% and possibly increase the 20%

Cloud Seeding Solution

- Seeding agent to start supercooled water crystallizing
- Hygroscopic agents to stimulate collisions and coalescence
- Water crystallization releases heat fueling updrafts

Seeding Areas Within Cloud



January 21st/22nd 2004 Workshop

- 13 Experts participated in the program
- 84 Attendees
- Consensus to proceed with pilot program

FOR MORE INFO...

Proceedings of Jan 22nd/23rd 2004 Workshop

Two Illustrative Scenarios

Acres Seeded	Seasonal Precip	Acre-Feet of Precip	10% Increase	15% Increase
100,000	14 Inches	116,667	11,667	17,500
200,000	10 Inches	200,000	20,000	30,000

Preliminary Economic Analysis 20,000 AFY of Water

	Stream Runoff	Aquifer Recharge	ET	Total
Percentage	60%	15%	25%	100%
Acre Feet		3,000	5,000	20,000
Value AFY	\$500	\$500	0	\$375
Value or Replacement Cost	\$6MM	\$1.5MM	\$0	\$7.5MM

Additional Hard to Quantify Benefits

- Additional precipitation at lower elevations
- Additional precipitation east of target area in the Sangres
- Recreational and tourism value of snow
- Fire suppression value of additional precipitation
- Benefits to wildlife and vegetation

Schedule: Optimistic Case

- Cloud Inventory Summer 2004
- Cloud in-situ measurements Nov/Dec 2004
- Legislature Appropriation Jan/Feb 2005
- Funds Available July 2005
- Seeding Begins November 2005

Schedule Slower Case

- Legislature Appropriation Jan/Feb 2005
- Funds Available July 2005
- Cloud Inventory Summer 2005
- Cloud in-situ measurements Nov/Dec 2005 or Jan - March 2006
- Seeding Begins November 2006

Factors Determining Rate of Progress

- Ability to fund Pre-seeding Analysis in 2004
- Federal Support/but not an EIS
- State Legislative Support
- Broad support from stakeholders
- Creation of Regional Organization /Coalition to Conduct Cloud Seeding
- Possible tie in with Aamodt Settlement

Proposed Pre-seeding Analysis

- Confirm that project is feasible: this part of analysis is state-wide
- Begin design of cloud seeding project
- Advance the start date of any project by accomplishing this work in 2004
- Cost approximately \$95,000
- Need private sector and city/county participation

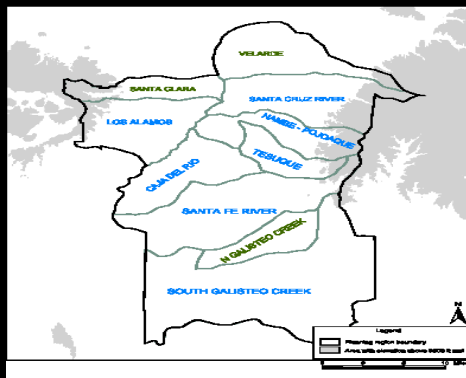
Components of Pre-seeding Analysis

- Historical Cloud Inventory
- In-Cloud Measurements
- Modeling of Seeding Operations

Possible Funding Sources

- Private Sector
- Cities and Counties
- State of NM
- Public Sector
 - Agencies
 - Amodt
 - EPA Fines

Areas Above 9000 Feet



Possible Winter Seeding Target Area

