

# Stage 5: The Mimbres Water Market

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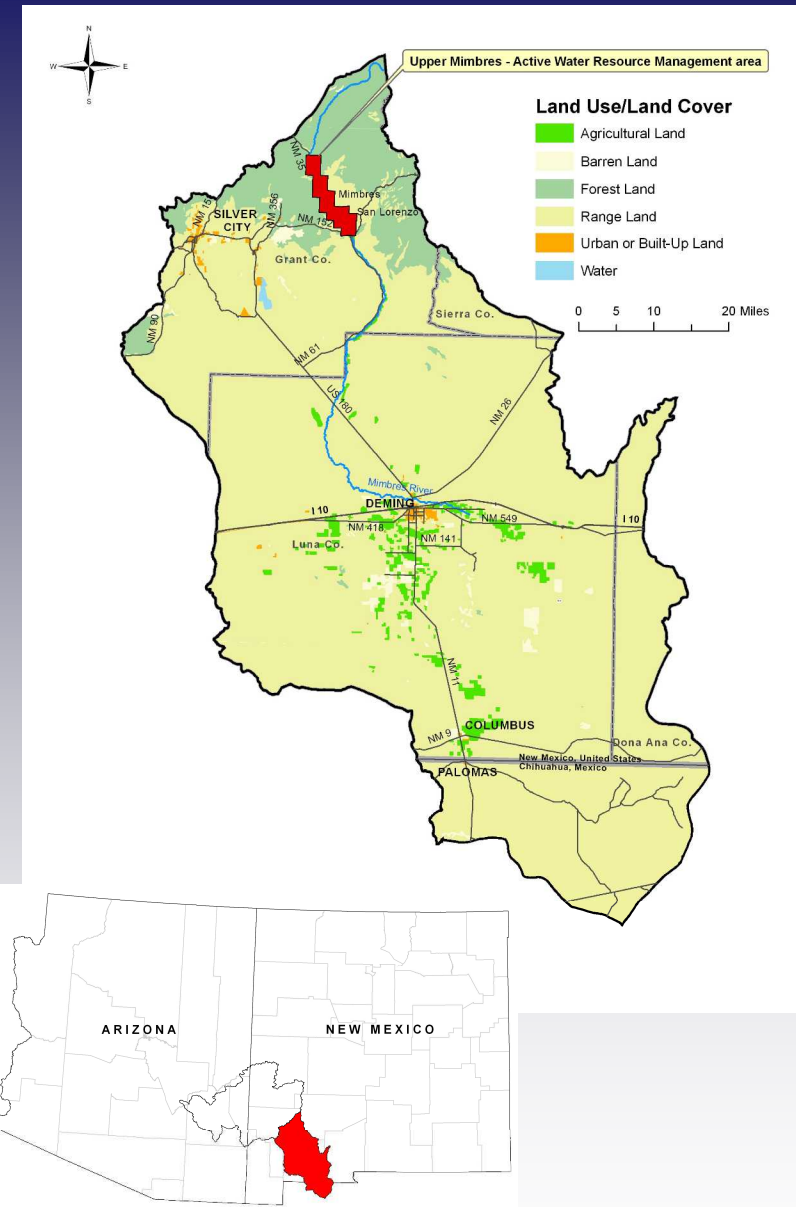
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*University of Texas*

# Water Leasing Stages

| Stage | Description                      | Current Status                                           | Result                                                      |
|-------|----------------------------------|----------------------------------------------------------|-------------------------------------------------------------|
| 1     | Stylized Proof of Concept        | Completed 2005                                           | Efficient Prices<br>Monetary Gains                          |
| 2     | Enhanced Farming Decisions       | Completed 2006                                           | Solved an<br>Endogenous Market<br>Equilibrium               |
| 3     | Futures and Climatic Uncertainty | Data Analysis has begun<br>will be completed Spring 2008 | Higher Crop Yields<br>and Monetary Gains                    |
| 4     | Third Party Effects              | Running simulations over<br>2007/2008                    |                                                             |
| 5     | Real Time Market in the Mimbres  | Working with Stakeholders                                | Understanding<br>“Stacking” pre and<br>post call incentives |
| 6     | Scenario Analysis                | Working with SAHRA<br>Scenario Team                      |                                                             |

# Mimbres AWRM

- *Located in southwestern New Mexico*
- *AWRM area is only a small portion of basin.*
- *Approximately 800 acres of irrigated agriculture*
- *Basin has also seen rapid growth in domestic well use*



# Water Conveyance System

- Nine individually operated irrigation ditches, serving approximately 140 farms.
- Bear Canyon Reservoir is operated for summer irrigation and recreation



# Water Use Priority

- Each of the 9 ditches has a different priority date.
- The senior ditch is downstream of all junior ditches.
- Domestic well users are junior to all ditches.



# Our Job

- Design a water market that:
  - Is consistent with State water law,
  - Provides “value” to basin water users, and
  - Is simple as possible.
- Pilot study for New Mexico



## Methods: Stakeholder Team

- New Mexico Office of the State Engineer
- Mimbres Water Users Group:
  - Irrigators
  - Domestic Wells
  - Mutual Domestic, and
  - NM Fish and Game.



## UPPER MIMBRES WATER DISTRICT ADVISORY COMMITTEE MEMBERS



|                                                                         |  |                                                                                           |
|-------------------------------------------------------------------------|--|-------------------------------------------------------------------------------------------|
| Please contact us if you have questions or need additional information. |  |                                                                                           |
| <a href="http://www.sanlorenzo.com">www.sanlorenzo.com</a>              |  |                                                                                           |
| <b>Heuchling Ditches</b>                                                |  | Jupe Bounds<br>PO Box 4069<br>Silver City, NM 88062<br>(505-)                             |
| <b>Montoya Ditch</b>                                                    |  | Ron Strain<br>PO Box 171<br>Mimbres, NM 88049<br>(505-536-9856)                           |
| <b>Heuchling</b>                                                        |  | Manuel Galaz<br>Rt. 15, Box 615<br>San Lorenzo, NM 88041<br>(505-536-9307)                |
| <b>Grijalva Ditch</b>                                                   |  | Danny Joe Roybal<br>HC 68 Box 27<br>Mimbres, NM 88049<br>(505-537-2969)                   |
| <b>Kenly #1 &amp; #2</b>                                                |  | Joe Miller<br>PO Box 532<br>Mimbres, NM 88049<br>(505-536-3313)                           |
| <b>Mimbres Basin (at large)</b>                                         |  | G.X. McSherry<br>8600 Hwy 377 SE<br>Deming, NM 88030<br>(505-546-8086)                    |
| <b>Casas Adobes</b>                                                     |  | Al Wegher ~ c/o Casas Adobes<br>Route 15, Box 2540<br>Mimbres, NM 88049<br>(505-536-9918) |
| <b>Game &amp; Fish</b>                                                  |  | Leon Redman<br>PO Box 1421<br>Silver City, NM 88062<br>(505-)                             |
| <b>Domestic Well Users</b>                                              |  | Sue Richins<br>HC 68 Box 3150<br>Mimbres NM 88049<br>(505-536-2866)                       |

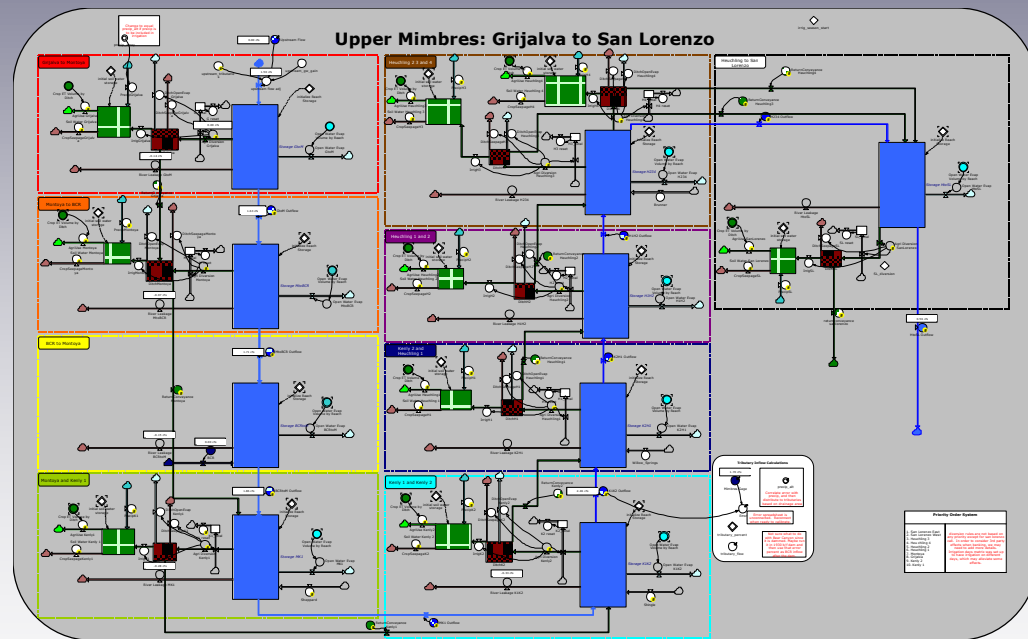


# Methods: Integrated Modeling

- Model Purpose
  - Address the deliverability of water to upper ditches,
  - 3<sup>rd</sup> party effects,
  - Scheduling of deliveries, and
  - Identify unintended consequences.

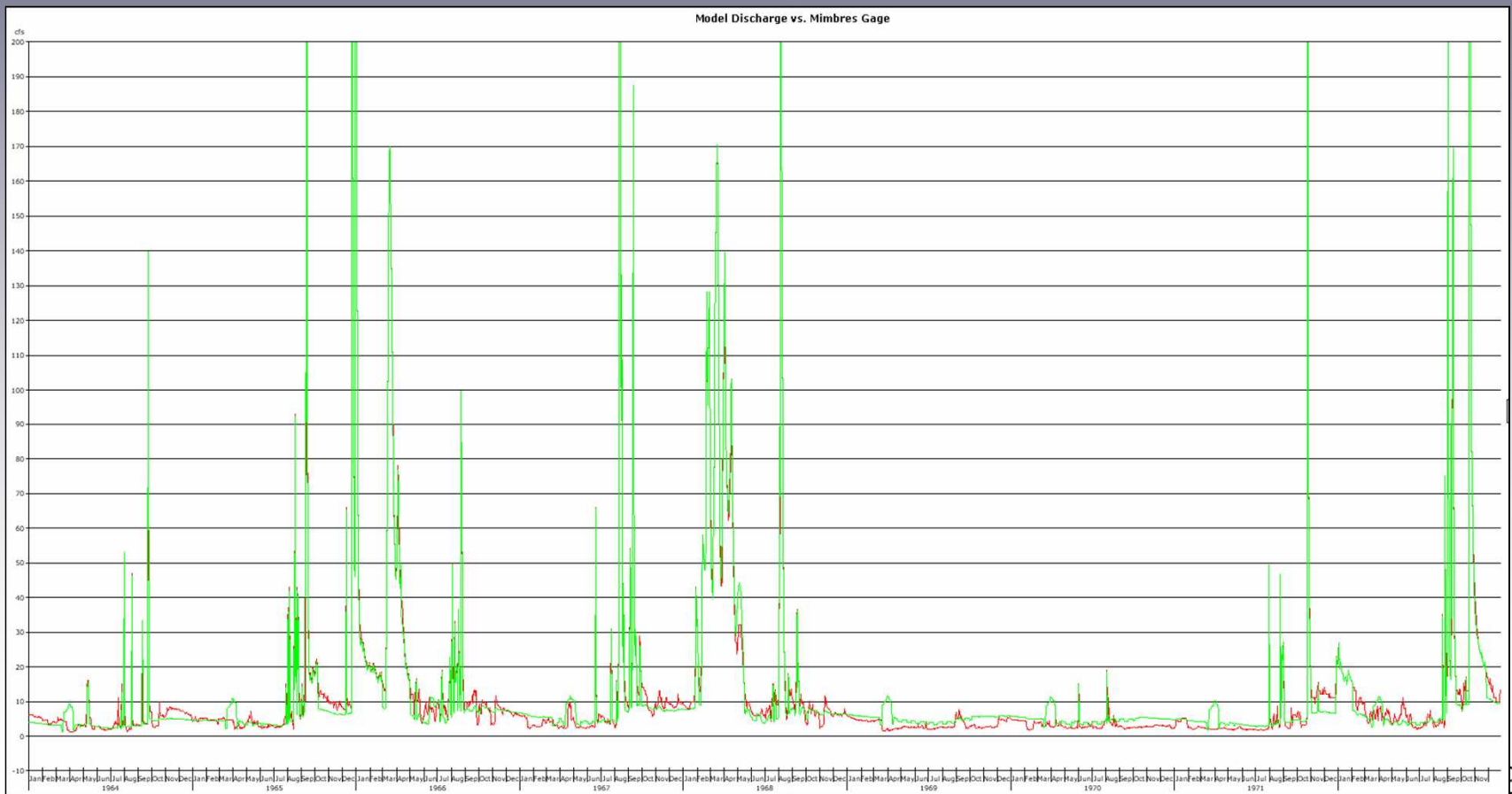
# Methods: Integrated Modeling

- Hydrology model
  - Upper Mimbres river,
  - Nine irrigation ditches,
  - Bear Canyon Reservoir,
  - Fluvial and regional groundwater system,
  - Domestic and irrigation demands.
- Water rights
  - Priority allocations, and
  - Priority call procedures.



# Methods: Integrated Modeling

- Calibrated on available data, which is very limited



# Methods: Integrated Modeling

- Link hydrology model to market “storefront”.
- Let participants design market through series of trading experiments.

Trading - Mozilla Firefox

File Edit View History Bookmarks Tools Help deljcio.us

http://localhost:8080/gwdss-generalized/secure/specialist/trading.jsp?alfalfa=grijalva=0.08smallGrains+grijalva=...

Mimbres Water Banking Experiment

### Trading

This is the trading round for **January 1st, 1966**

| Location     | Select                           | Priority | Call  | Tradable | Used Tradable | Bought/Sold This Round | Bank Balances | Tradable Left | App. Left | Bid | Offer |
|--------------|----------------------------------|----------|-------|----------|---------------|------------------------|---------------|---------------|-----------|-----|-------|
| grijalva     | <input type="radio"/>            | 1893     | false | 7        | 0             | 0                      |               | 7             | 132       |     |       |
| montoya      | <input type="radio"/>            | 1880     | false | 0        | 0             | 0                      |               | 0             | 99        |     |       |
| kenly_1      | <input type="radio"/>            | 1894     | false | 0        | 0             | 0                      |               | 0             | 96        |     |       |
| kenly_2      | <input type="radio"/>            | 1894     | false | 0        | 0             | 0                      |               | 0             | 137       |     |       |
| heuchling_1  | <input type="radio"/>            | 1870     | false | 0        | 0             | 0                      |               | 0             | 16        |     |       |
| heuchling_2  | <input type="radio"/>            | 1870     | false | 0        | 0             | 0                      |               | 0             | 11        |     |       |
| heuchling_3  | <input type="radio"/>            | 1870     | false | 99       | 0             | 0                      |               | 99            | 9         |     |       |
| heuchling_4  | <input checked="" type="radio"/> | 1870     | false | 116      | 0             | 0                      |               | 116           | 37        |     |       |
| san_lorenzo  | <input type="radio"/>            | 1869     | false | 12       | 0             | 0                      |               | 12            | 800       |     |       |
| casas_adobes | <input type="radio"/>            | 1895     | false | 0        | 0             | 0                      |               | 0             | 0         |     |       |
| misc_pumping | <input type="radio"/>            | 1895     | false | 0        | 0             | 0                      |               | 0             | 0         |     |       |

Next Round

#### Last 5 Trades

| From | To | Price | A.F. | Price/A.F. | Priority Date |
|------|----|-------|------|------------|---------------|
| -    | -  | -     | -    | -          | -             |
| -    | -  | -     | -    | -          | -             |
| -    | -  | -     | -    | -          | -             |
| -    | -  | -     | -    | -          | -             |
| -    | -  | -     | -    | -          | -             |

#### Action

☐ Submit Bid  
☒ Submit Offer  
☐ Accept Bid  
☐ Accept Offer  
☐ Withdraw Bid/Offer

Quantity:   
 Price:   
 Price / Quantity:

#### Priority Date

☐ 1869 ☒ 1870 ☐ 1880 ☐ 1893 ☐ 1894

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Done McAfee SiteAdvisor

# Methods: Experiments

- June 2006 Initial Contact
- December 2006 Kickoff Meeting
- February 2007 Model Introduction and Market Definition
- June 2007 Model Demonstration
- October 2007 Project Recalibration

# Results: Market Regulations

- Water “stacking”:
  - The application of more water than the adjudicated right (2.7 AF/acre),
  - Constitutes waste,
  - Concession: can exceed right slightly if improves crop yield.
- Stakeholders lack clear understanding of regulations

# Results: Improved “Value”

- NMOSE Perspective
  - Facilitate Active Water Resource Management in time of priority call.
- Water Users Perspective
  - Lease of unused water:
    - Limited stacking allowed,
    - Higher water use crop (e.g., pecans),
    - Multiple cropping,
    - Irrigation of “new” acreage,
    - Lease outside the AWRM

# Results: Market Administration

- NO COMPUTERS!
- Chalkboard and piece of paper with rules.
- NMSOE nor water users want responsibility of administration.
- Water users willing to pay administration fee.

# Next Steps

- Perform experiments at UNM to:
  - Identify market consequences, and
  - Identify hydraulic consequences.
- Develop rule set with input from NMOSE and results of experiments.
- Iterate on rules.
- Identify administrator.