

Stucky Hall - Home of the NM WRRI



N E W M E X I C O
WATER RESOURCES
RESEARCH INSTITUTE

Outline

I. History and Purpose of NM WRRI

II. Need for statewide water assessment

III. \$1M FY 15 water initiative activity report

IV. \$2.3 M FY 16 legislative request



NM WRRI History

I. History and Purpose of NM WRRI

Established in response to drought of 1950s in New Mexico

- 1956 First annual New Mexico Water Conference

Long history of supporting statewide water research

- 1963 NM WRRI established

Special relationship with nationwide network of water institutes

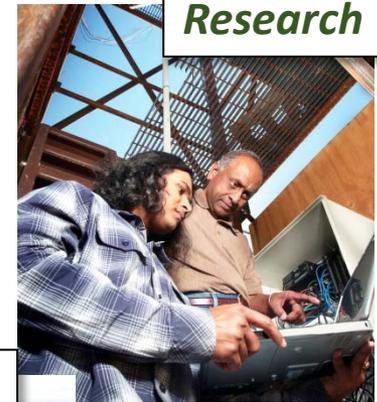
- 1964 Water Resources Research Act set up network of water research institutes
(one in every state plus three territories and the District of Columbia ; PL 88-379.2 introduced by NM Senator Clinton P. Anderson modeled on NM WRRI)

Statewide mandate

- 1966 Memorandum of Agreement: establishes NM WRRI statewide cooperation with UNM, NMIMT, NMSU

Purposes of NM WRRRI as per Statute 21-8-40

- **Provide research and training** in water conservation, planning, and management; atmospheric-surface-groundwater relations; and water quality;
- **Transfer water information** through the use of technical and miscellaneous publications, newsletters, conferences, and presentations;
- **Provide expertise, specialized assistance, and information** to address water problems; and
- **Cooperate** with local, state, and federal water agencies.

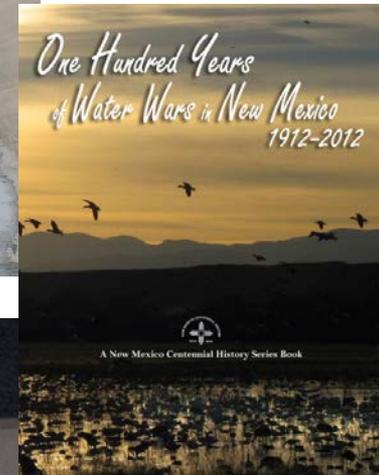


Research

Training

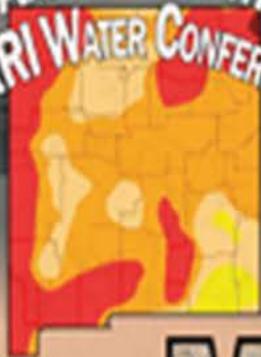


Statewide Cooperation



Water Information

59TH ANNUAL NEW MEXICO
WRRI WATER CONFERENCE



NOVEMBER 18-19, 2014

LA FONDA ON THE PLAZA, SANTA FE

NEW MEXICO'S WATER FUTURE:

CONNECTING STAKEHOLDER NEEDS TO WATER INFORMATION

EARLY BIRD REGISTRATION: \$75 THROUGH OCTOBER 31, 2014

REGULAR REGISTRATION: \$125 STARTING NOVEMBER 1, 2014

FULL-TIME STUDENT WITH ID: \$25

CONFERENCE REGISTRATION INCLUDES TWO(2) LUNCHEONS



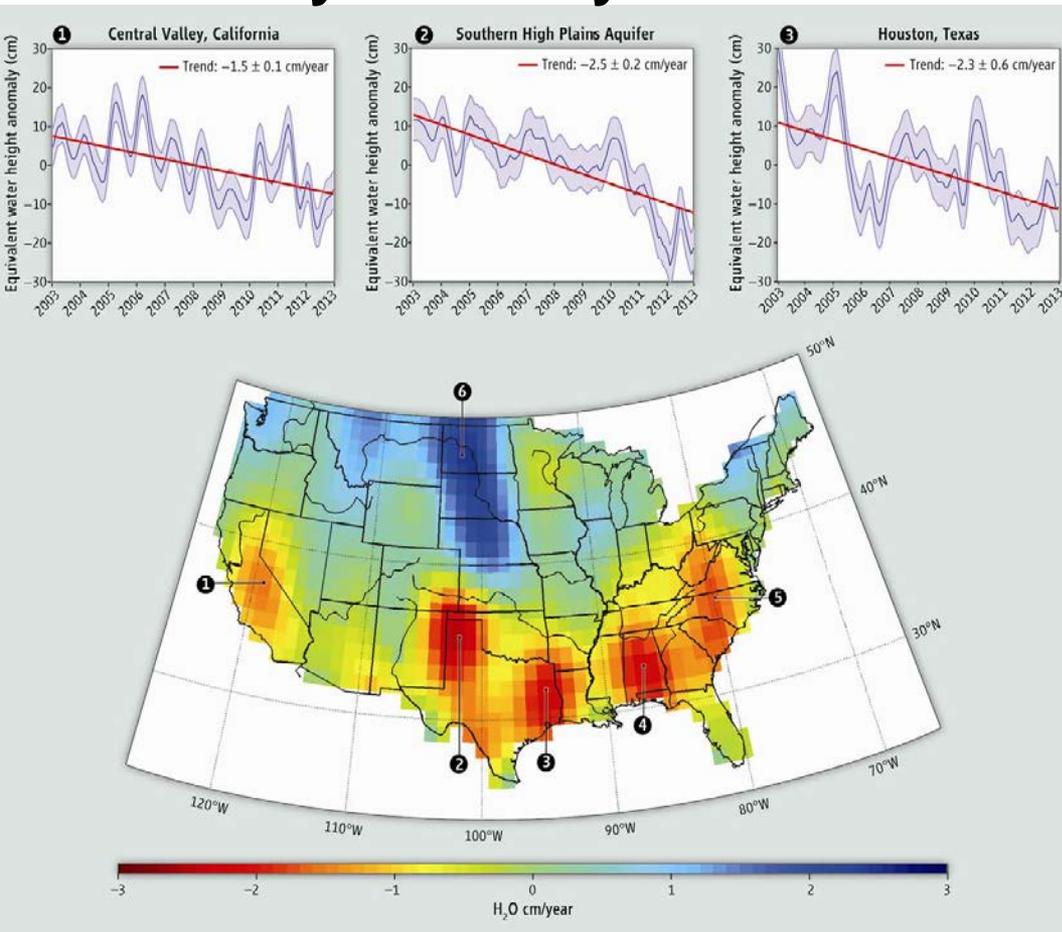
NEW MEXICO WATER RESOURCES RESEARCH INSTITUTE

REGISTER AT <http://2014.wrri.nmsu.edu/registration> • 575-646-4337

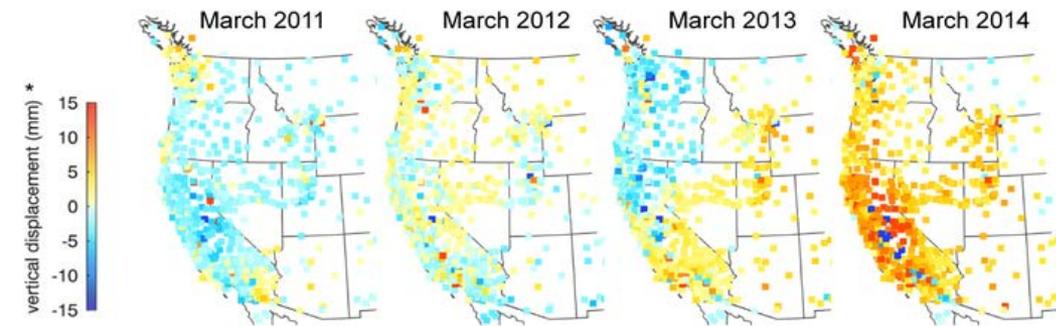
Drought, Water Scarcity and Groundwater Extraction



The Gravity Recovery and Climate Experiment (GRACE)



- **GRACE measures short term gravity fluctuations**
- **Water is the primary cause of changes in gravity**
- **This enabled detection of declines in groundwater**
- **A different set of studies by UCSD and NASA have detected measurable displacements of the ground as the surface rebounds from the loss of water mass.**



Groundwater extractions exceed recharge

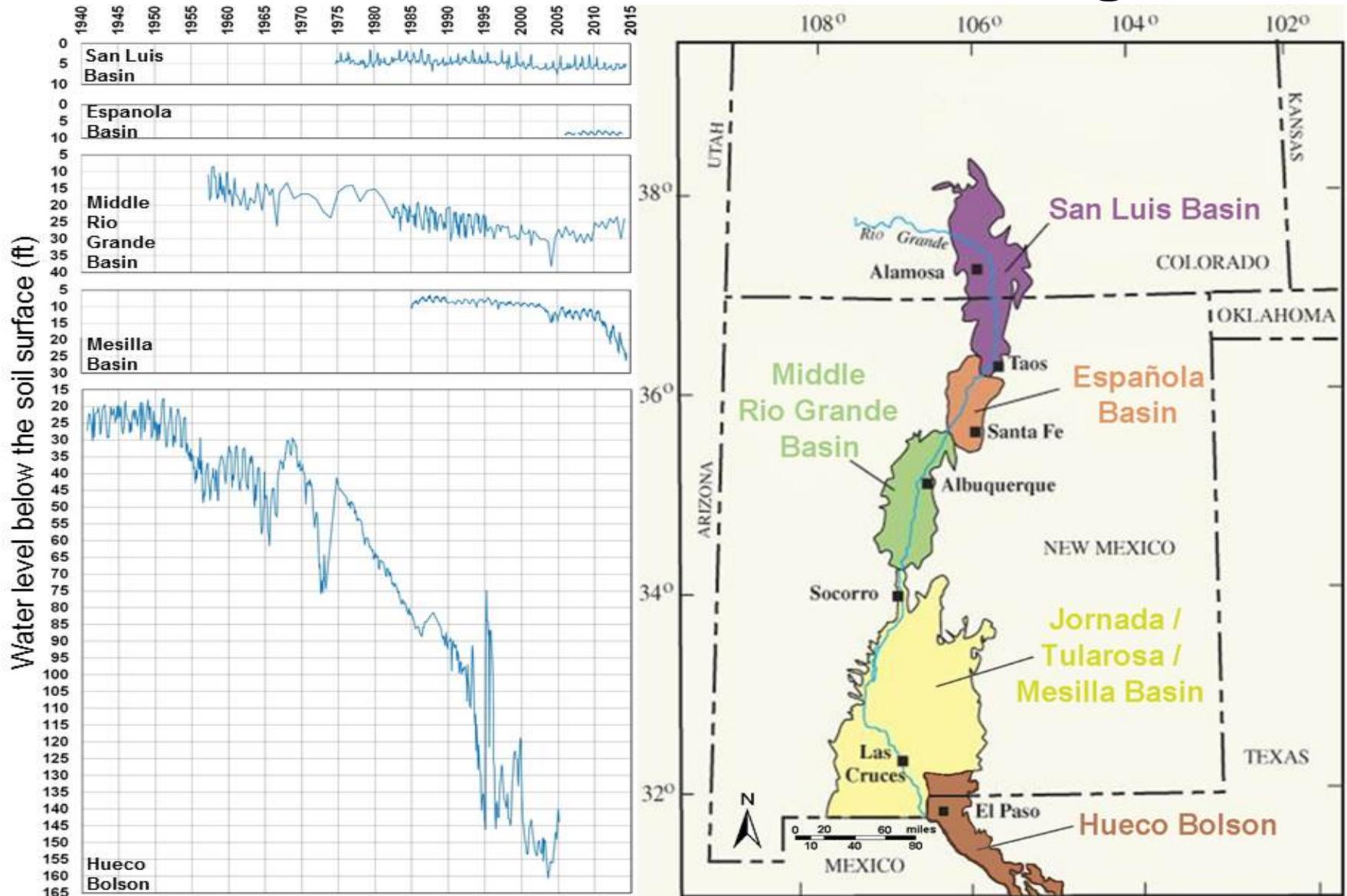
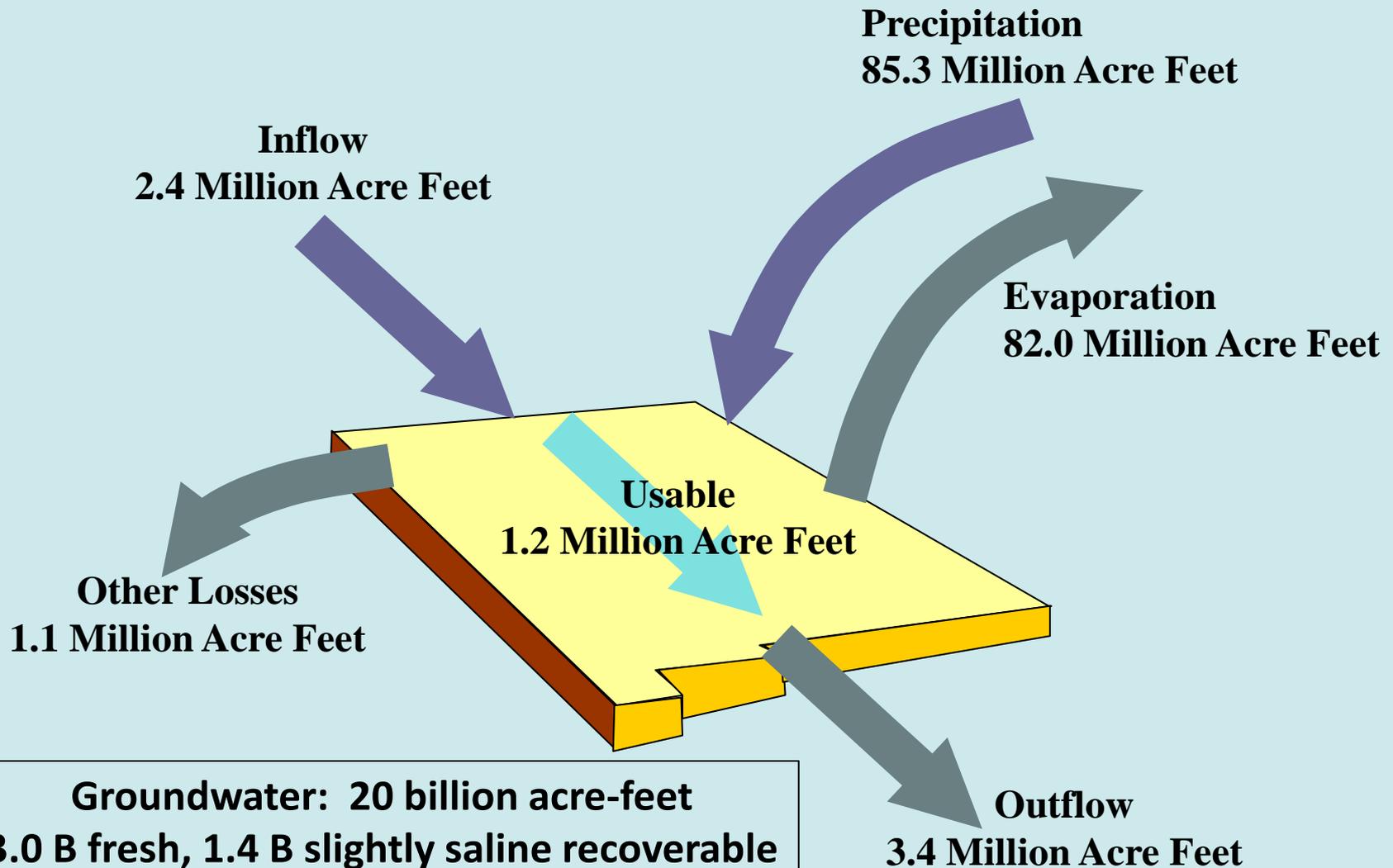


Figure 1. Shallow groundwater annually recharged by surface water in basins along the Rio Grande, with drawdown occurring in two downstream basins.

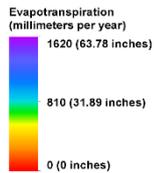
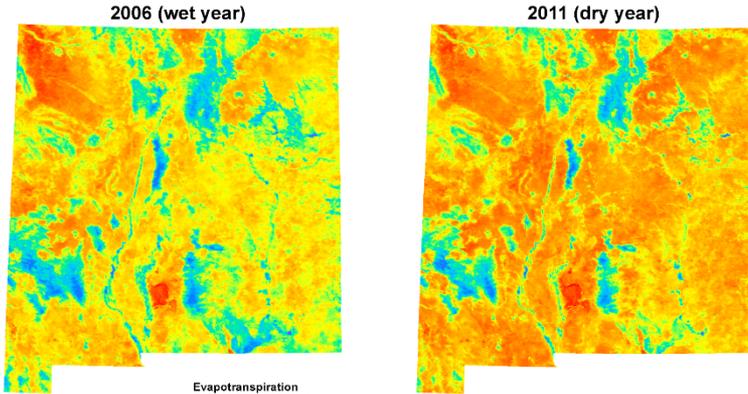
Existing water budgets are static and imprecise

NEW MEXICO MEAN ANNUAL SURFACE WATER BUDGET

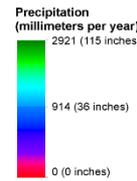
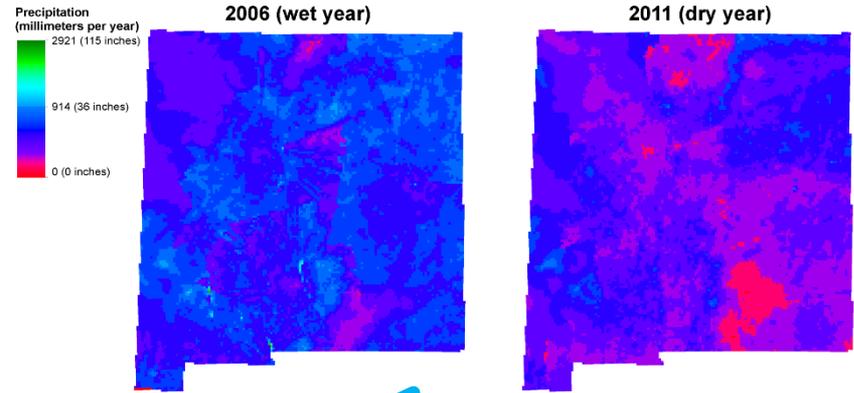


Statewide Water Budget Approach II. Need for statewide water assessment

New Mexico Yearly Evapotranspiration from Senay et al. (2013)

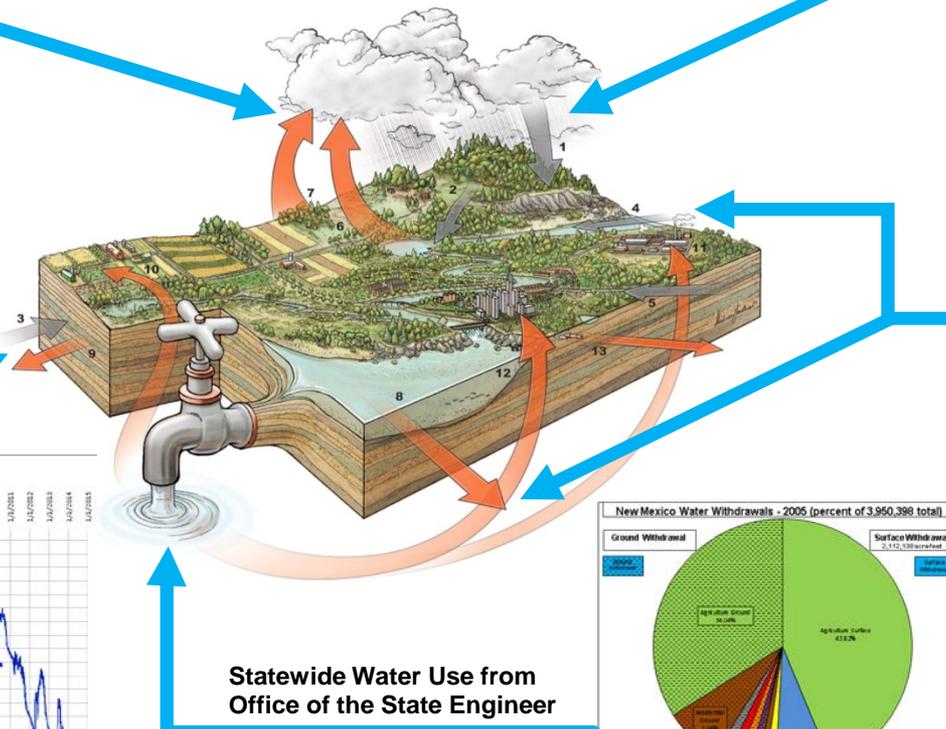


New Mexico Yearly Precipitation from National Weather Service

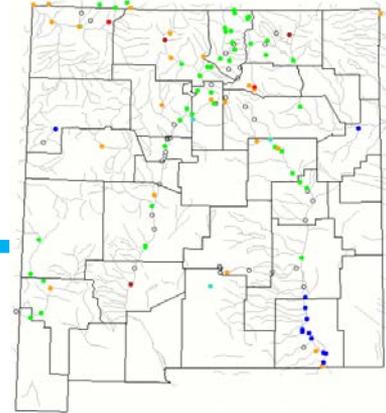


Components of a Water Budget

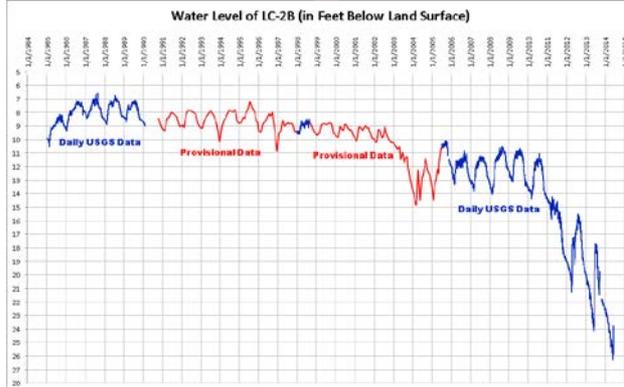
- | | |
|-------------------------|--------------------------|
| Inputs | Outputs |
| ← | → |
| 1. Precipitation | 6. Evaporation |
| 2. Runoff | 7. Transpiration |
| 3. Groundwater Inflow | 8. Surface Water Outflow |
| 4. Surface Water Inflow | 9. Groundwater Outflow |
| 5. Water Diversions | 10. Irrigation |
| | 11. Industrial Uses |
| | 12. Residential Uses |
| | 13. Water Diversions |



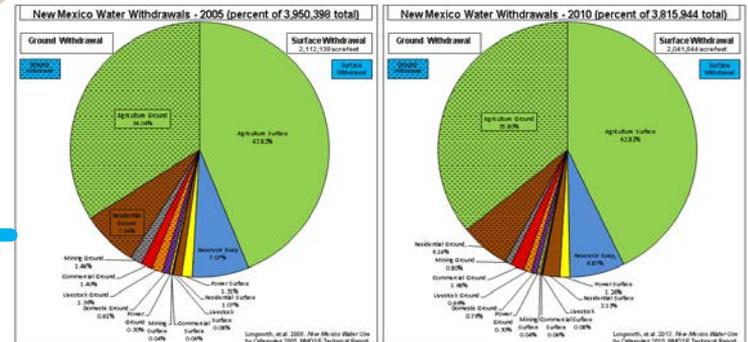
Surface Water Changes from IISGS



Groundwater Changes from USGS Wells



Statewide Water Use from Office of the State Engineer



Funding (NMSU RPSP in SB313)

- \$101K added to recurring \$216K = \$317K recurring base
- \$1M one-time water initiative

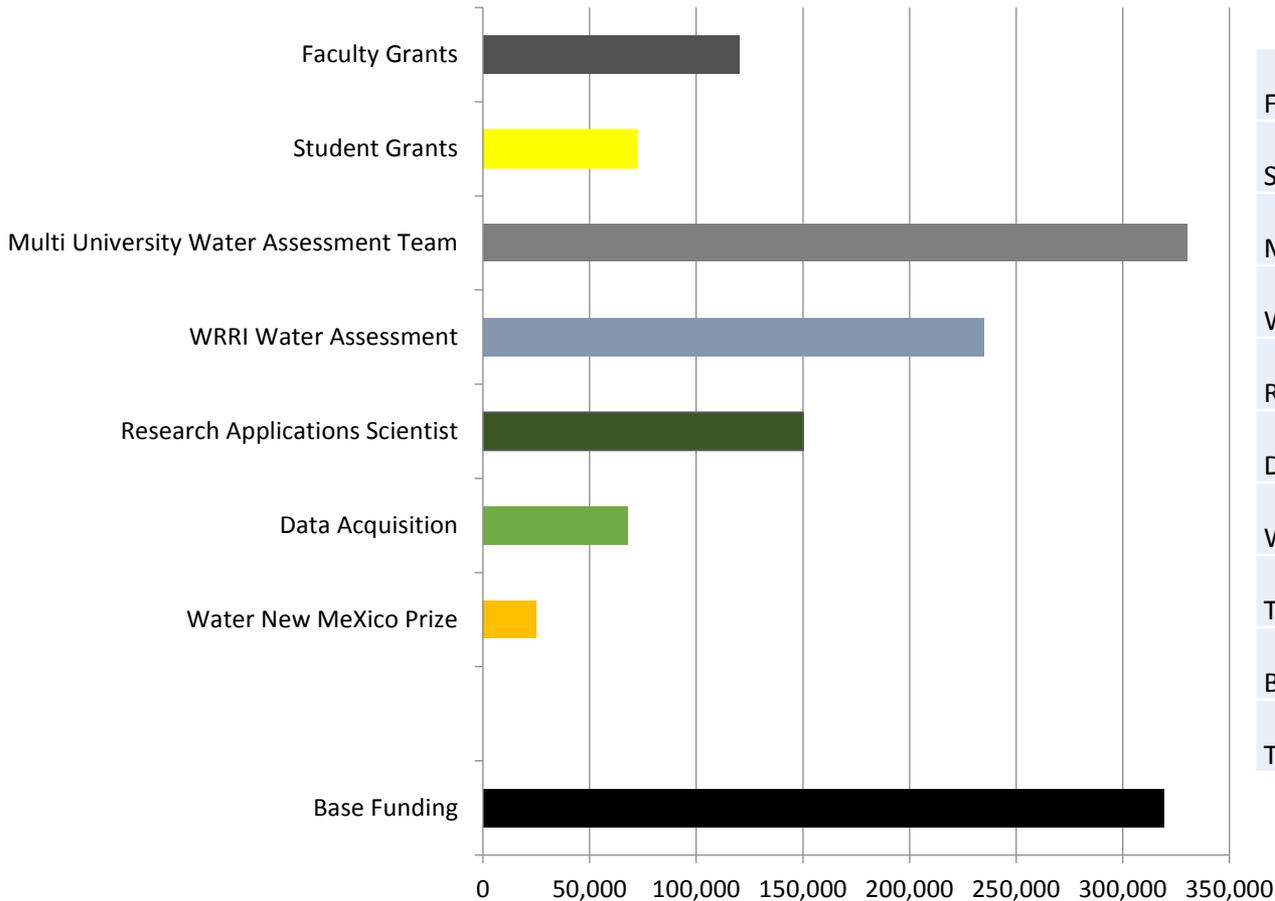
Thanks to

Legislators
Governor
NMSU Administration
Stakeholders
NM Universities
NM WRRRI Supporters

WRRRI structure for funding projects

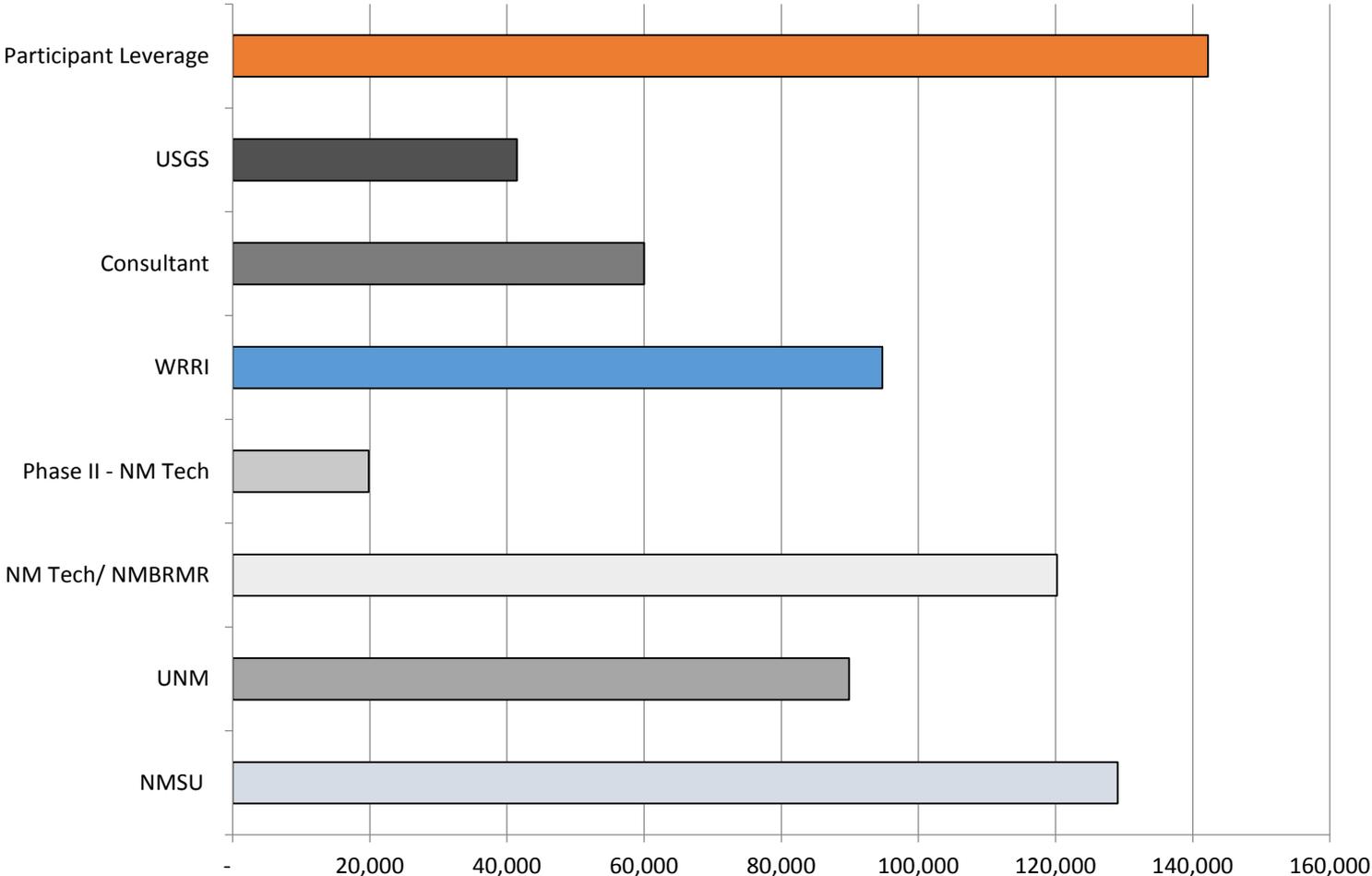
- Program Development Review Board
 - Includes representatives from research universities, state agencies, USGS
- Technical Peer Reviewers
 - For objective scientific review of proposals
- Conference Committee
 - To capture information needs of stakeholders throughout New Mexico
- Statewide water assessment team
 - Multi-university multi-agency team with mechanism for stakeholder input

Total Statewide Water Initiative FY15

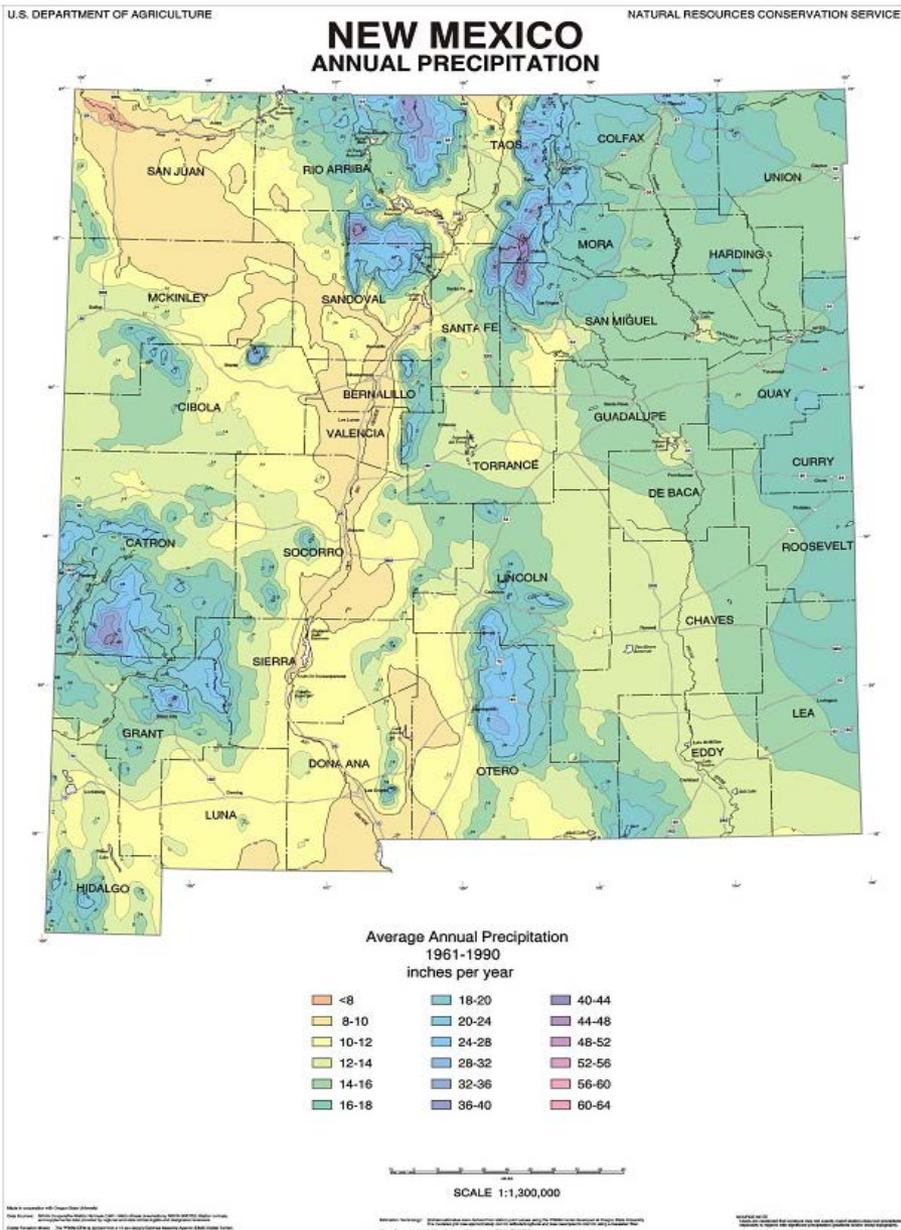


Faculty Grants	120,000
Student Grants	72,000
Multi University Water Assessment Team	330,000
WRRR Water Assessment	235,000
Research Policy Applications Scientist	150,000
Data Acquisition	68,000
Water New Mexico Prize	25,000
Total Without Base Funding	1,000,000
Base Funding	319,400
Total With Base Funding	1,319,400

Total Statewide Water Assessment FY15



New Mexico Climate Mapping



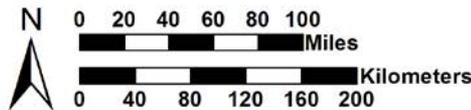
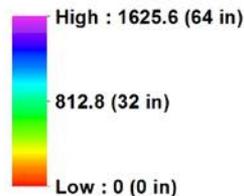
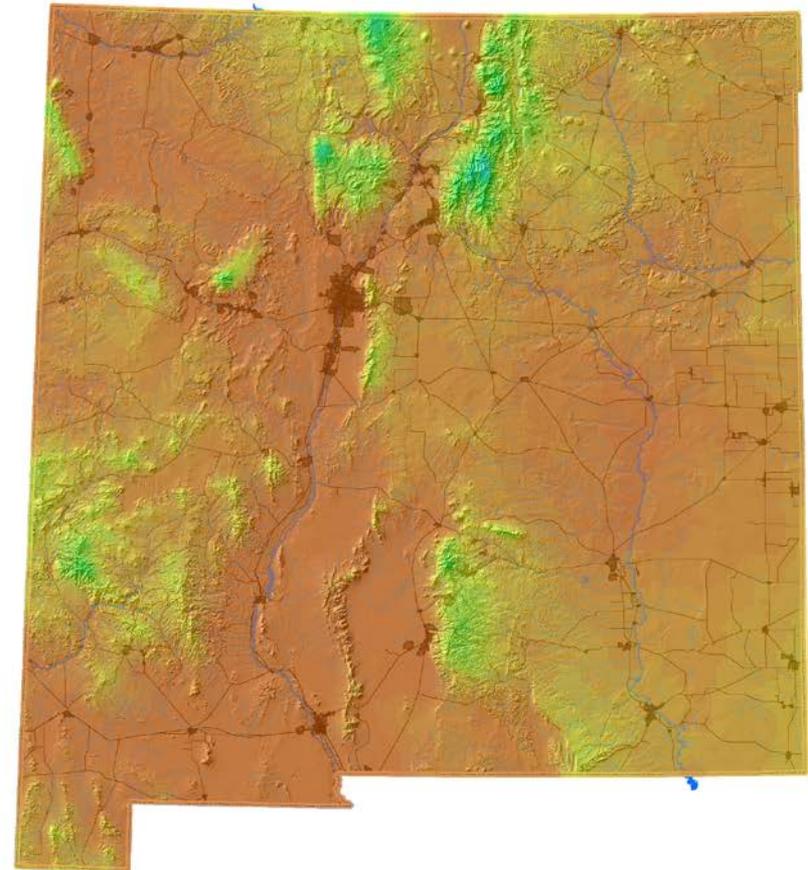
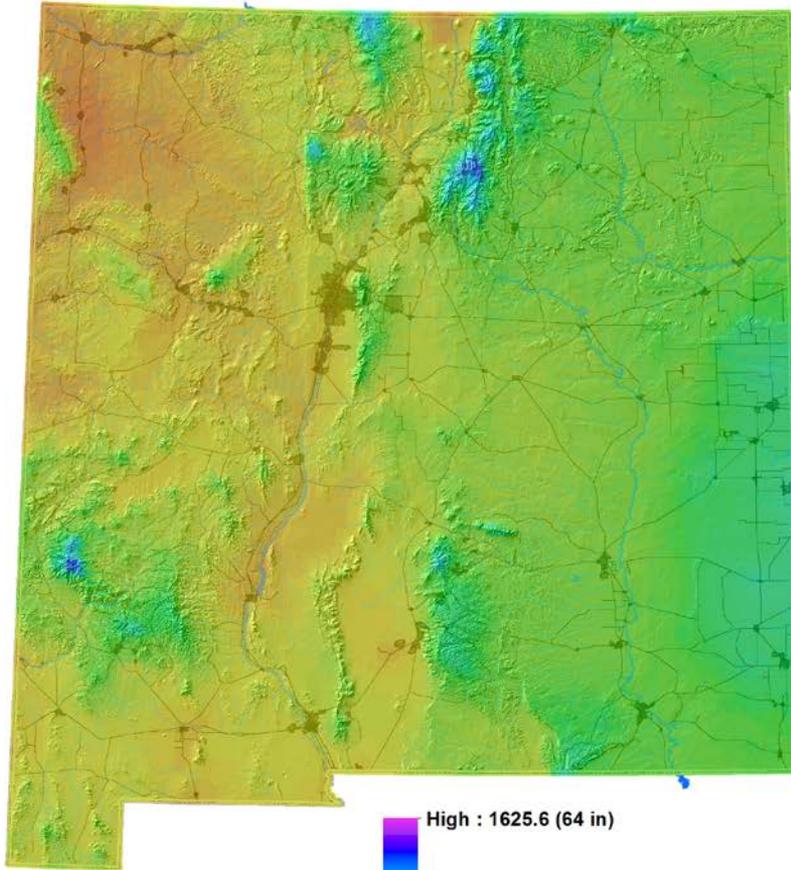
- Old maps are static
- We will create dynamic, higher resolution, accessible maps

Future climatic models

PRISM-Parameter-elevation Regression Independent Slopes Model Precipitation

2004 - Wet Year

2012 - Dry Year



**116.55 million
acre-feet
statewide**

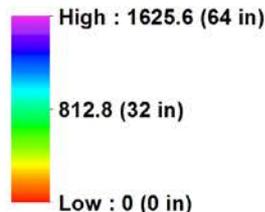
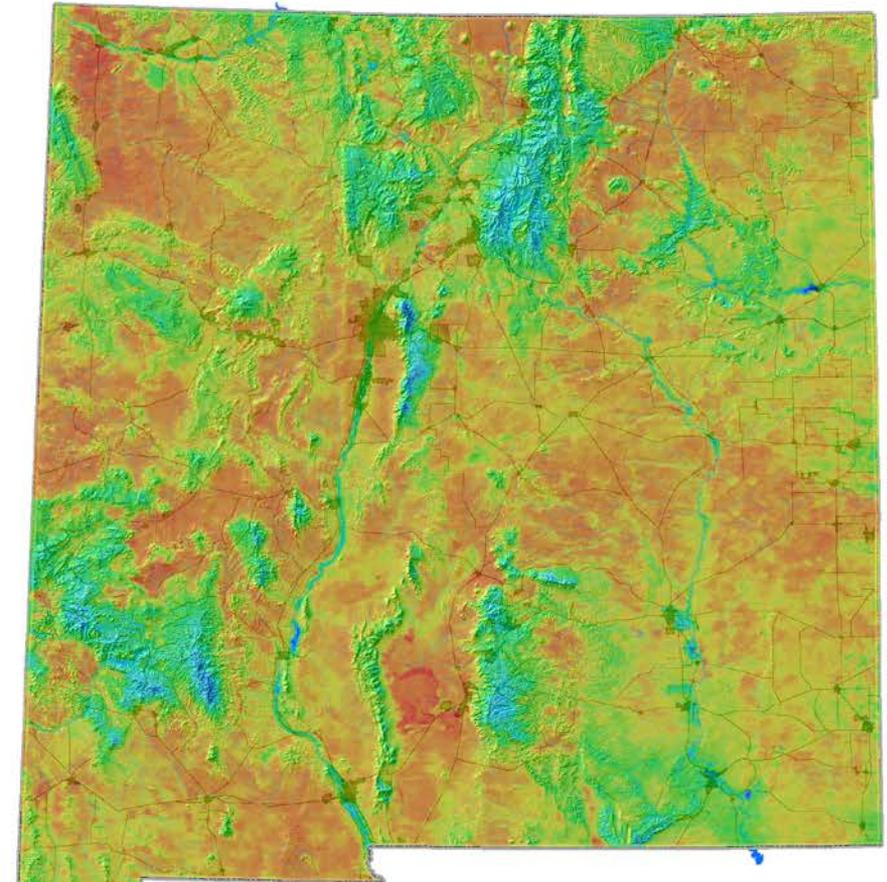
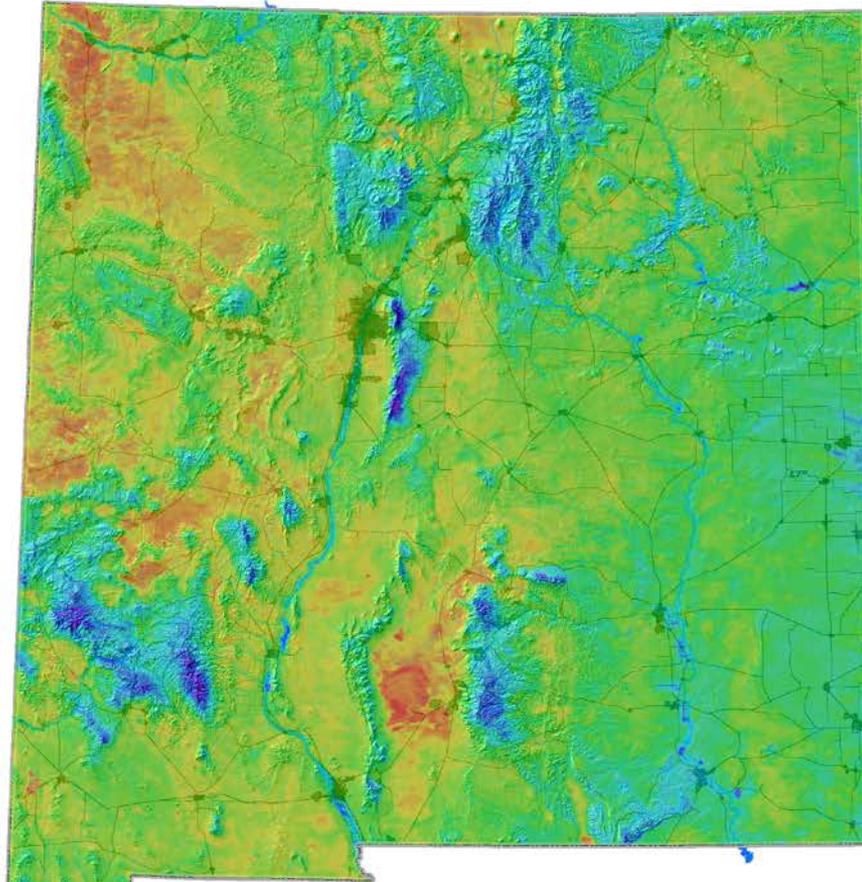
**53.78 million
acre-feet
statewide**

ET - Future evapotranspiration models

SSEB - Simplified Surface Energy Balance New Mexico Evapotranspiration

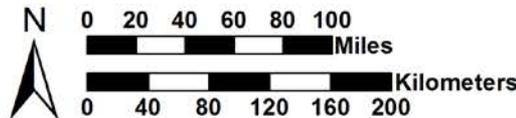
2004 - Wet Year

2012 - Dry Year

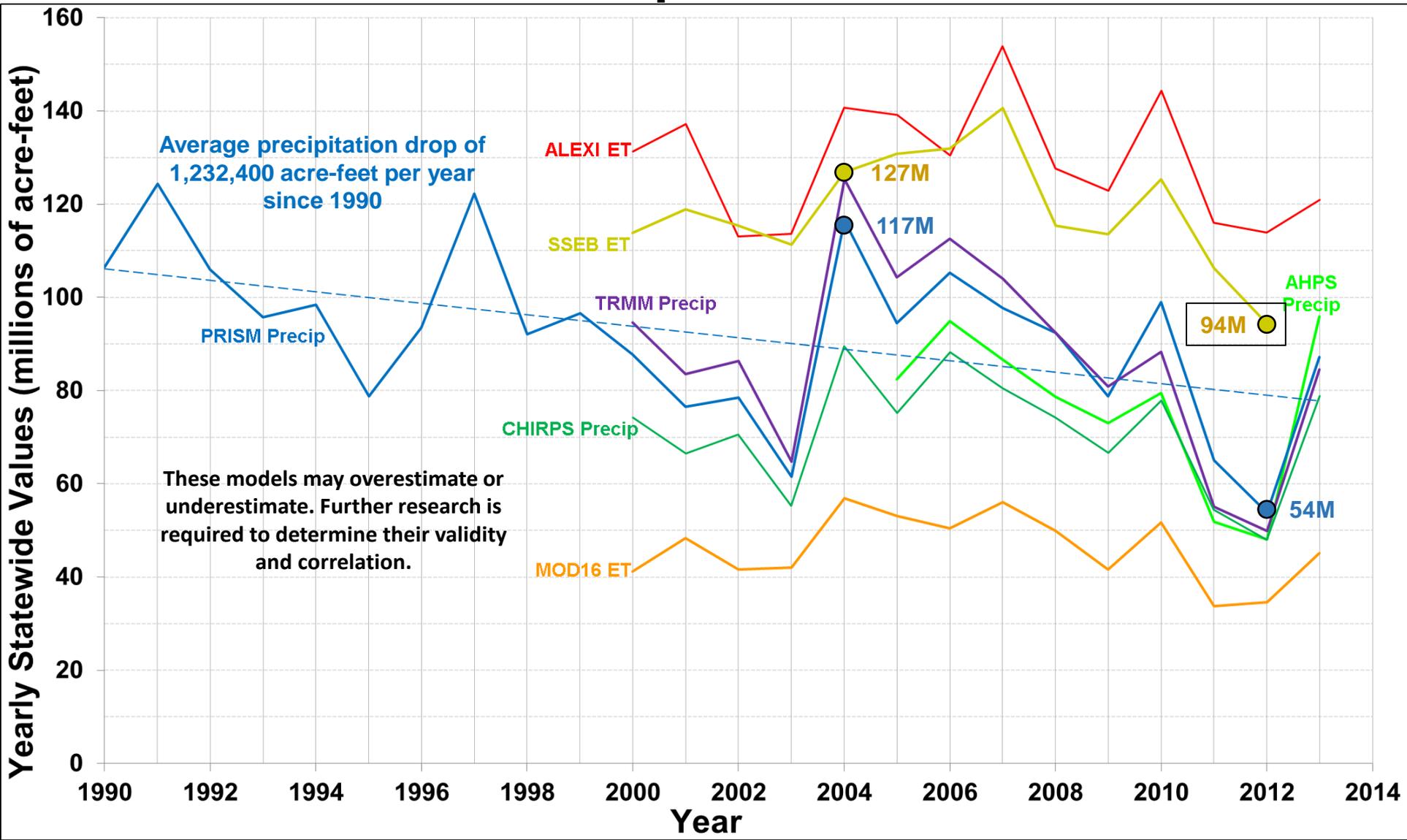


126.92 million
acre-feet
statewide

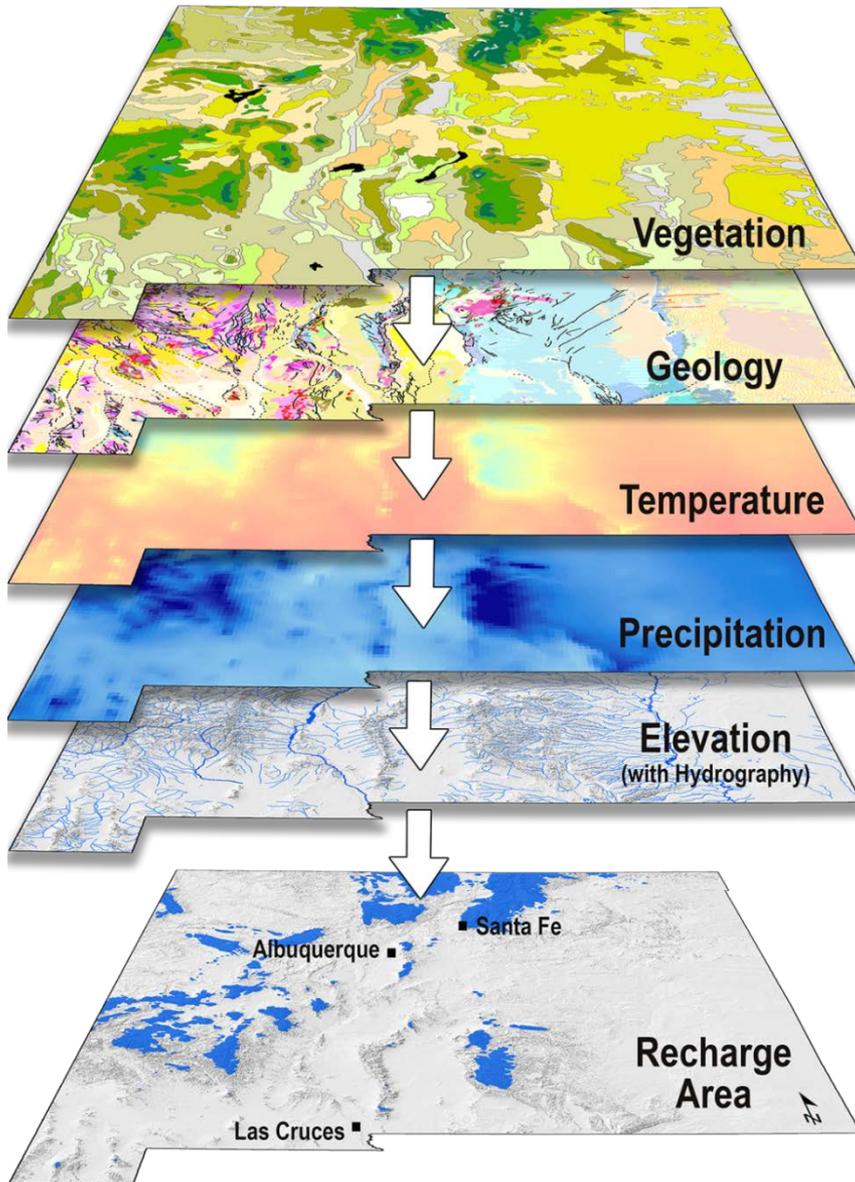
94.29 million
acre-feet
statewide



Precipitation and Evapotranspiration Model Comparisons



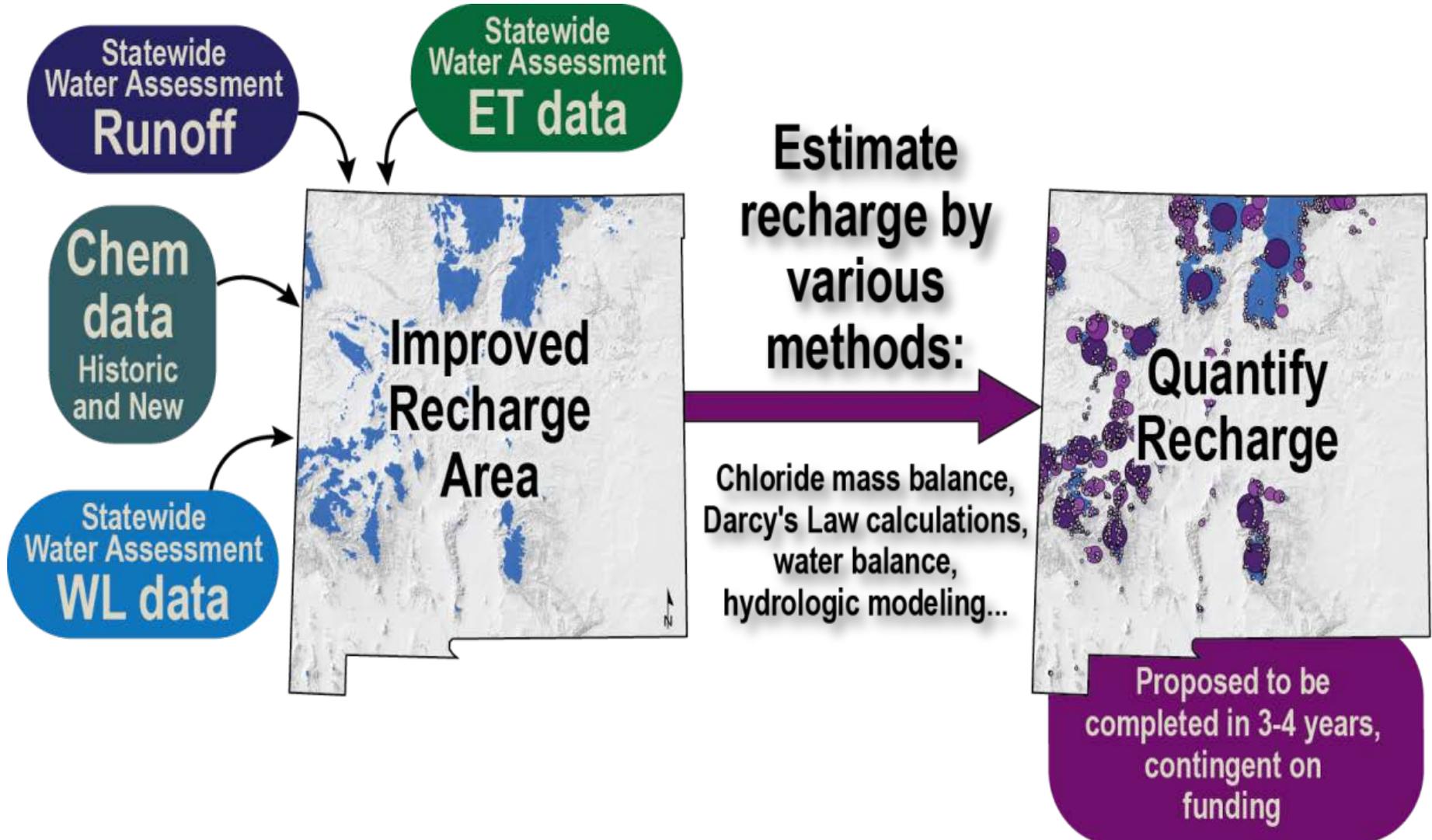
Statewide Recharge Assessment



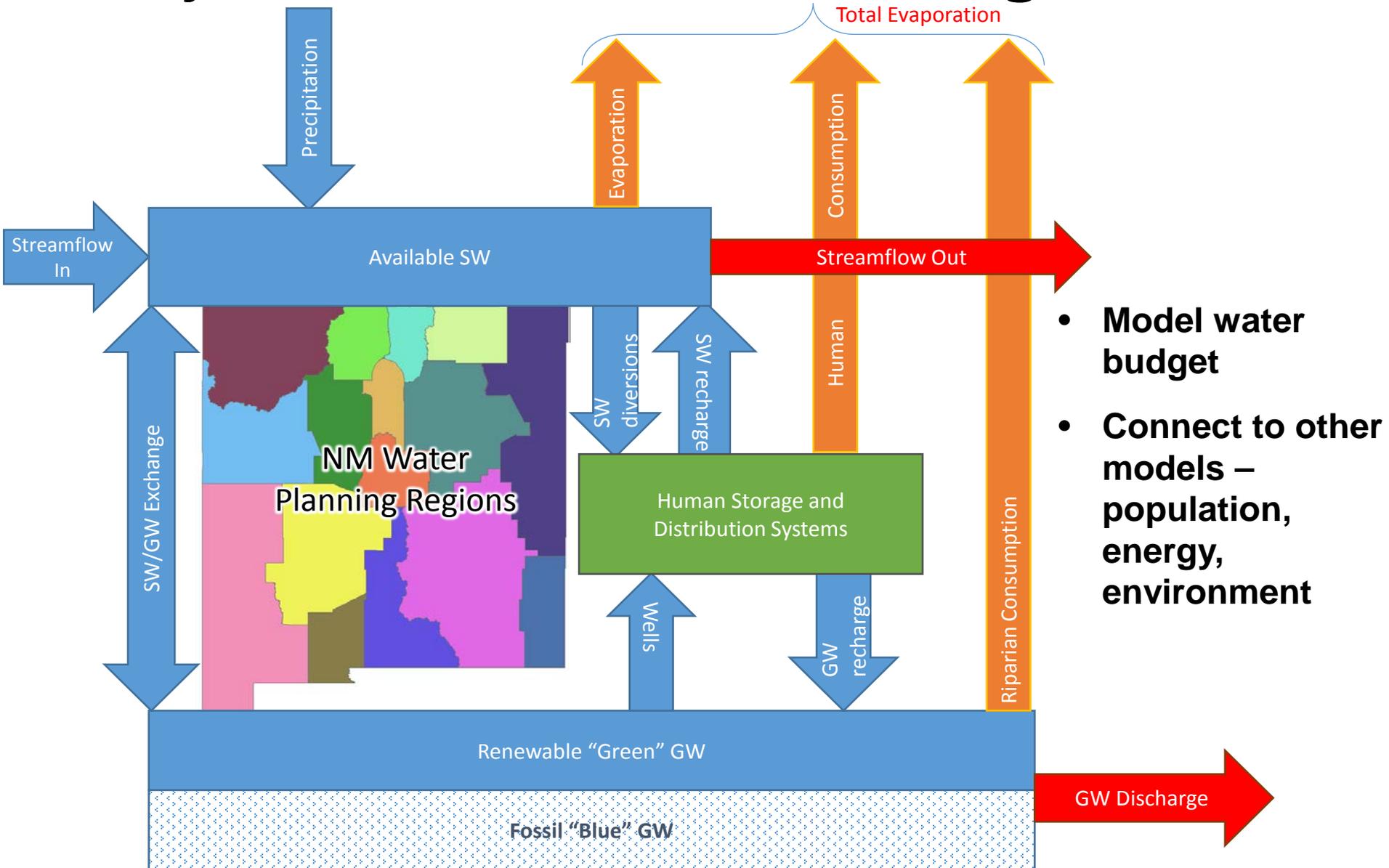
Objectives for FY 2014-2015

- Compilation of past recharge estimates in different areas of NM
- Construction of GIS based map that identifies the most probable recharge areas

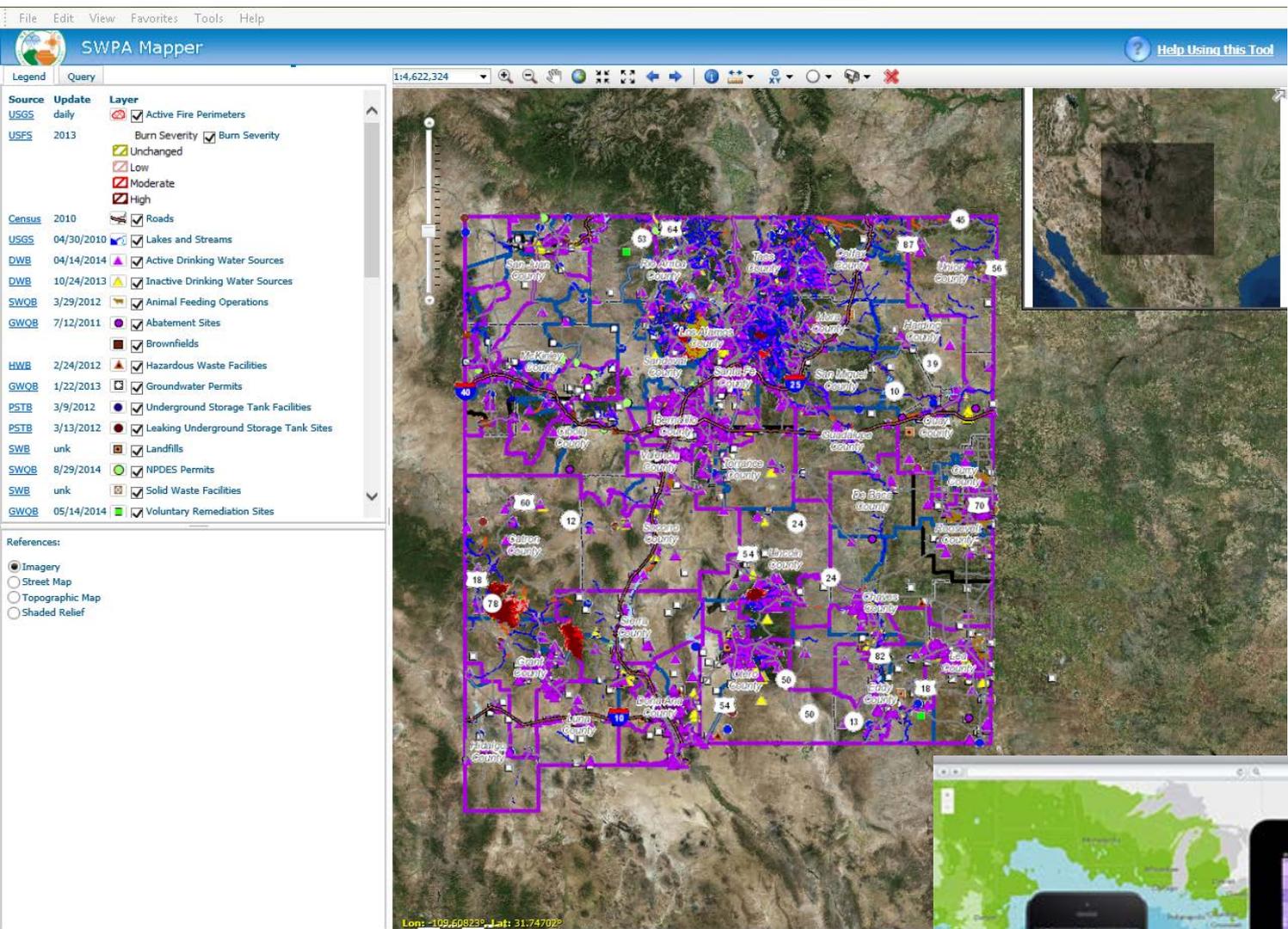
Recharge Quantification



NM Dynamic Statewide Water Budget



Data Deployment: Serving the Stakeholders



Using online geographic information system, we will make our data interactive and available on the web.

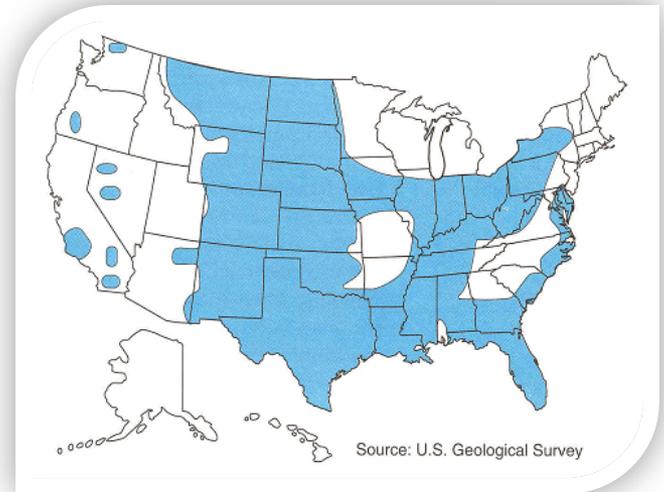


IV. \$2.3 M FY 16 legislative request

Fracking



Brackish Groundwater



FY16 NM WRRI Expansion Request \$2M/year

(#1 Regents NMSU legislative priority)

\$200,000 base funding expansion for associate director policy analyst to apply water research policy studies to help solve drought and water scarcity problems in New Mexico leading to new policy directives based on scientific data and core NM WRRI faculty research support

\$120,000 New Mexico Faculty Water Research Seed Grants

At least four research projects per year that confront water issues will be funded at NMSU, UNM, and NM Tech. Funding is primarily for student training and products include technical reports, peer-reviewed journal articles, and communications to water managers and end-users.

\$60,000 University Student Water Research Grants

Approximately twelve grants per year will fund student research at NMSU, NM Tech, UNM, ENMU, NMHU, WNMU, Diné College and Northern NMC and provide leverage for securing additional funding.

\$300,000 Desalination and Brackish Water Research

In-house research will leverage Brackish Groundwater National Desalination Research Facility (BGNDRF) federal research installation and NMSU programs with Reclamation.

\$300,000 Fracking Water Use Analysis for SE New Mexico

Critical analysis of water level change, water quality, water use in hydraulic fracturing areas

FY16 NM WRRRI Expansion Request \$2M/year (cont.)

\$590,000 Statewide Water Assessment

This ongoing funding supports a yearly statewide water assessment that addresses water scarcity challenges and improves water planning with synthesis of cutting edge scientific data and involves key water people.

\$75,000 Research on Water Reuse

Complete water quality component with water reuse research

\$80,000 Hydrologic Data Acquisition and Synthesis

Funds will be used to acquire, process, synthesize, and deliver data to assist in making sound management and policy decisions.

\$150,000 Research Applications Scientist

All water use sectors from agriculture to urban, environmental, and industry will benefit from a regional water scientist who will use the most advanced science to understand New Mexico's complex water systems.

\$125,000 Water New Mexico Prize

This award recognizes excellence in water research and application.



THANK YOU

THANK YOU



Water

XPRIZE



ARROWHEAD RESEARCH
CENTER



THANKS AGAIN!

Faculty Water Research Grants

Proposals received in response to NM WRRRI FY15 Faculty Water Research Program

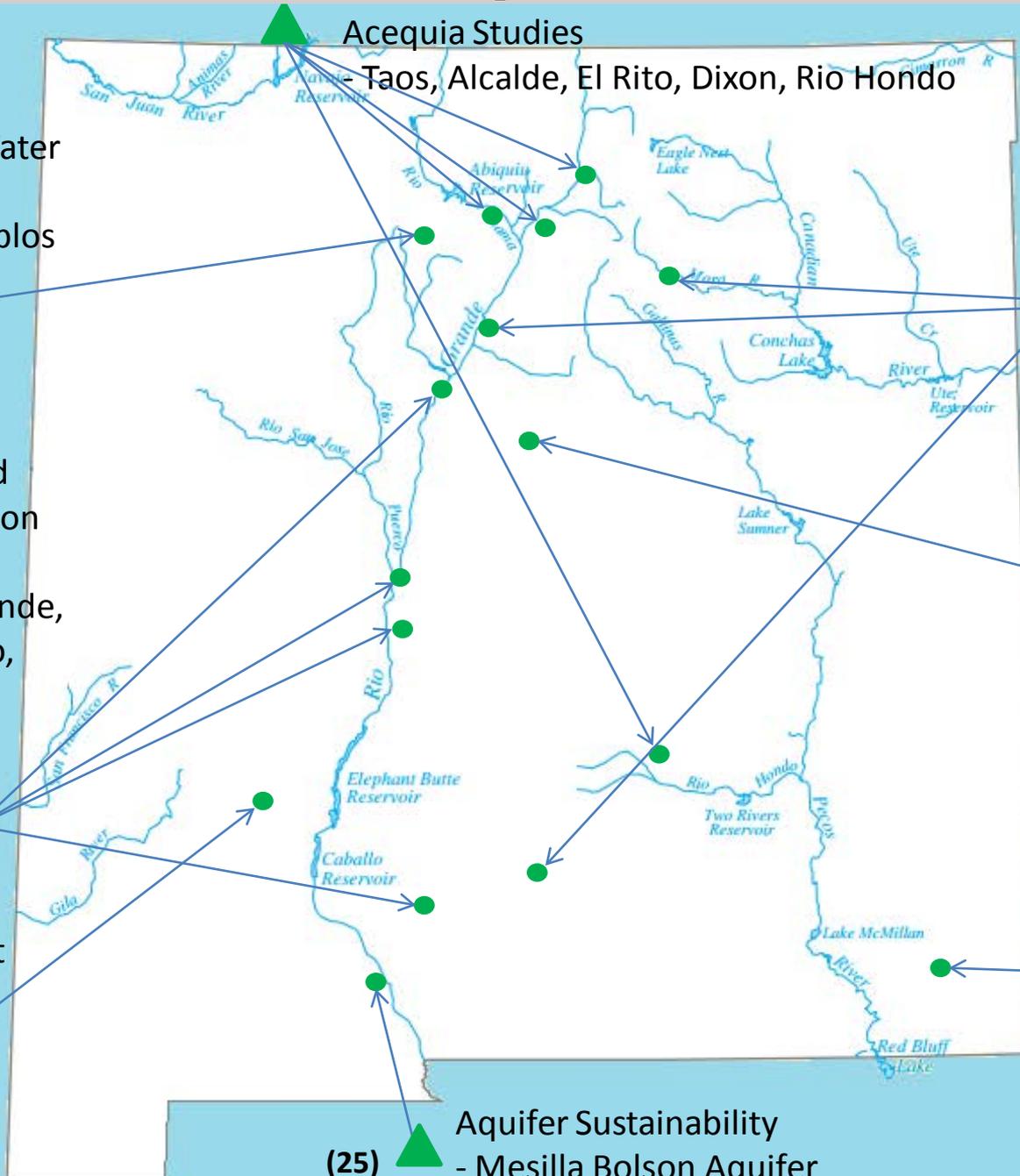
1. Doing hydrology backwards in New Mexico to estimate a statewide water assessment (i.e., Canadian, Rio Grande, Gila, and Pecos Rivers); UNM
2. Soil water sodicity as a standard to predict invasive plant problems in NM; NMSU
3. Policy alternatives for controlling nitrate pollution from NM's dairies; UNM
4. Quantifying the variability and interactions of stream flow, riparian extent and ET; NM Tech
5. Assessment of water table and water quality variations with respect to river flow along Rio Grande between Garfield, NM and Fabens, TX; NMSU
6. Policy options to enhance water supply in support of revision of the Lower Rio Grande Water Users Organization Regional Plan; NMSU
7. Photon-energized forward osmotic system for seawater and brackish water desalination; Highlands/NM Tech
8. Identification of law and policy options for best water management practices; UNM
9. Nanocrystalline cellulose reinforced polyamide thin film as RO membranes; UNM

Student Grant RFP will be released in August for projects to start in October.

Research Needs Across New Mexico

- Evaluating the Current Coldwater Temperature Standards for New Mexico to Protect Aquatic Life (NMSU, WQCC, NMED; 1 year; \$30,000)
- Where Will the Water Come From? Analyzing Grassroots Political Formations in Mega-energy Development in Mora, Rio Arriba, San Miguel, and Lea counties (UNM; 1 year; \$30,000)
- Well Water Quality Study for the Hatch and Las Cruces Areas – Studying the Interaction Between Surface Water, Irrigation Water Applied to Crops, and Groundwater (NMSU; 1 year; \$30,000)
- Helping Families without Access to Water – Household Water Conservation Workshop & Water Rate Assessment (WRRI; 3 years; \$195,000)
- Improving Access to Potable Water within a Transboundary Regional Aquifer (WRRI; 1 year; \$80,000)
- Estimating a Critical Water Assessment Component: ET in Water Storage Reservoirs and Lakes in the Upper Rio Grande Basin with Satellite Data from 2000 to 2014 (UNM; 1 year; \$30,000)

Technical Studies that Complement Statewide Water Assessment



Acequia Studies
- Taos, Alcalde, El Rito, Dixon, Rio Hondo

Aquifer Sustainability/Water Infrastructure
- Tribes and Pueblos

Remotely sensed evapotranspiration studies
- Middle Rio Grande, Jornada, Socorro, Sevilleta

Riparian Habitat Studies

Forest Thinning Effects on Water Yield
- Santa Fe Ranch
- Mora County
- Sacramento Mountains

Groundwater Study
- Estancia

Produced Water, Water Used for Fracking
- SE New Mexico

(25) Aquifer Sustainability
- Mesilla Bolson Aquifer

