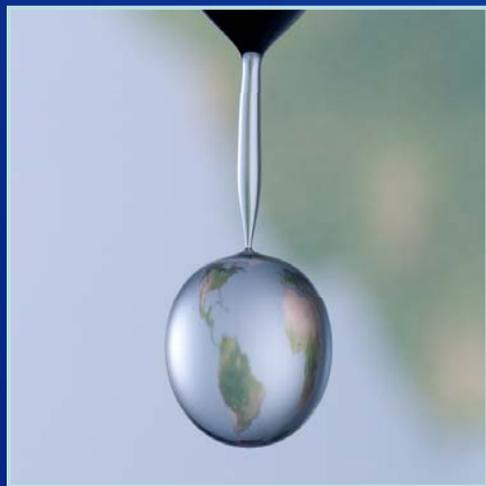


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Managing Water in the West

Oklahoma-Texas Area Office

Lower Rio Grande Basin Study



U.S. Department of the Interior
Bureau of Reclamation

October 2012

Who We Are

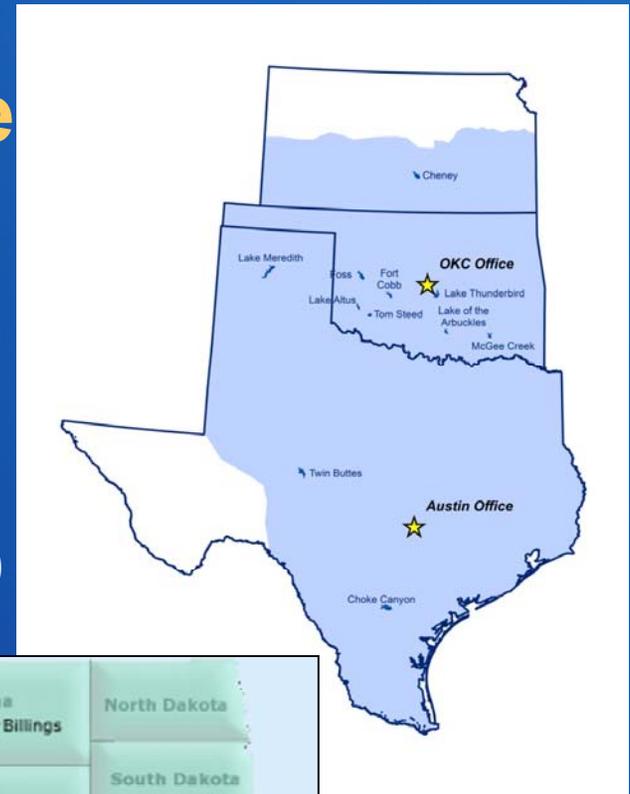
The mission of the Bureau of Reclamation is to manage, develop, and protect water and related resources in an environmentally and economically sound manner in the interest of the American public.



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Oklahoma-Texas Area Office

- 11 reservoirs with a total capacity of 4.2 million acre-feet
- Total water rights from projects:
 - M&I - 571,000 acre-ft/yr to about 2.7 million customers
 - Irrigation - 110,600 acre-ft/yr for about 63,000 acres



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Lower Rio Grande Valley Program

- 48 miles of canal lining
- 87 miles of canals into pipeline
- 113 telemetry/metering sites
- Pump station and pump replacements
- Gate replacements
- 80,100 af/yr water savings
- 7,400,000 kWh/yr energy savings
- \$775,000/yr O&M savings

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WaterSMART Program

- ❖ **Sustain and Manage America's Resources for Tomorrow**
- ❖ **Secretarial Order 3297 - Established the WaterSMART Program**
 - Coordination between Reclamation and USGS
 - WaterSMART Clearinghouse
<http://www.doi.gov/watersmart>
 - Integration of Energy and Water Policies
 - Scientific Information to Support Sustainable Water Supplies

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Components of The WaterSMART Program

❖ WaterSMART Grants

- Water and Energy Efficiency Grants
- Advanced Water Treatment
- System Optimization Reviews
- Research Grants to Develop Climate Analysis Tools

❖ Basin Studies Programs ◀

- Basin Studies
- West-Wide Climate Risk Assessments
- Landscape Conservation Cooperatives

❖ Title XVI

❖ Water Conservation Field Services

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Basin Study Program

❖ Reclamation implements Section §9503 of the Secure Water Act through the Basin Study Program.

❖ The Program includes

- Basin Studies – Cost-shared assessments of water supply and demand and identification of climate adaptation strategies.
- West-Wide Climate Risk Assessments – Reclamation only, non cost-shared, baseline climate risk assessments
- Landscape Conservation Cooperatives – Reclamation is co-leading the Desert and Southern Rockies LCCs to help meet the science needs of resource managers

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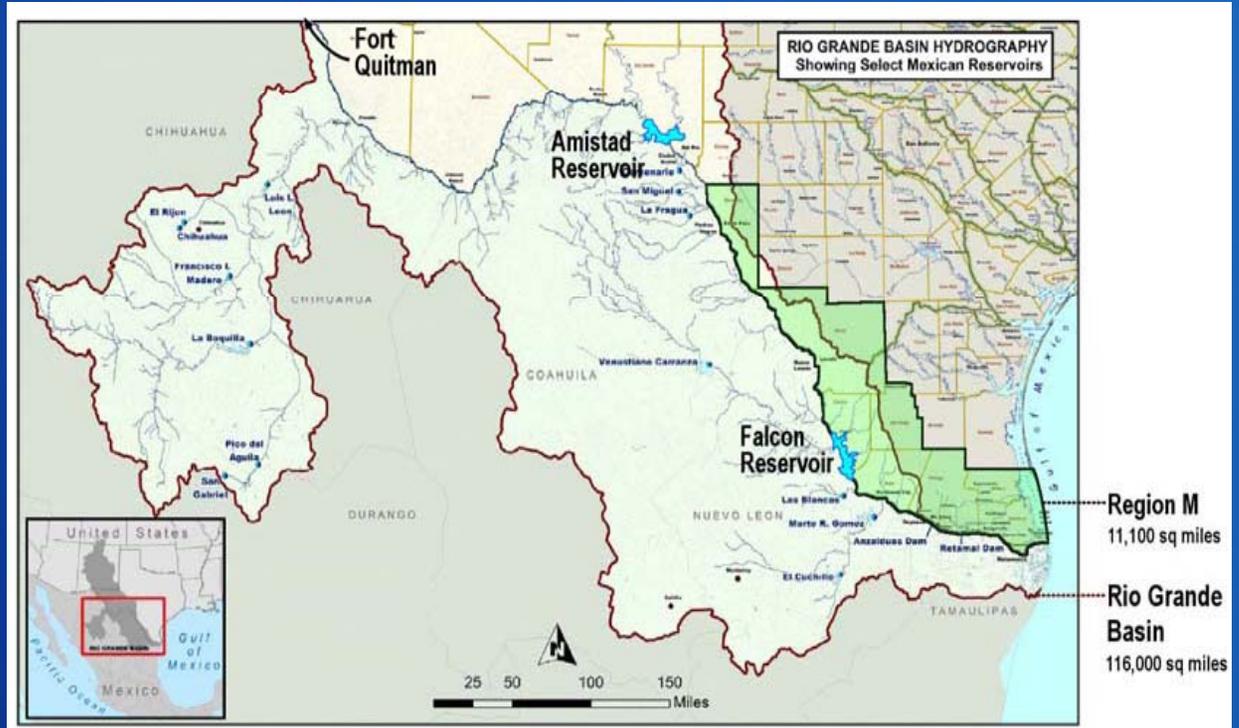
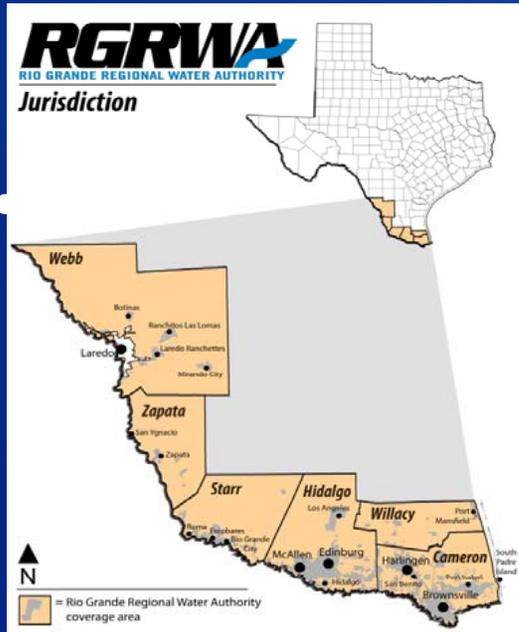
Basin Studies

Requirements Summary

- Large geographic scope
- 50/50 cost-share – no Federal cap
- Completed within 2 years
- Incorporate climate variability projections
- Supply/Demand updates
- System reliability analyses
- Compare options to meet future supply needs
- Findings and recommendations

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Lower Rio Grande River Basin Study with RGRWA



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BLACK & VEATCH
Building a world of difference.



Lower Rio Grande Basin Study Consultant Team



DBS&A
Daniel B. Stephens & Associates, Inc.



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Lower Rio Grande River Basin Study

Key Stakeholders

- Texas Water Development Board
- Region M Planning Group
- CNA-Comision Nacional del Agua)
- Rio Grande Watermaster
- Texas Commission on Environmental Quality
- International Boundary & Water Commission
- U.S. Department of Agriculture: Rural Development Administration
- U.S. Geological Survey
- Environmental Protection Agency
- U.S. Fish and Wildlife Service
- Texas Water Resources Institute
- Texas Parks and Wildlife Department
- Public Involvement

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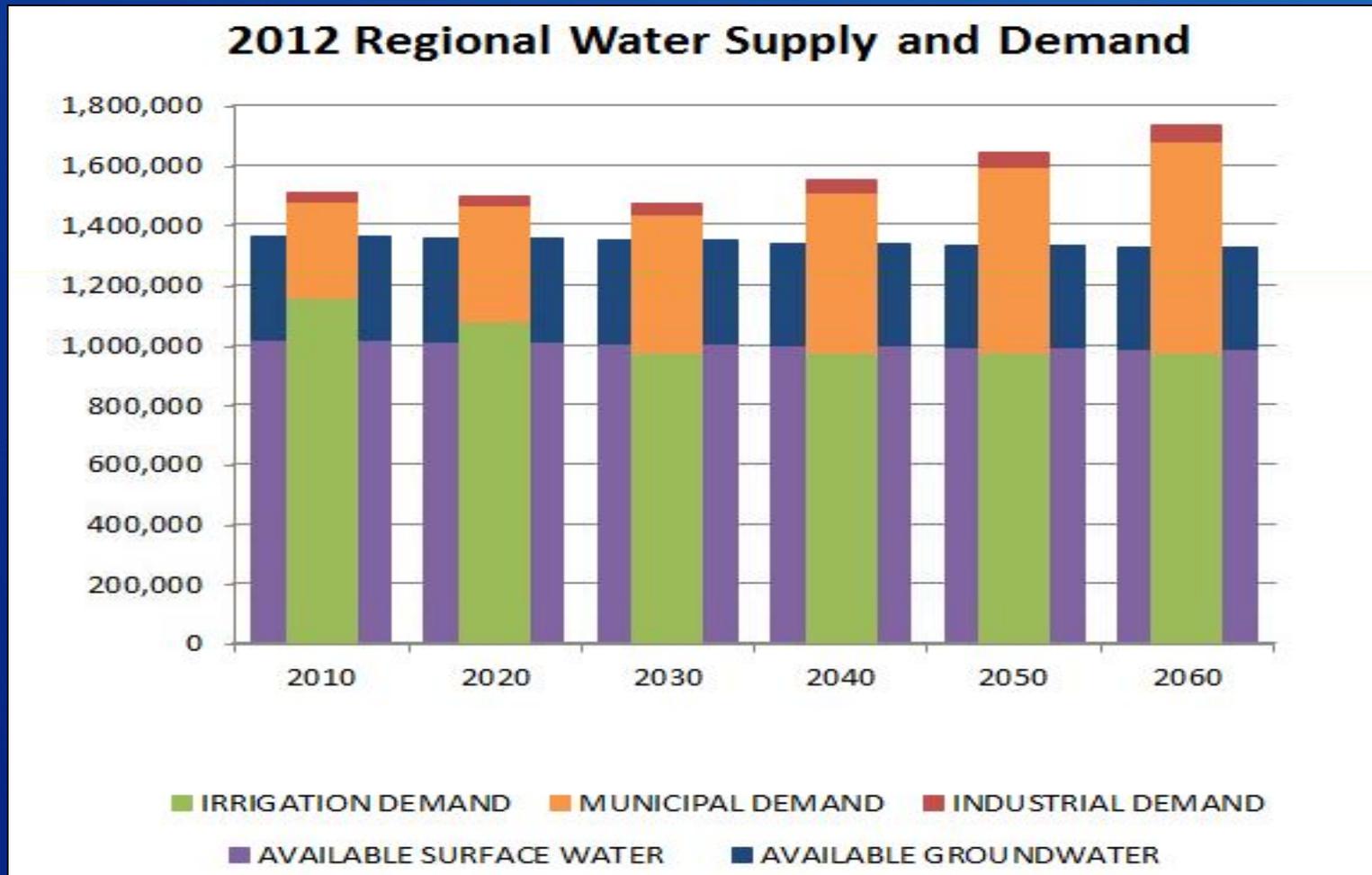
Lower Rio Grande Valley Basin Study: General Tasks

- In face of climate change:
 - Perform hydrologic projections of future water supply and demand
 - Evaluate how existing water & power will perform in 2060
- Create range of water supply management alternatives



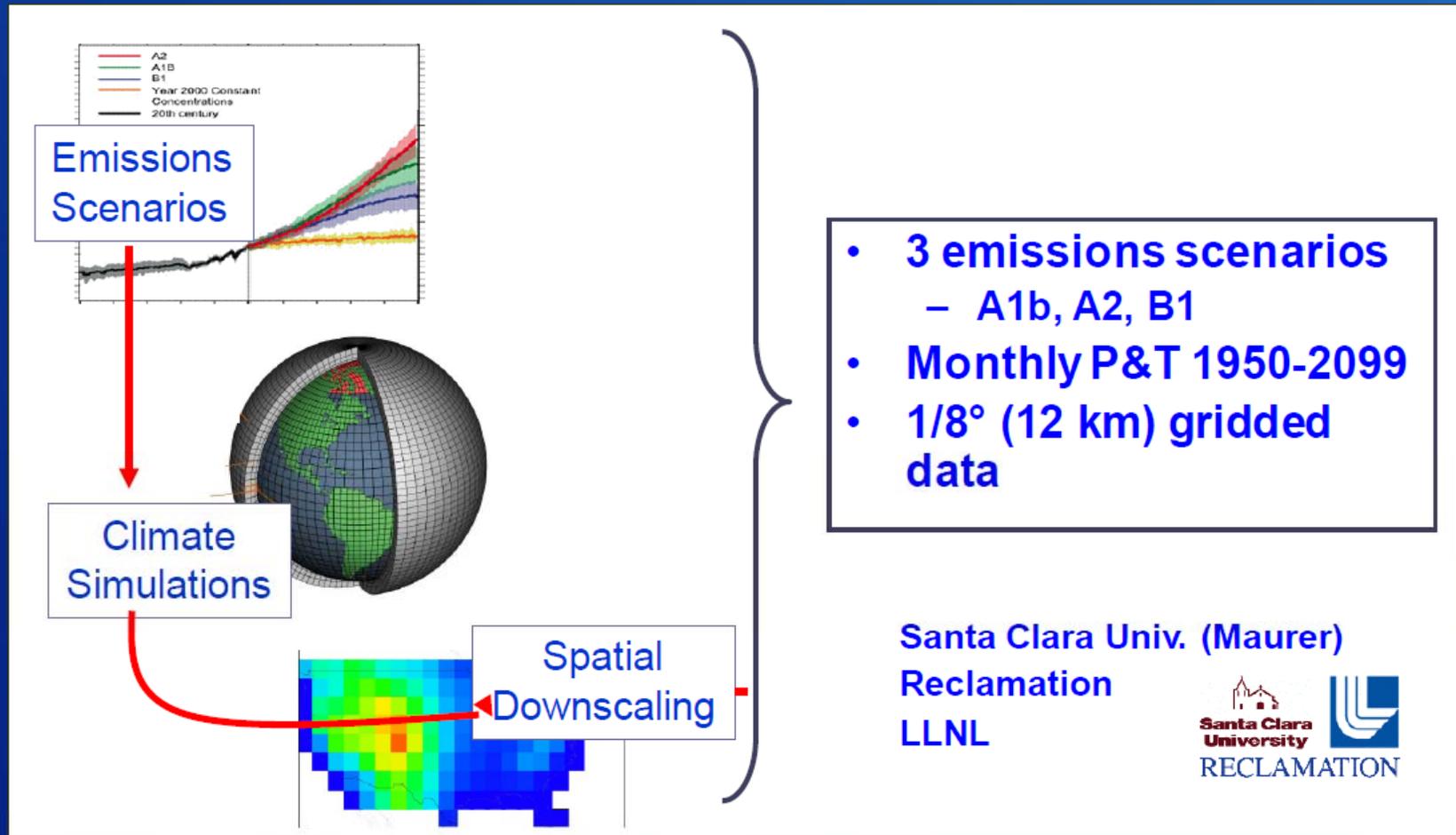
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2060 Projected Supply/Demand Imbalance

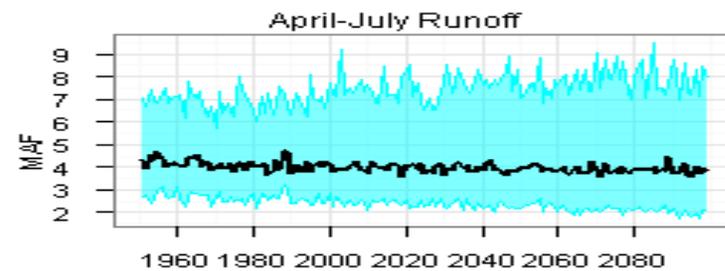
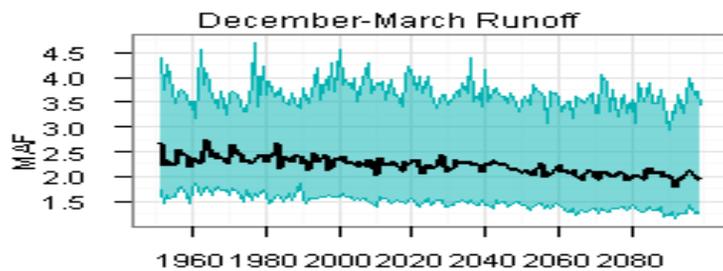
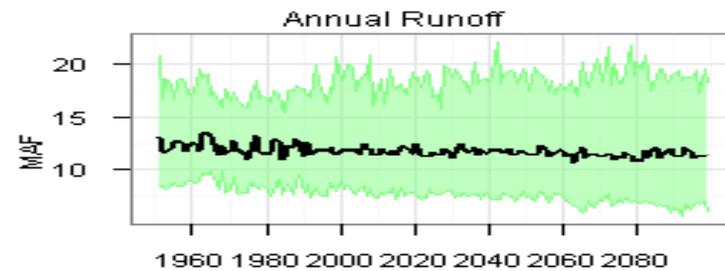
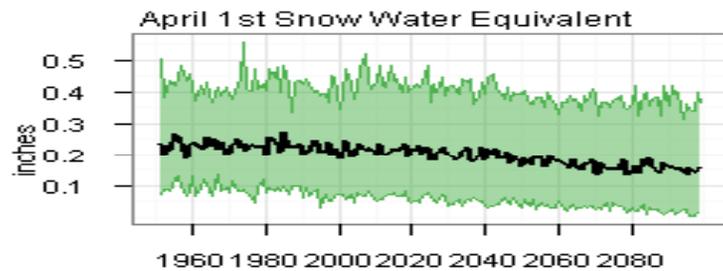
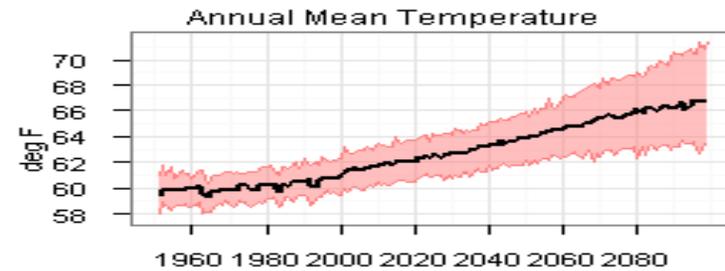
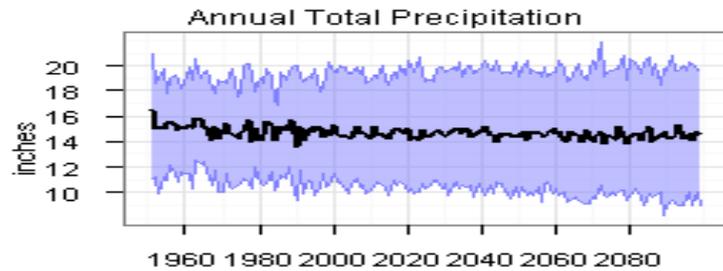


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Climate Scenarios

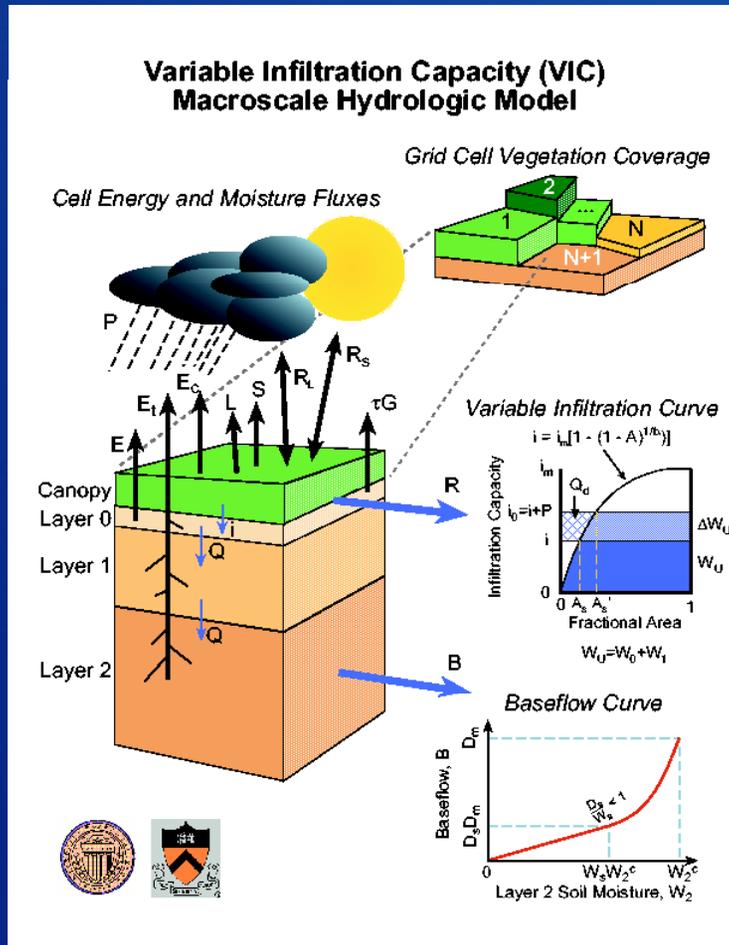


Climate Projections



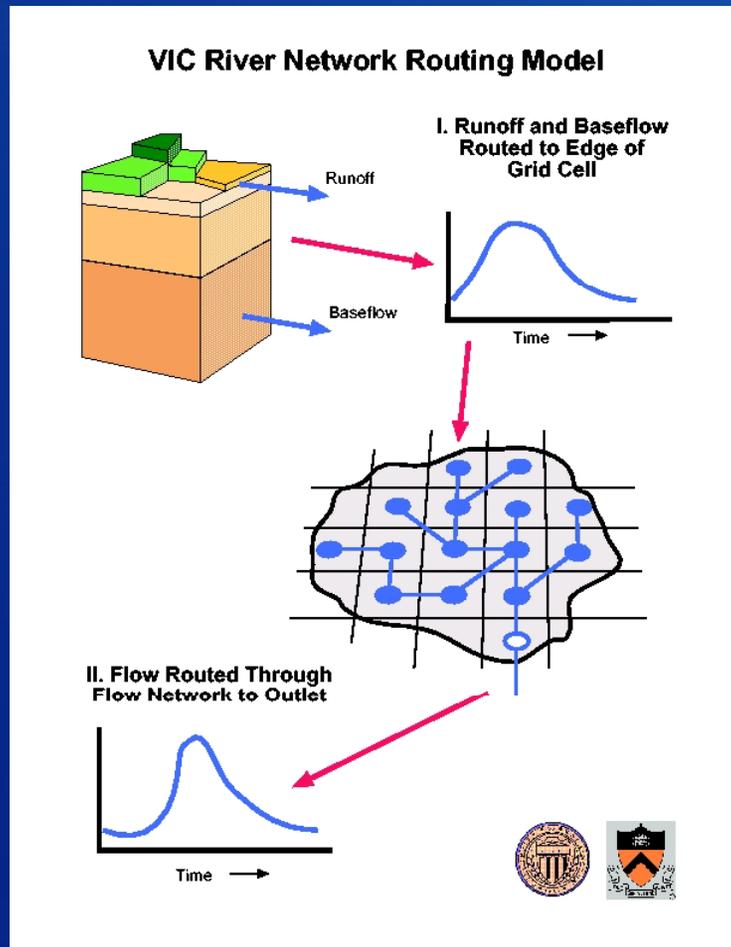
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Steps to developing VIC Factors



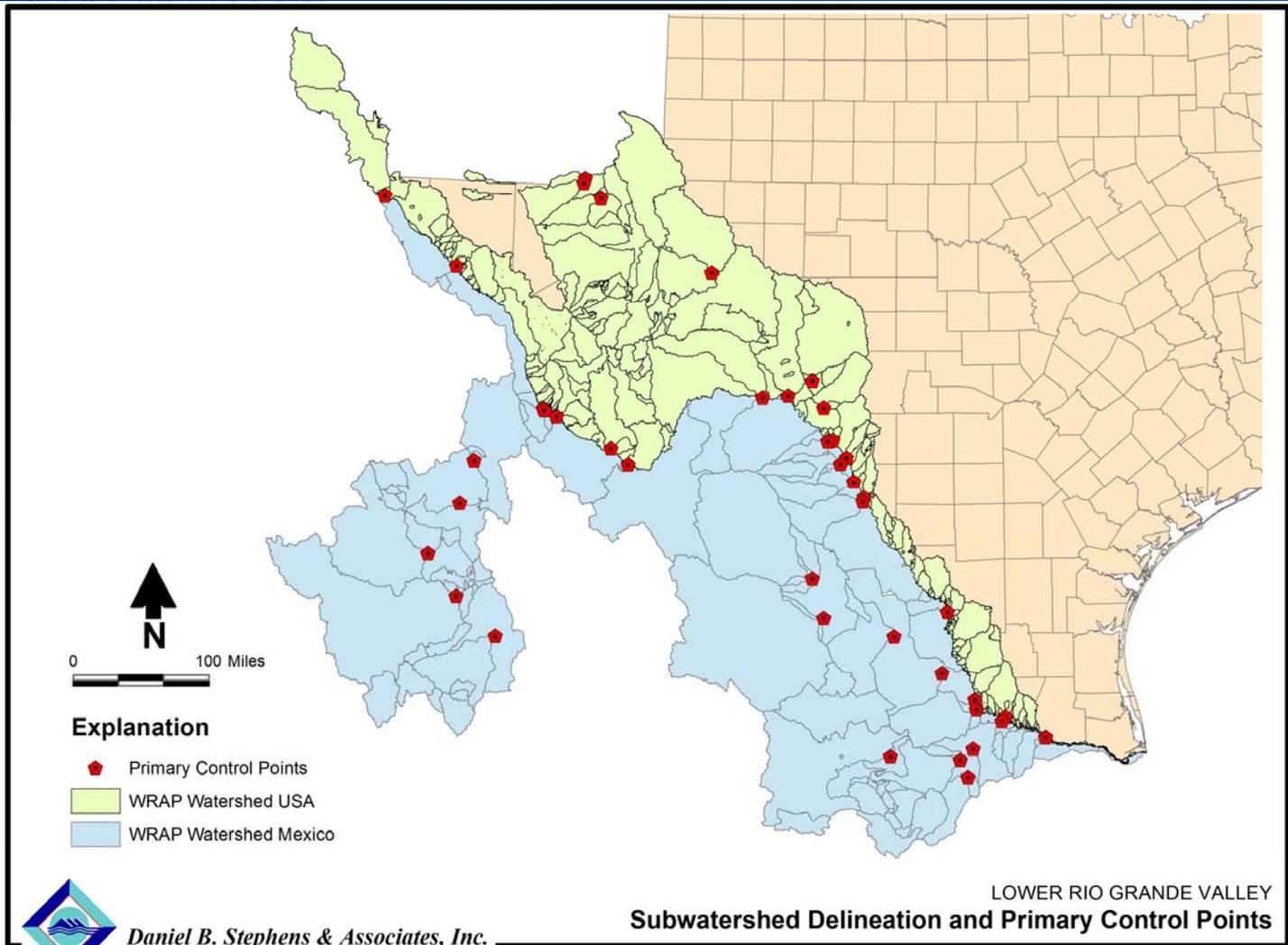
- **Step 1: Land surface simulation**
 - Surface runoff
 - Baseflow
 - Daily precipitation
 - Min. temperature
 - Max. temperature
 - Historic factors
 - 1950-1999

Steps to developing VIC factors



- **Step 2: Streamflow routing**
 - Transport runoff
 - Surface runoff
 - baseflow
 - Moves water from the grid cells through flow network or outlet, routing locations of interest

Rio Grande Basin Flow Control Points



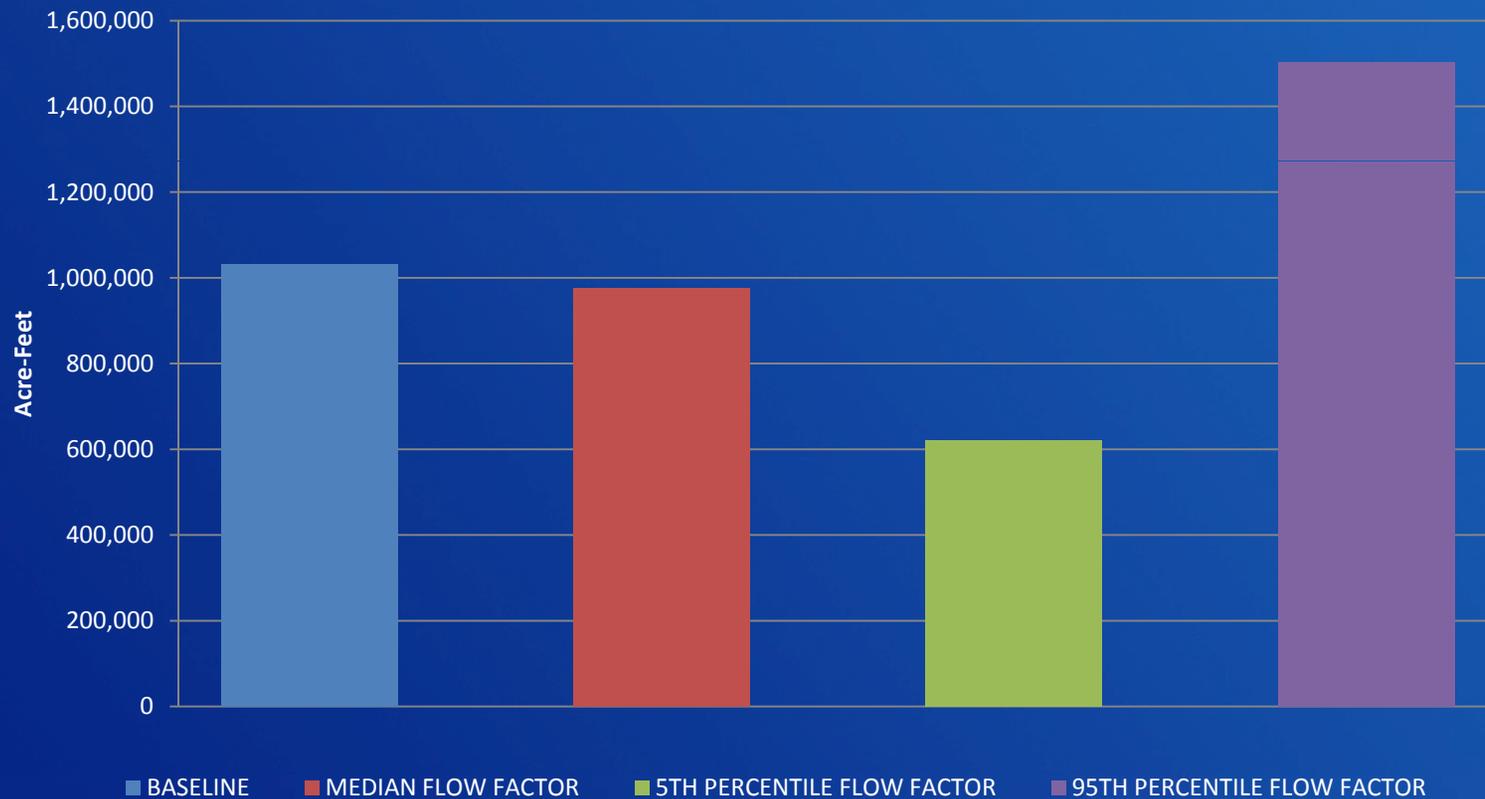
Daniel B. Stephens & Associates, Inc.
03/13/2012

Water Supply Projections

- Future Surface water supply
 - Water Availability Model (WAM)
 - Naturalized flow input files were modified based on **median**, **5th percentile** and **95th percentile** flow factors from 112 climate projections
 - Water-rights Applied
- Future Groundwater supply
 - Groundwater Availability Model (GAM)

Climate-Affected Reservoir Firm Yields

Current U.S. Reservoir Annual Firm Yield



Groundwater Availability

County	State Water Plan Annual Availability (acre-feet)	Managed Available Groundwater (acre-feet)
Cameron	104,700	50,560
Hidalgo	62,530	41,926
Jim Hogg	4,980	24,414
Maverick	12,066	2,041*
Starr	19,600	7,526
Webb	35,176	23,917
Willacy	90,140	20,013
Zapata	12,500	7,999
Total	341,692	176,355

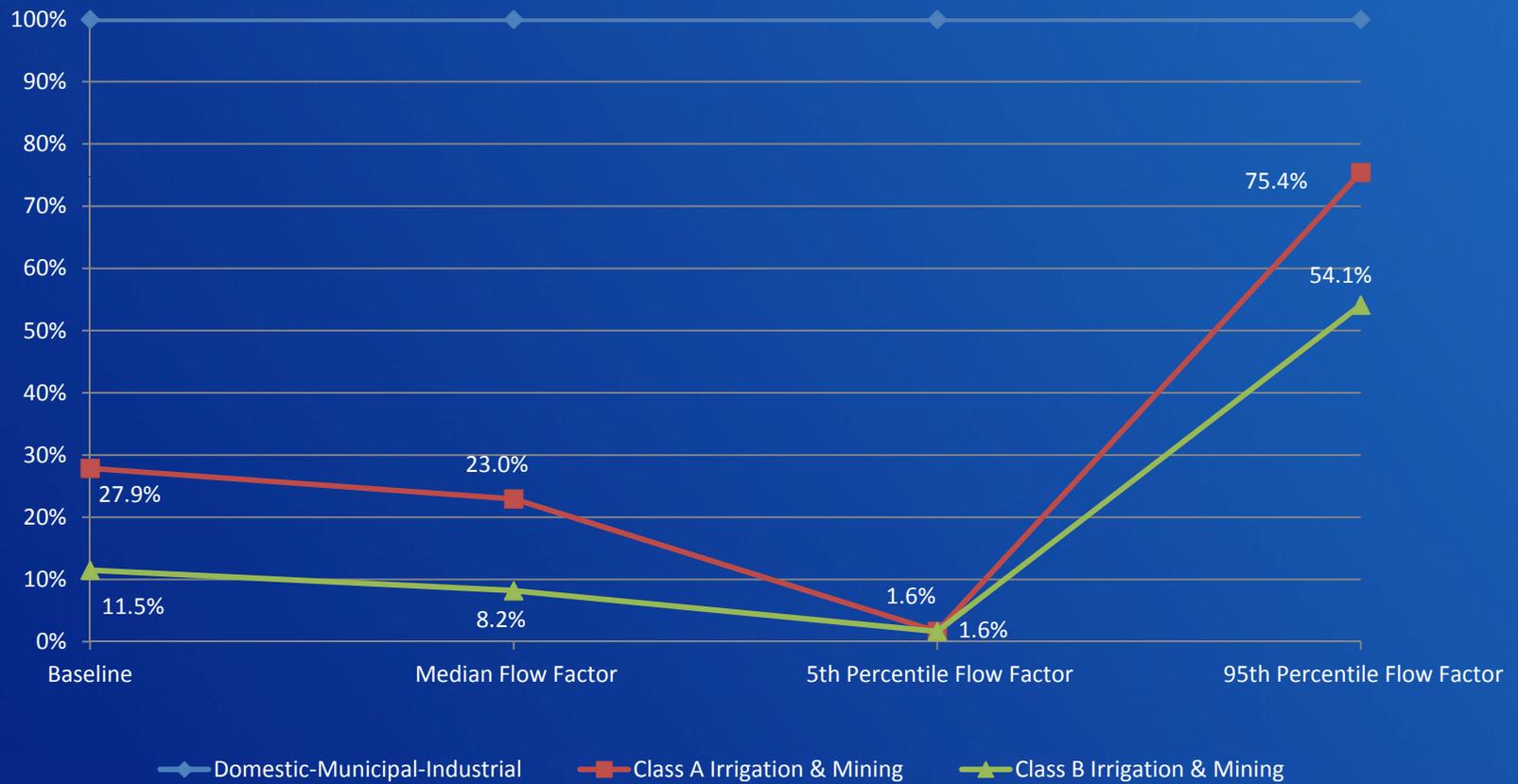
Source: GAM (Hutchison, 2011)

* Decreases from 2,041 to 1,531 acre-feet by 2060

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WAM Results

Baseline +4% vs. Annual Period Reliability



Key Project Deliverables

- **Task 1. Signed MOA and Final Plan of Study ✓**
- **Task 2. Technical Memorandum that includes the monthly stream flow time-series for the Rio Grande WRAP/WAM ✓**
- **Task 3. Baseline System Reliability and Projections of Future System Reliability Technical Memorandum combined with Task 2 – includes reservoir yield, agricultural demands, WAM simulations. ✓**
- **Task 4. Technical Memorandum describing planning objectives, preliminary screening criteria, and alternatives eliminated from further consideration.**

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RGRWA Basin Study Proposal

Key Project Deliverables –continued.

- **Task 5. Draft and Final Alternatives Formulation Report**
- **Task 6. Draft and Final Screening Criteria Report**
- **Task 7. Draft and final Preliminary Assessment Report**
- **Task 8. Technical Memorandum to include Draft and Final Financial model and resulting preferred alternative for feasibility-level design**
- **Task 9. Draft and Final Basin Study Report (2013)**

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Questions?



Jeff Gerber

512-899-4157

jgerber@usbr.gov

<http://rgrwa.org/basinstudy.html>

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