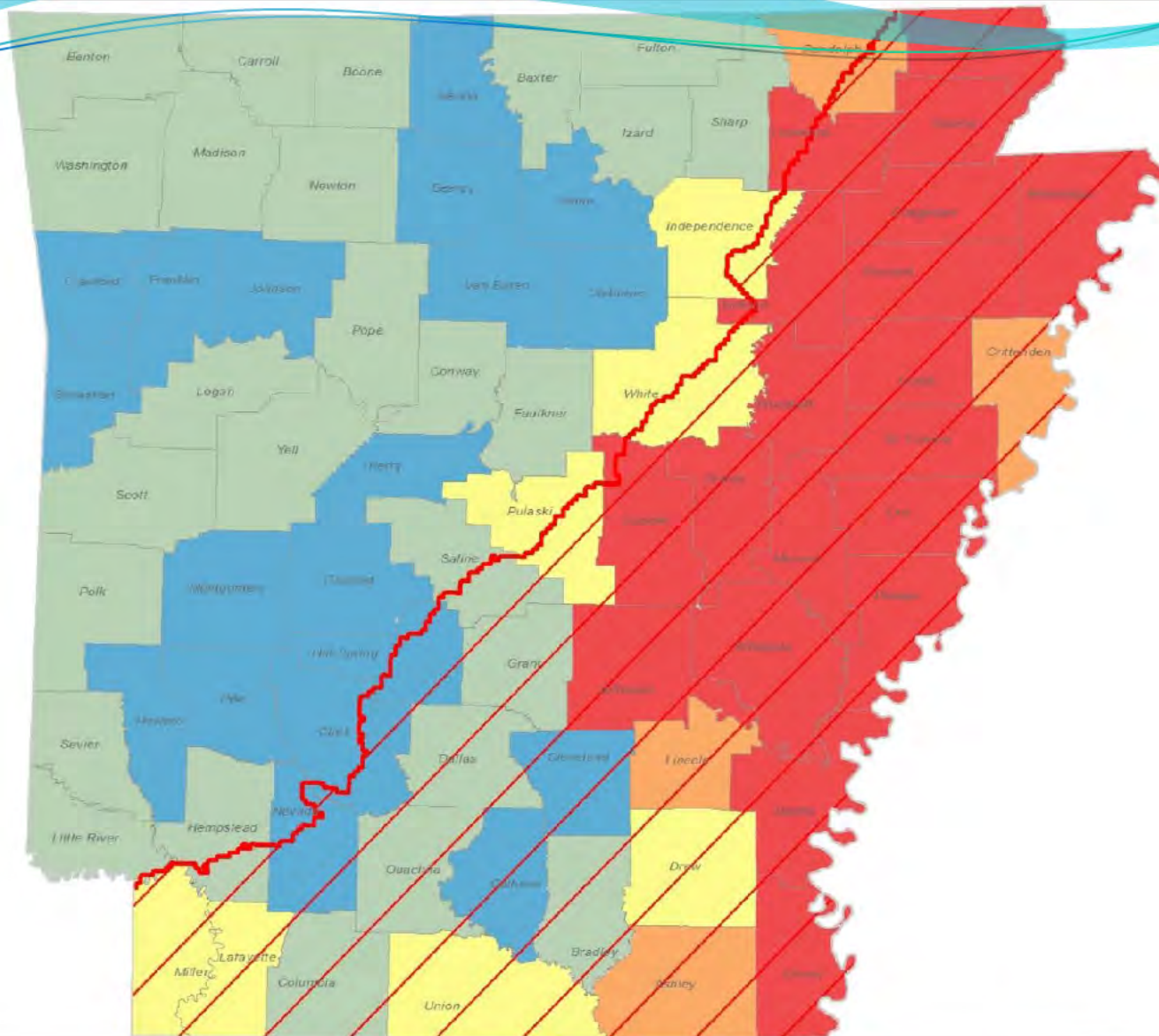
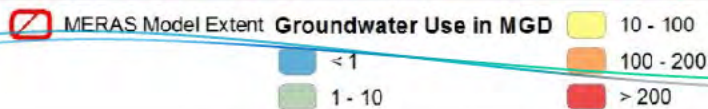


Groundwater Availability



Ground Water



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Groundwater Availability in Alluvial and Sparta Sand Aquifers

• Current Conditions

- Use USGS MERAS groundwater model
- Run model simulation with USGS inputs from 1870 to 2007
- Summarize model results
 - Pumping, recharge, and boundary conditions
 - Water elevation maps

• Future Conditions

- Incorporate demands out to 2050
- Run model simulations from 2010 to 2050
- Summarize model results
 - Pumping, recharge, and boundary conditions
 - Water elevation maps
 - Groundwater in storage

Groundwater in storage

From Water Use Data to Groundwater Availability

County	Pumping
1	7.2
2	6.1
3	4.5

Water Use Projections



Spatial Estimate of Pumping



2020

2030

2040

2050

1870

2007



Historic MERAS Simulation

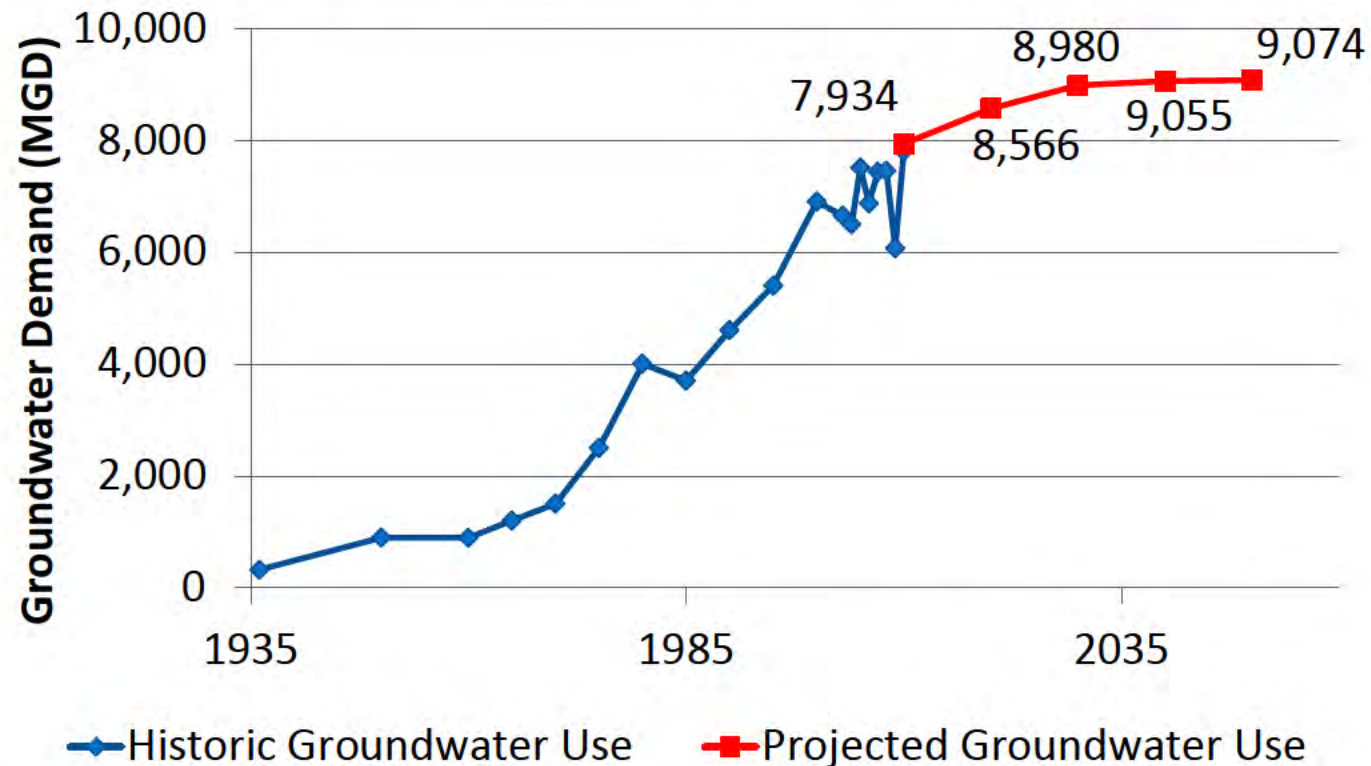


Future Extended MERAS Simulation

2050 Estimate of GW Availability

Arkansas Groundwater Demand Data Trends

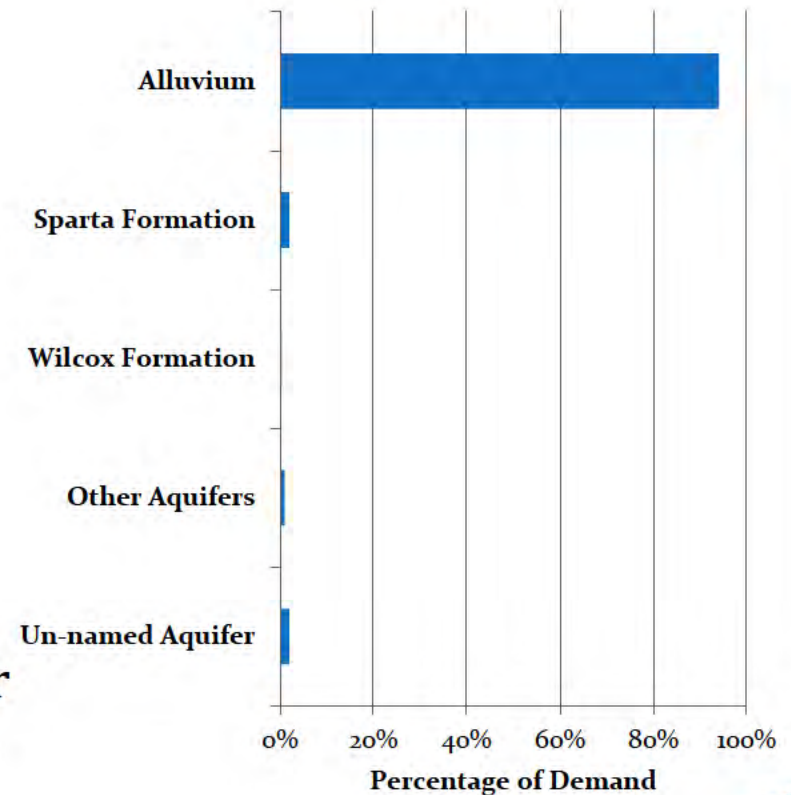
- Updated Demand Data Added from 2010-2050



Groundwater Demand Data (Arkansas Only)

Of the 52,119 individual demand data points compiled:

- 94% (49,107 wells) extract from the Coastal Plain Alluvium
- 2% (1,042 wells) extract from the Sparta Formation
- 0.4% (202 wells) extract from the Wilcox Formation
- 1% (560 wells) extract from other aquifers
- 2% (1,208 wells) do not have an aquifer associated with them



Groundwater Model Configuration

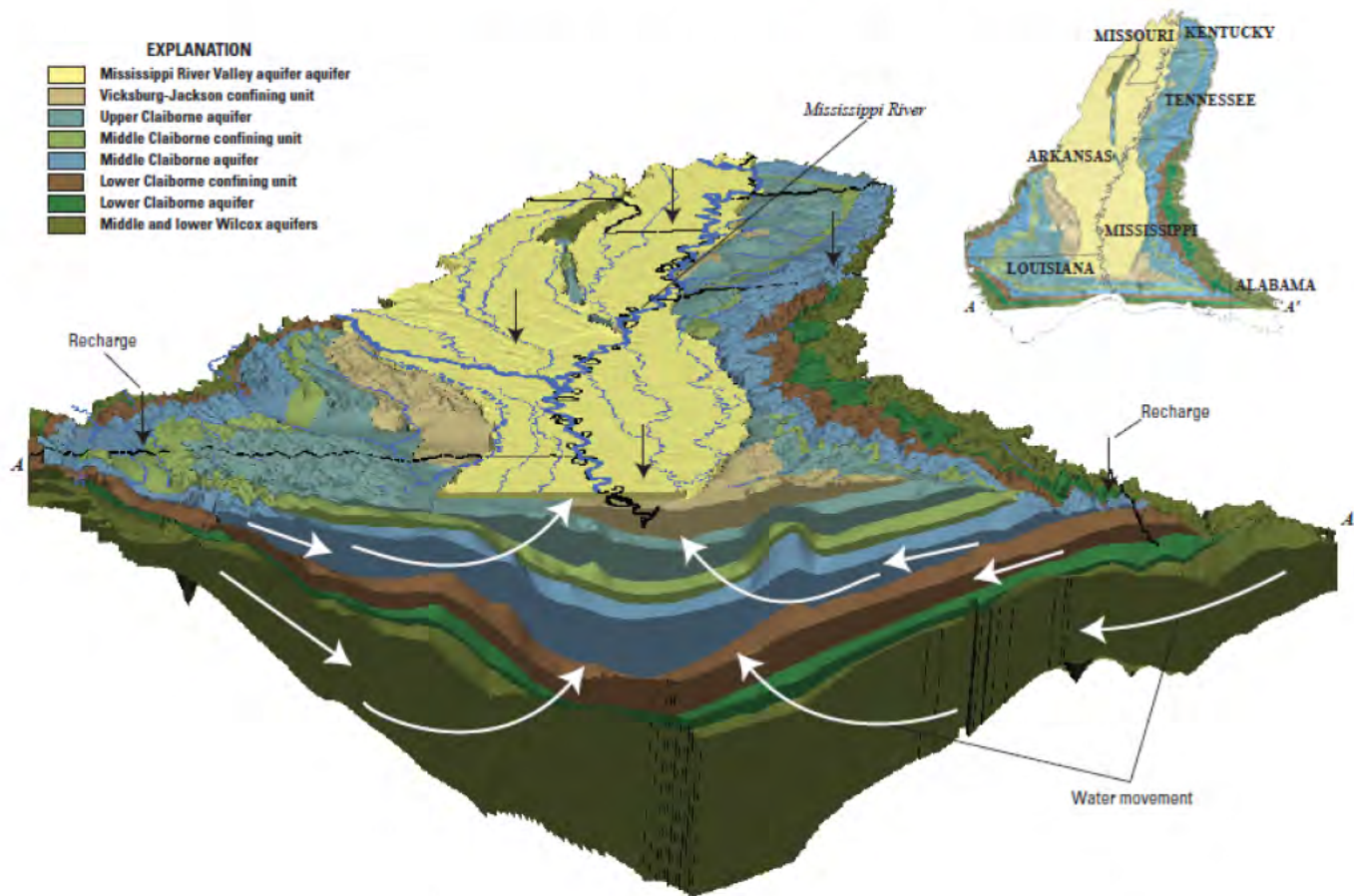


Figure 6. Cross-sectional view of hydrogeologic units within the study area with predevelopment conceptual water movement.

Groundwater Model Configuration

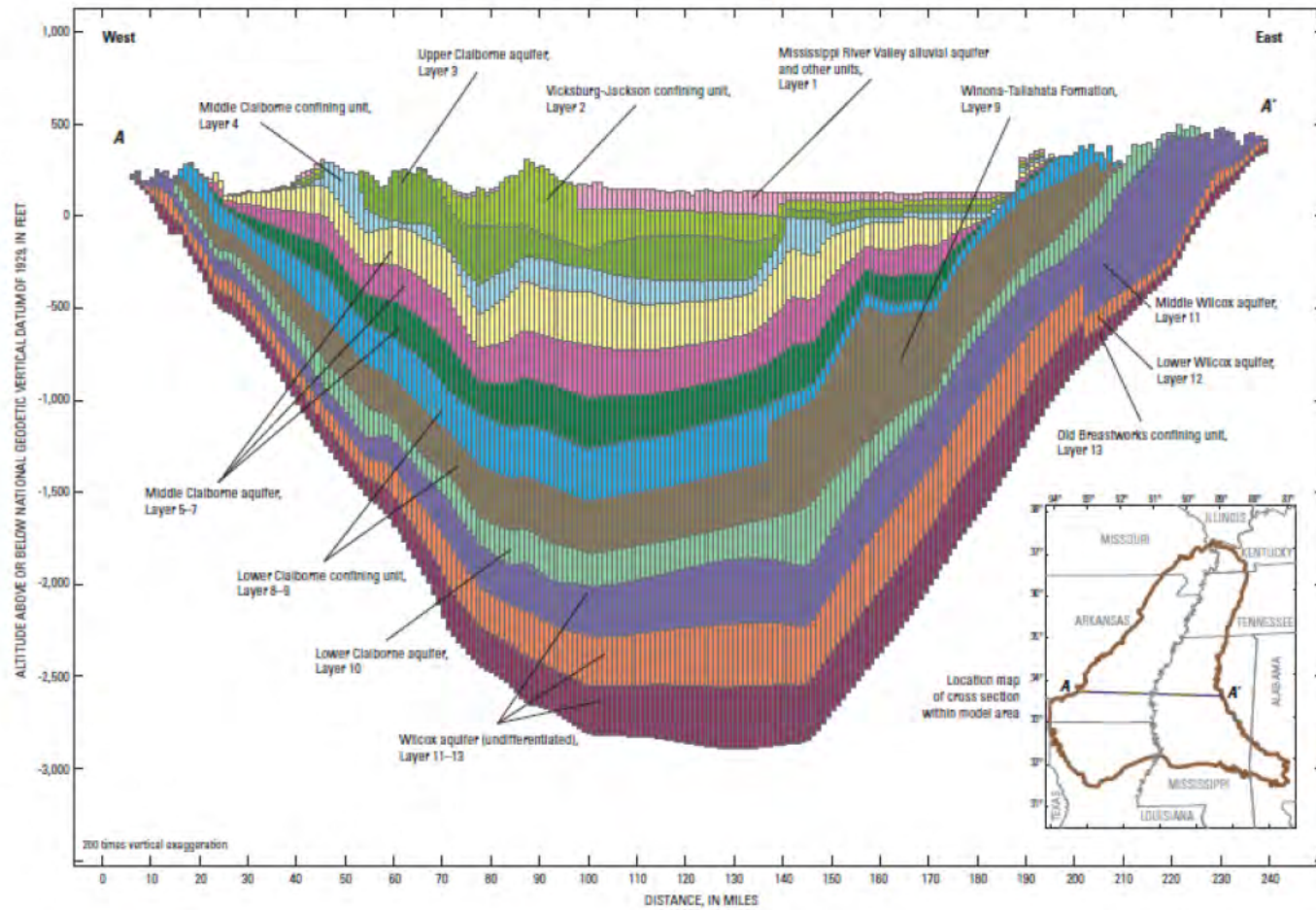


Figure 8. Cross section of model grid from west to east through row 258. Cross-section location is shown on inset map.

Simulated River Locations

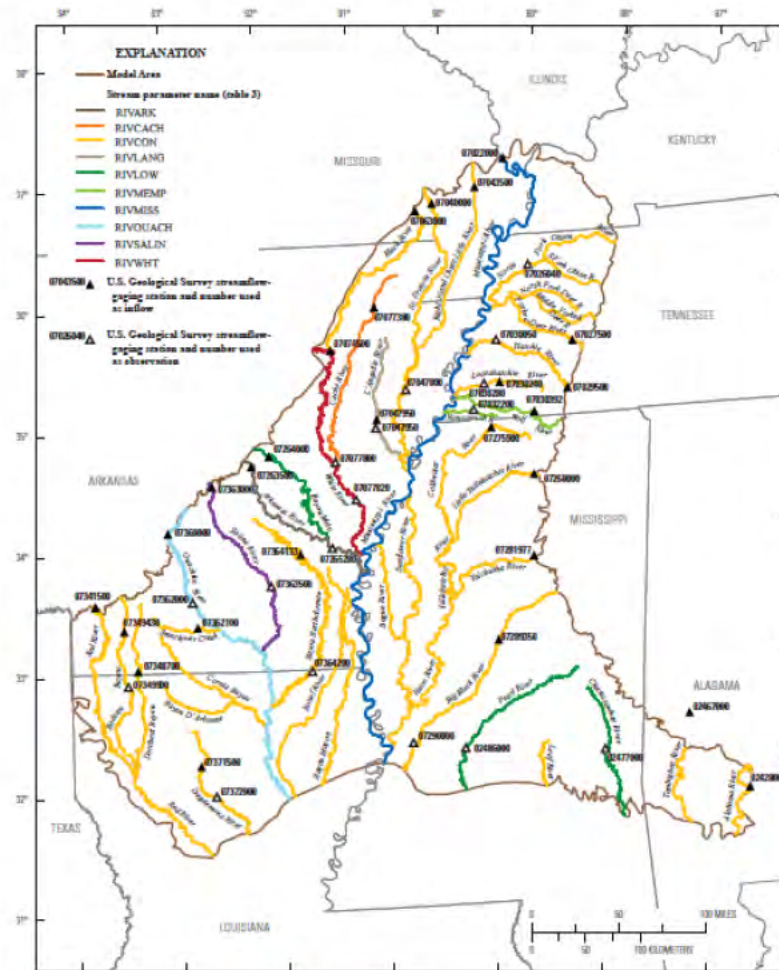


Figure 3. Streams simulated in the model area.

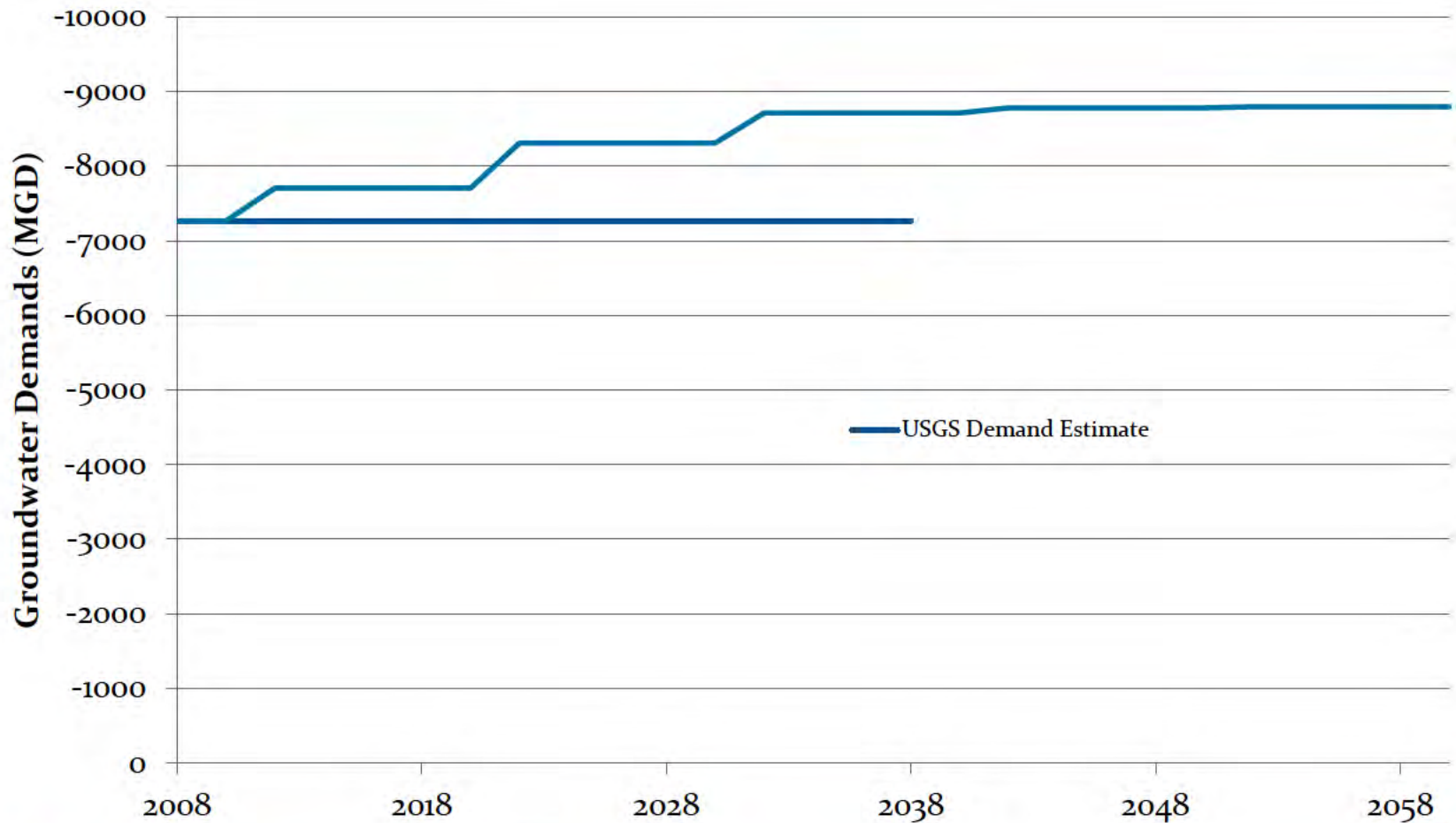
Simulating Impact of Updated Groundwater Demand Data

- Groundwater demands simulated using USGS future projection model – covers most of Eastern Arkansas
- Original model simulated 2007 – 2037 period; extended to 2060 for this study; recharge and streamflow sequences repeated
- Demands incorporated from 2010 – 2050
- Only demands in Arkansas updated
- Water levels tracked across entire model
- Wet and dry conditions simulated – similar results as found by USGS, only dry conditions presented

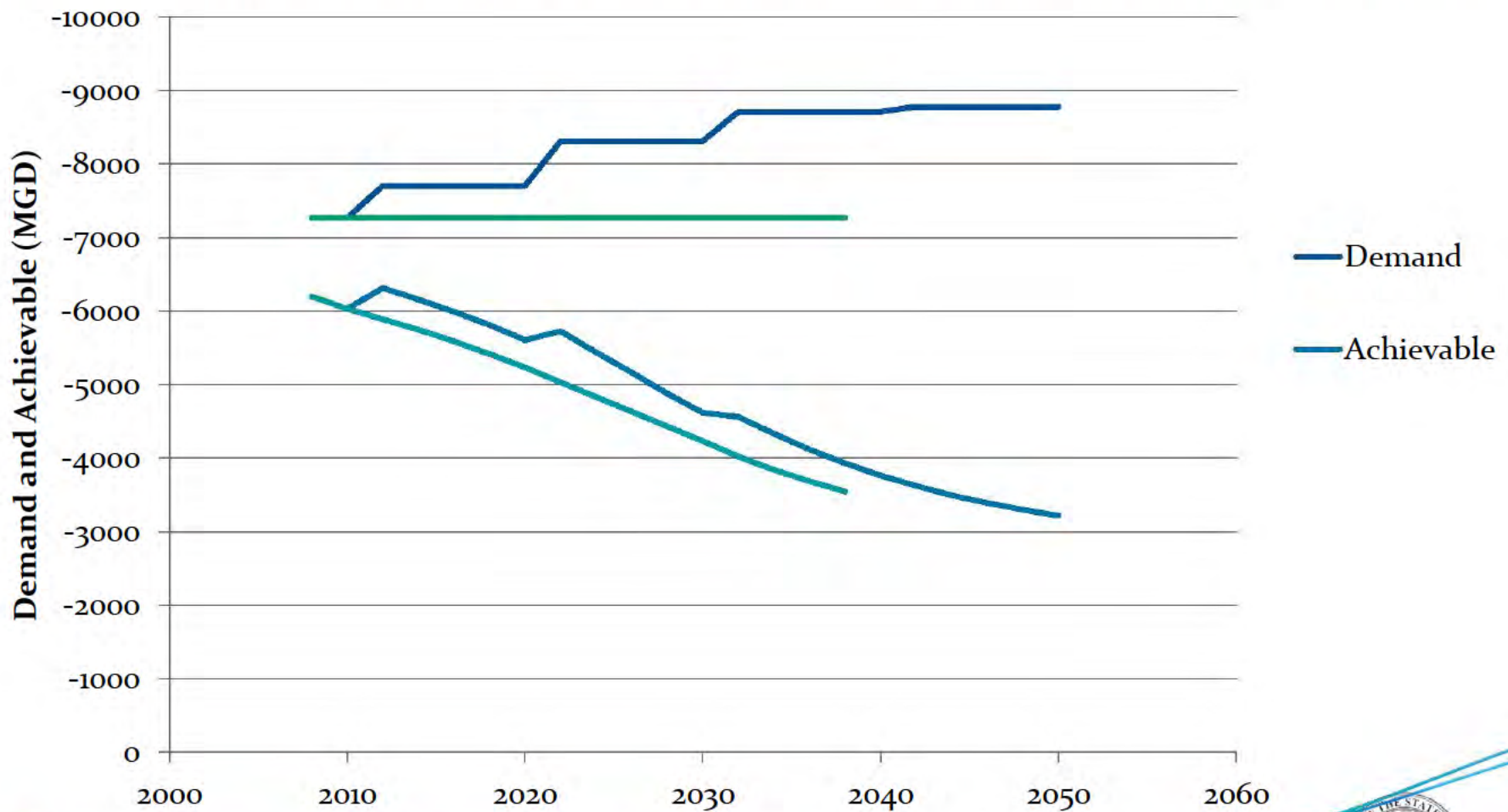
Incorporating Updated Demand Into Model

- Demand entries that had location information were assigned to the appropriate model cell
- Sectors where demand was based on county assigned to well(s) near center of the county
- Pumping assigned to principal aquifer identified in demand study
- Where model stratigraphy suggested deeper alluvium layering, pumping moved down to lowest “high K” layer

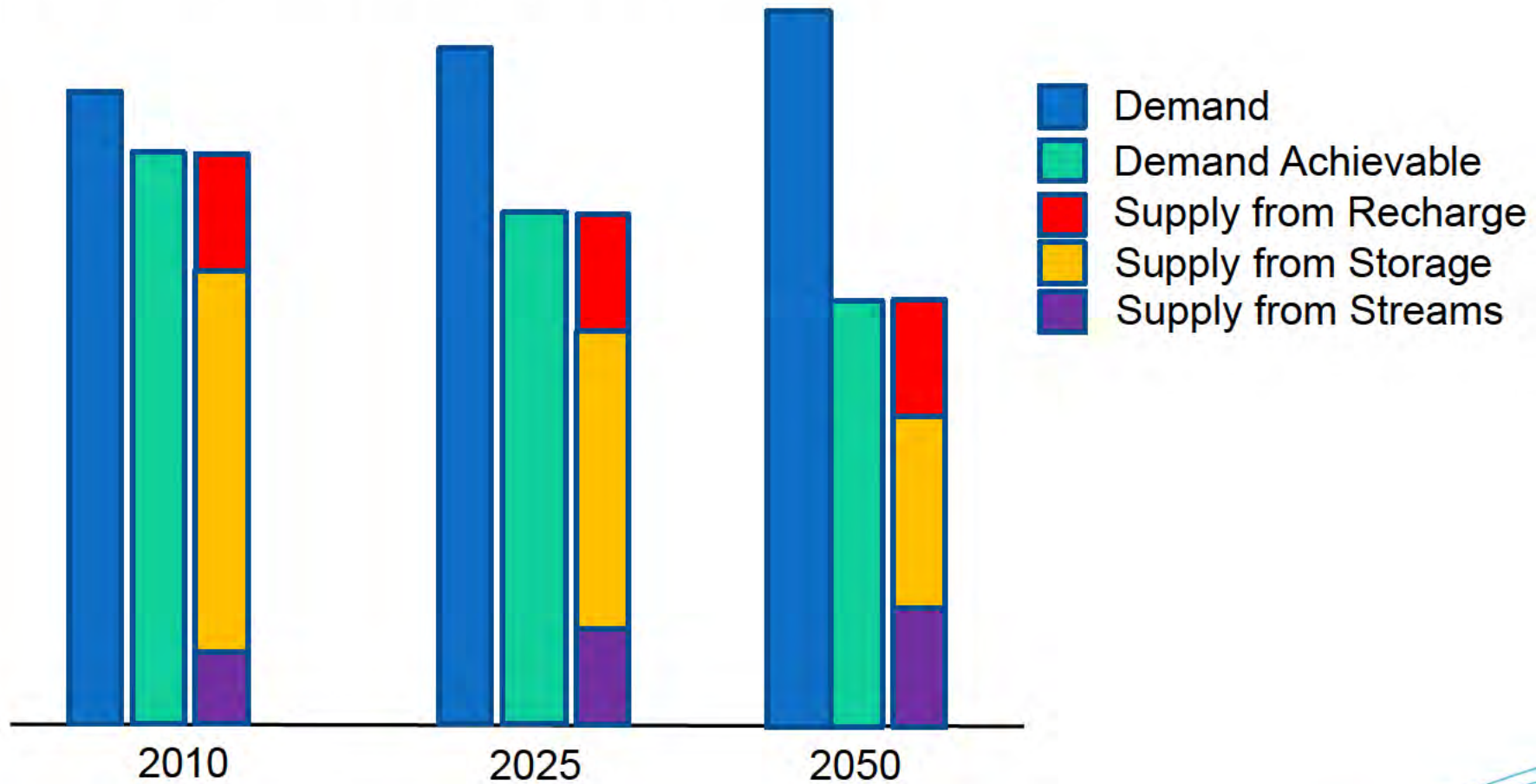
Comparison of USGS and Current Demands Estimates



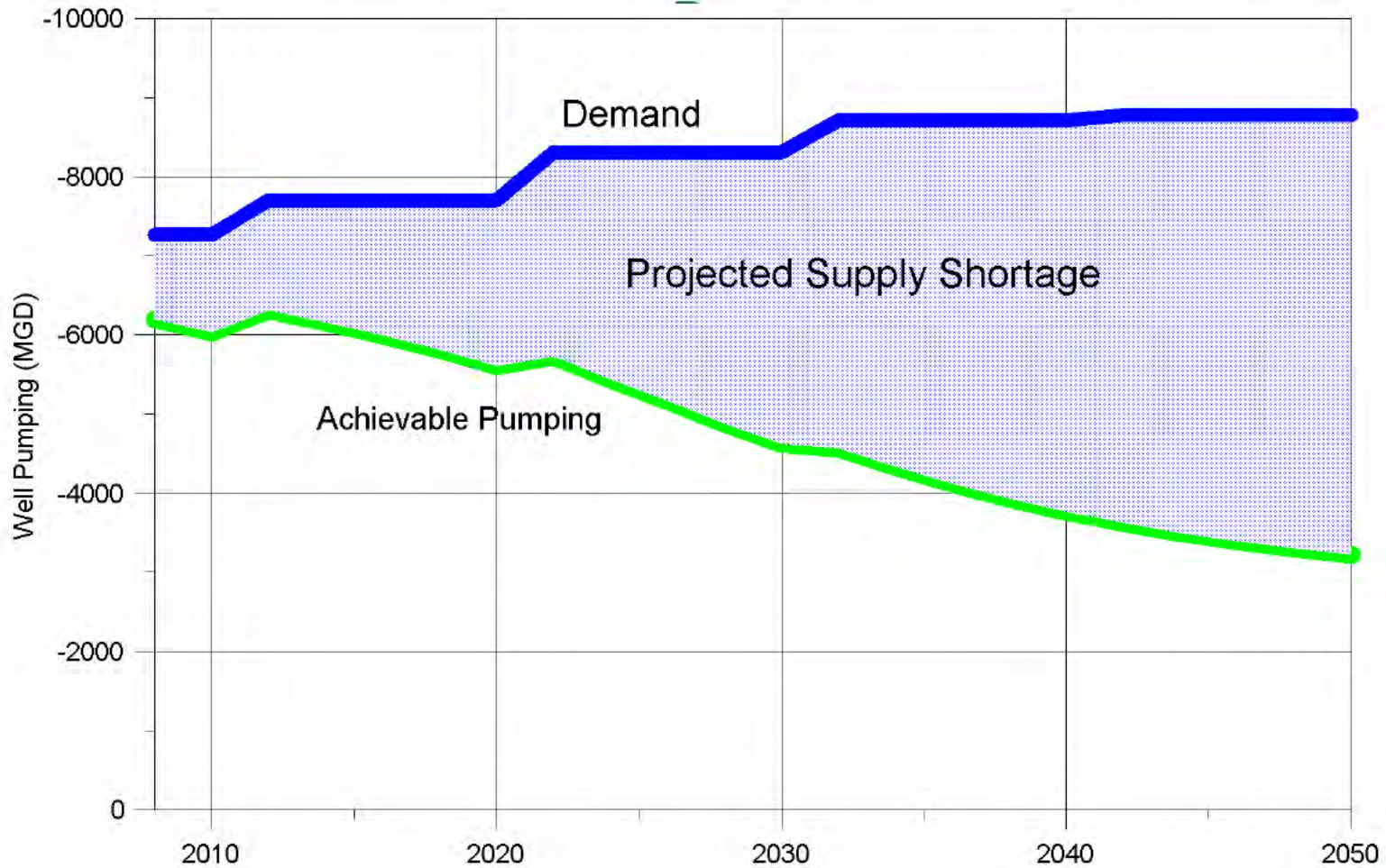
Comparison of USGS and Current Demands Model



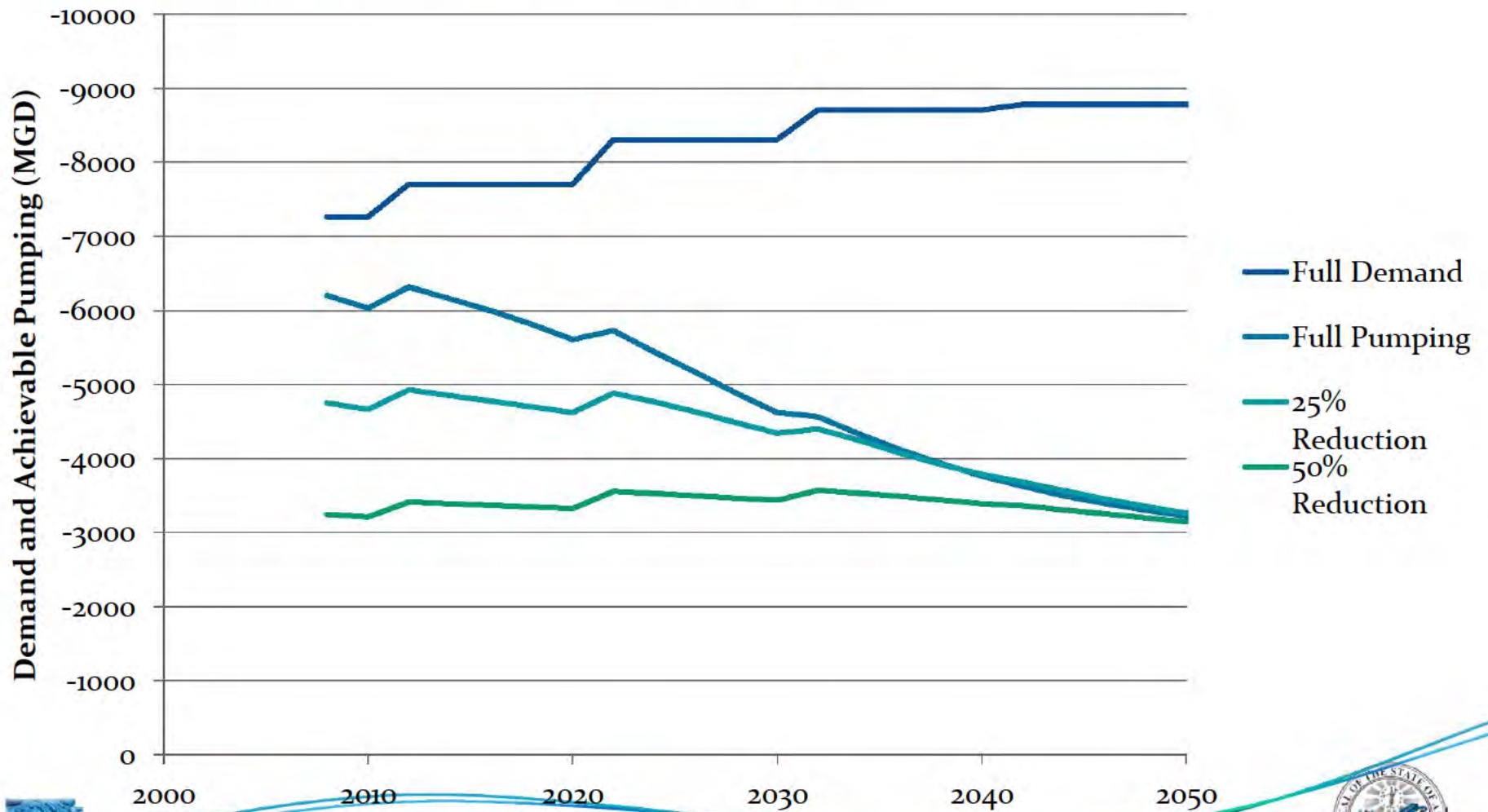
Conceptual Water Balance



Comparison of Demand and Achievable Pumping

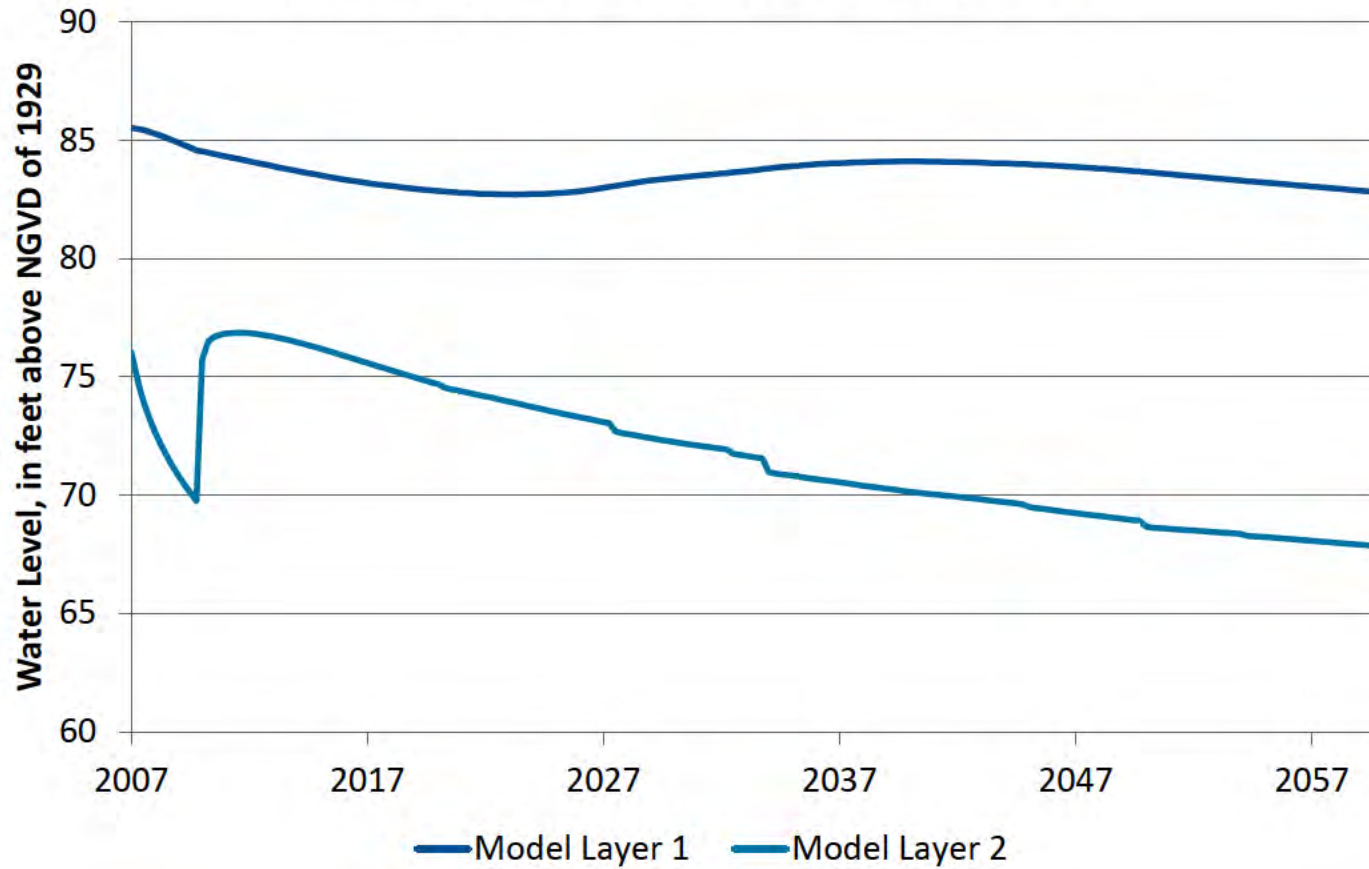


Impact of Reduced Demands



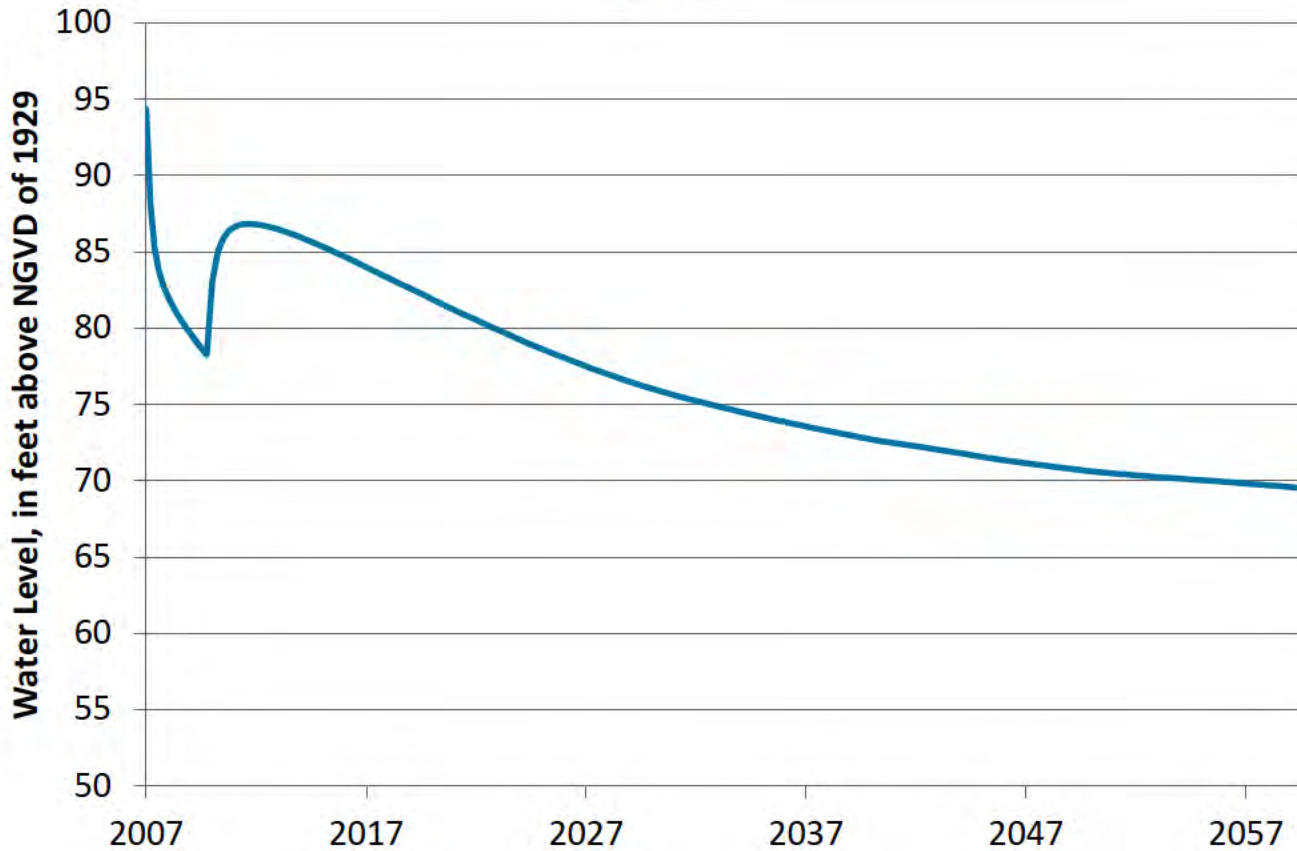
Baseline Model – Water Level Trends (Alluvial)

Alluvial Aquifer Water Levels Near Stuttgart



Baseline Model – Water Level Trends (Sparta)

Hazen



Groundwater Availability in Aquifers West of Alluvial and Sparta Sand Aquifers

- **Goal:** Assess baseline and future groundwater conditions
- **Analysis:** No groundwater model is available, so analysis will be based on existing information
- **Assess:** Water levels, pumping/water use, geology, some estimate of recharge and perhaps loss from aquifers through inter-aquifer flows
- **Estimate:** Effects of future demands

Future Demand Scenarios

- Multiple demand scenarios will be modeled to evaluate impact on aquifers and economy:
 - Sustainable yield
 - Using half the groundwater in the aquifers
 - Using all the water in the aquifers
 - Pumping at 2000-2010 rates

