

# Update of Preliminary Groundwater Modeling Results

PRESENTED TO:

GROUNDWATER MANAGEMENT AREA 12

FEBRUARY 25, 2015



# Model Simulations

- ▶ Assemble data to update groundwater pumping in model from 1999 through 2010 for GMA 12.
- ▶ Utilize Central Queen City-Sparta GAM extended to 2070 for simulations.
- ▶ Comparison of results to current desired future conditions.



# Model Simulations (cont'd)

## Predictive Scenario 1 (PS1)

- ▶ Perform model simulation from 2000 to 2070 based on current permits within the GCDs being fully utilized beginning in 2015.
- ▶ Develop estimates of average drawdown in 2070 from 2000 by aquifer and GCD.



# Model Simulations (cont'd)

## Predictive Scenario 2 (PS2)

- ▶ Utilizing current permits within each GCD, estimate the ramp up in pumping beginning in 2015 to 2070. Gradual increases in pumping mainly controlled by increases in public supply water usage.
- ▶ Perform simulation to calculate average drawdown in 2070 from 2000.



# Model Simulations (cont'd)

## Predictive Scenario 3 (PS3)

- ▶ Update of PS1
- ▶ Updated pumping numbers by LPGCD and FCGCD
- ▶ Confirmed pumping numbers by BVGCD and METGCD
- ▶ POSGCD pumping numbers remain preliminary
- ▶ Perform simulation to calculate average drawdown in 2070 from 2000.



# Model Simulations (cont'd)

## Predictive Scenario 4 (PS4)

- ▶ Update of PS2
- ▶ Updated pumping numbers by LPGCD and FCGCD
- ▶ Confirmed pumping numbers by BVGCD and METGCD
- ▶ POSGCD pumping numbers remain preliminary
- ▶ Perform simulation to calculate average drawdown in 2070 from 2000.



# Current MAGs

## From 2010 planning

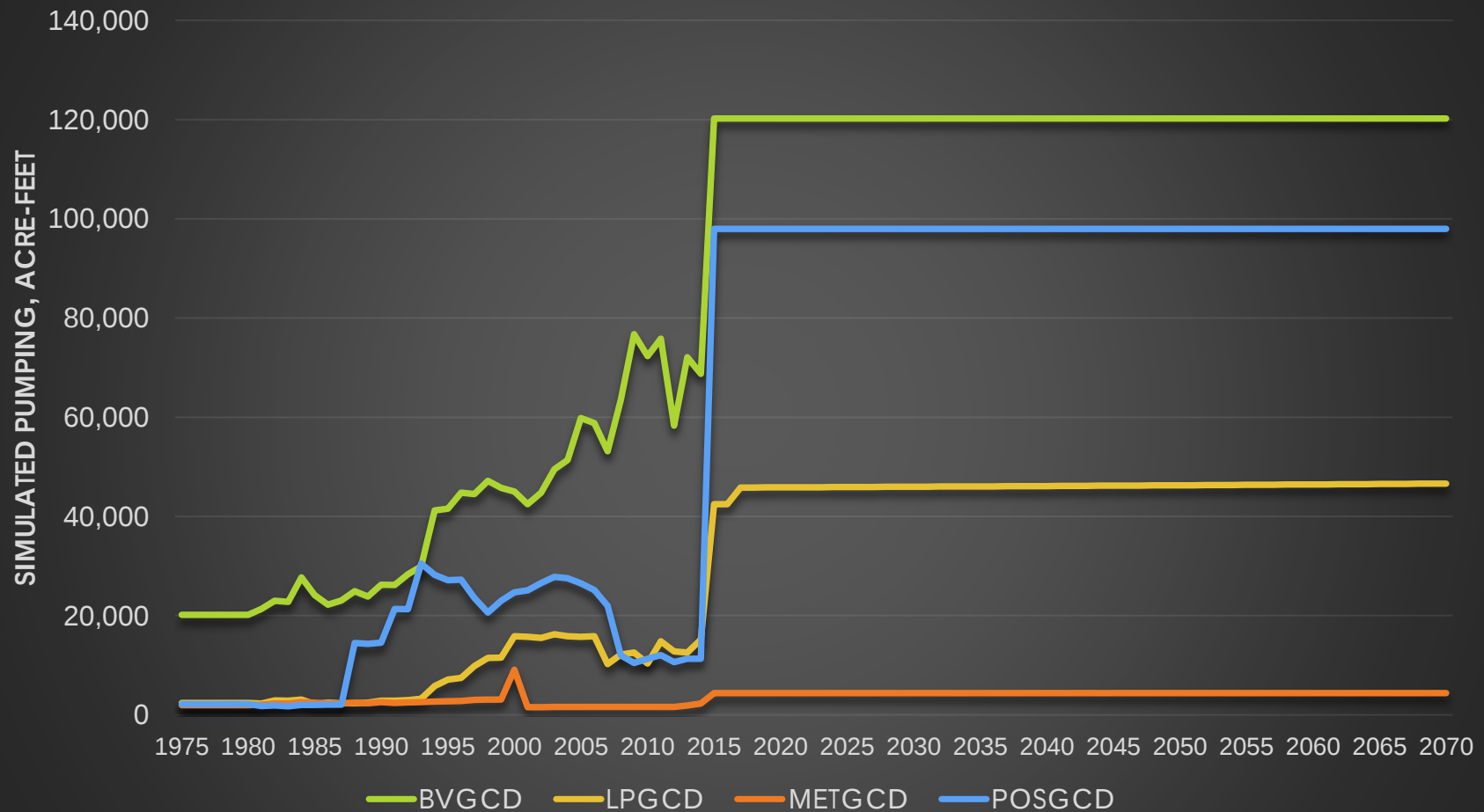
Year 2060 Managed Available Groundwater in Acre-Feet

| District          | Brazos River Alluvium | Carrizo       | Calvert Bluff | Simsboro       | Hooper       | Queen City   | Sparta        | Yegua-Jackson | Total          |
|-------------------|-----------------------|---------------|---------------|----------------|--------------|--------------|---------------|---------------|----------------|
| Brazos Valley     | -                     | 5,496         | 1,755         | 96,185         | 316          | 529          | 7,923         | 7,071         | 119,275        |
| Fayette County    | -                     | 1,000         | -             | -              | -            | 570          | 3,729         | 5,762         | 11,061         |
| Lost Pines        | -                     | 12,052        | 3,985         | 37,249         | 2,592        | 1,133        | 1,877         | -             | 58,888         |
| Mid-East Texas    | -                     | 11,088        | 3,912         | 7,170          | 827          | 974          | 3,334         | 1,122         | 28,427         |
| Post Oak Savannah | 25,138                | 7,059         | 1,038         | 48,501         | 4,422        | 502          | 6,734         | 12,923        | 106,377        |
| <b>GMA 12</b>     | <b>-</b>              | <b>36,695</b> | <b>10,690</b> | <b>189,105</b> | <b>8,157</b> | <b>3,688</b> | <b>23,597</b> | <b>26,878</b> | <b>323,968</b> |



# Predictive Scenario 1

## Simsboro Pumping



Preliminary



# Predictive Scenario 1 Pumping

Year 2070 in Acre-Feet

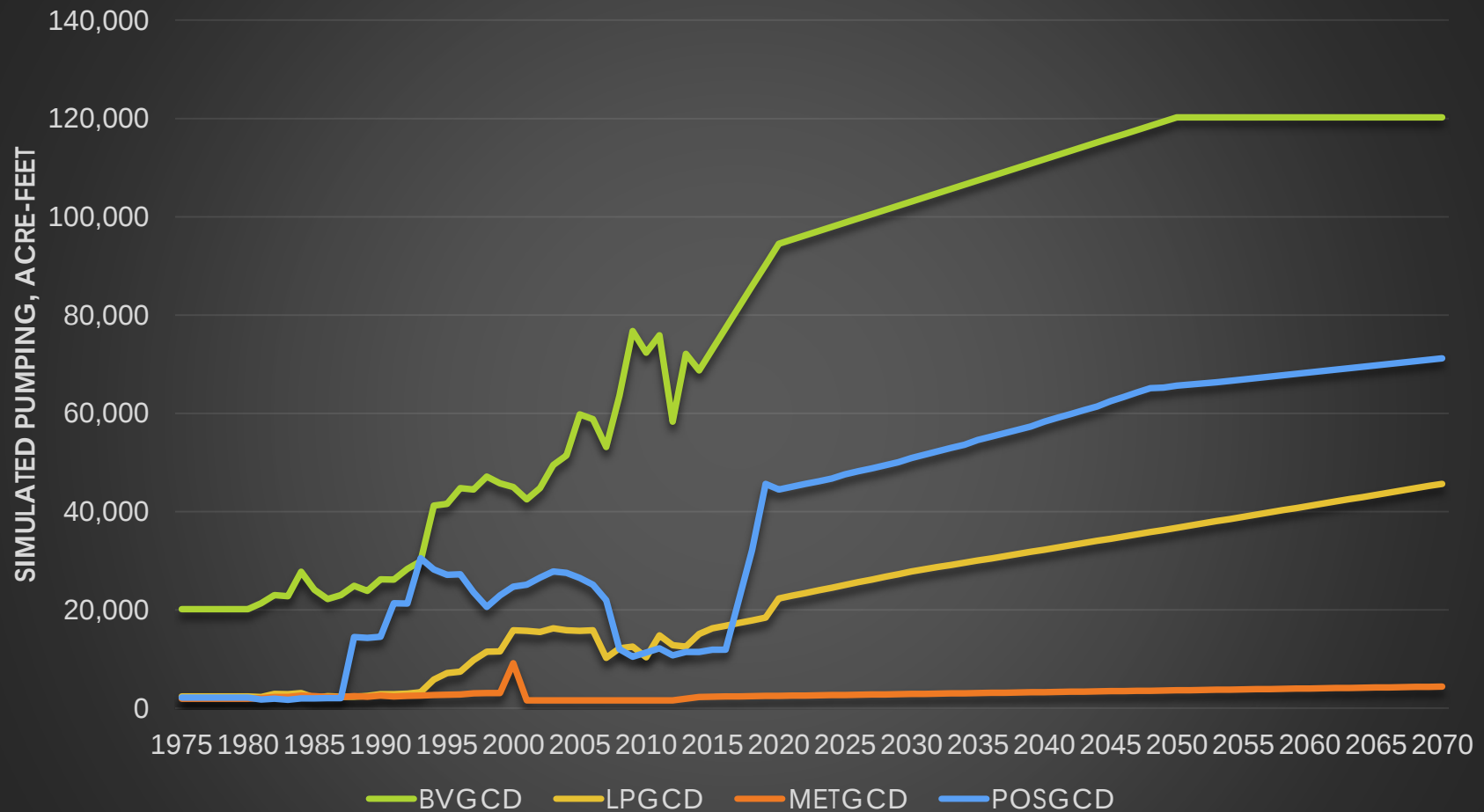
| District          | Carrizo       | Calvert Bluff | Simsboro       | Hooper        | Queen City   | Sparta        | Total          |
|-------------------|---------------|---------------|----------------|---------------|--------------|---------------|----------------|
| Brazos Valley     | 4,748         | 3,184         | 120,252        | 1,831         | 1,157        | 9,228         | 140,400        |
| Fayette County    | 1,000         | -             | -              | -             | 1,857        | 7,249         | 10,107         |
| Lost Pines        | 17,091        | 4,056         | 46,621         | 673           | 2,648        | 872           | 71,962         |
| Mid-East Texas    | 2,852         | 6,345         | 4,380          | 5,550         | 1,249        | 5,112         | 25,488         |
| Post Oak Savannah | 17,841        | 1,486         | 98,079         | 5,321         | 385          | 1,862         | 124,974        |
| <b>GMA 12</b>     | <b>43,533</b> | <b>15,071</b> | <b>269,333</b> | <b>13,375</b> | <b>7,296</b> | <b>24,322</b> | <b>372,931</b> |

# Preliminary



# Predictive Scenario 2

## Simsboro Pumping



Preliminary



# Predictive Scenario 2 Pumping

Year 2070 in Acre-Feet

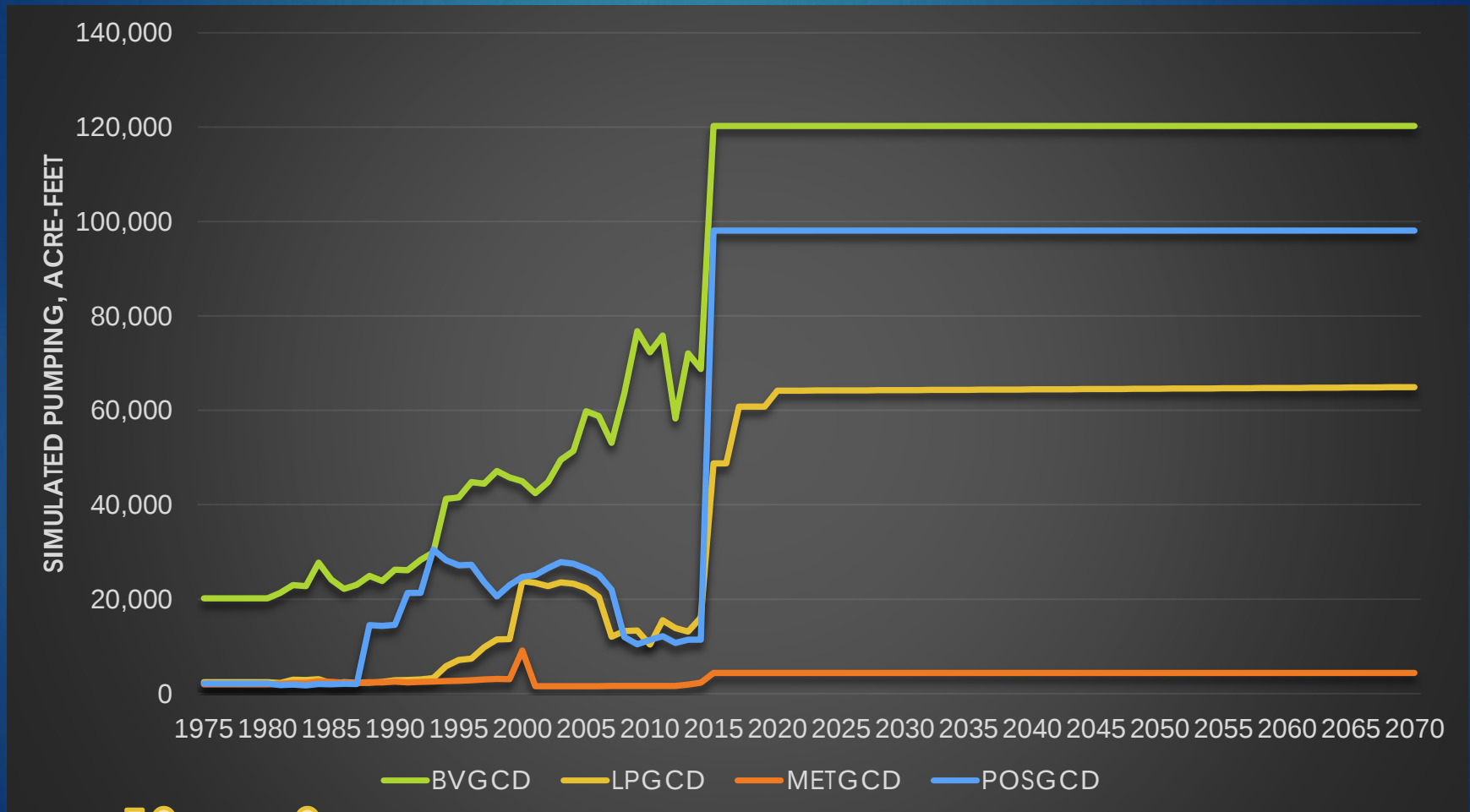
| District             | Carrizo       | Calvert<br>Bluff | Simsboro       | Hooper        | Queen<br>City | Sparta        | Total          |
|----------------------|---------------|------------------|----------------|---------------|---------------|---------------|----------------|
| Brazos<br>Valley     | 4,748         | 3,184            | 120,252        | 1,831         | 1,157         | 9,228         | 140,400        |
| Fayette<br>County    | 1,000         | -                | -              | -             | 1,857         | 7,249         | 10,107         |
| Lost<br>Pines        | 11,509        | 3,906            | 45,213         | 673           | 1,084         | 565           | 62,949         |
| Mid-East<br>Texas    | 2,851         | 6,305            | 4,342          | 5,527         | 1,245         | 5,093         | 25,363         |
| Post Oak<br>Savannah | 9,604         | 575              | 70,926         | 3,059         | 490           | 1,577         | 86,231         |
| <b>GMA 12</b>        | <b>29,712</b> | <b>13,970</b>    | <b>240,734</b> | <b>11,090</b> | <b>5,833</b>  | <b>23,712</b> | <b>325,051</b> |

# Preliminary



# Predictive Scenario 3

## Simsboro Pumping



Preliminary



# Predictive Scenario 3 Pumping

Year 2070 in Acre-Feet

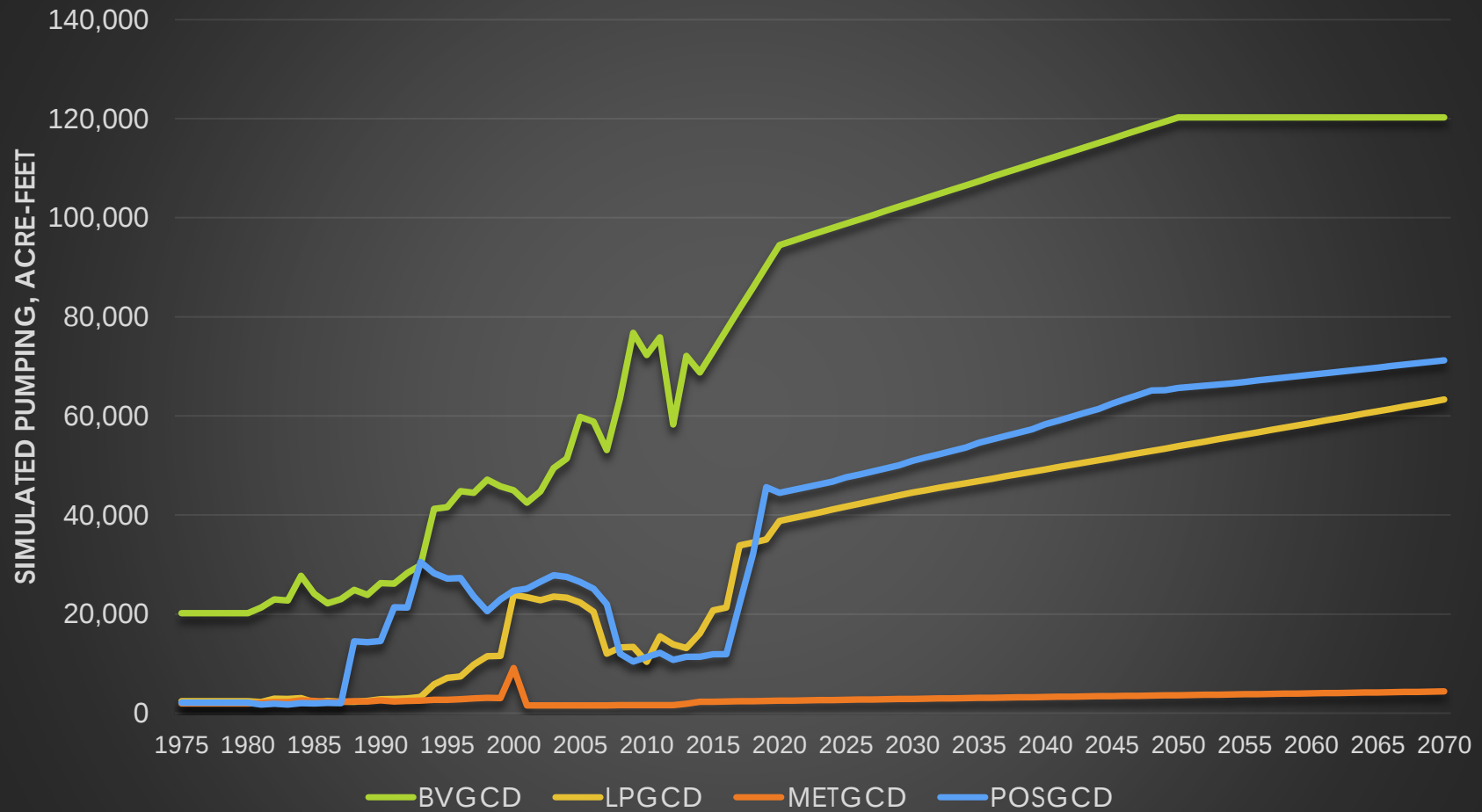
| District             | Carrizo       | Calvert<br>Bluff | Simsboro       | Hooper        | Queen<br>City | Sparta        | Total          |
|----------------------|---------------|------------------|----------------|---------------|---------------|---------------|----------------|
| Brazos<br>Valley     | 4,765         | 3,207            | 120,262        | 1,832         | 1,158         | 9,259         | 140,485        |
| Fayette<br>County    | 1,985         | -                | -              | -             | 2,709         | 2,802         | 7,496          |
| Lost<br>Pines        | 17,092        | 4,057            | 64,926         | 673           | 2,648         | 872           | 90,269         |
| Mid-East<br>Texas    | 2,852         | 6,345            | 4,380          | 5,550         | 1,249         | 5,112         | 25,488         |
| Post Oak<br>Savannah | 17,841        | 1,486            | 98,079         | 5,321         | 385           | 1,862         | 124,974        |
| <b>GMA 12</b>        | <b>44,536</b> | <b>15,095</b>    | <b>287,648</b> | <b>13,376</b> | <b>8,149</b>  | <b>19,907</b> | <b>388,711</b> |

# Preliminary



# Predictive Scenario 4

## Simsboro Pumping



Preliminary



# Predictive Scenario 4 Pumping

Year 2070 in Acre-Feet

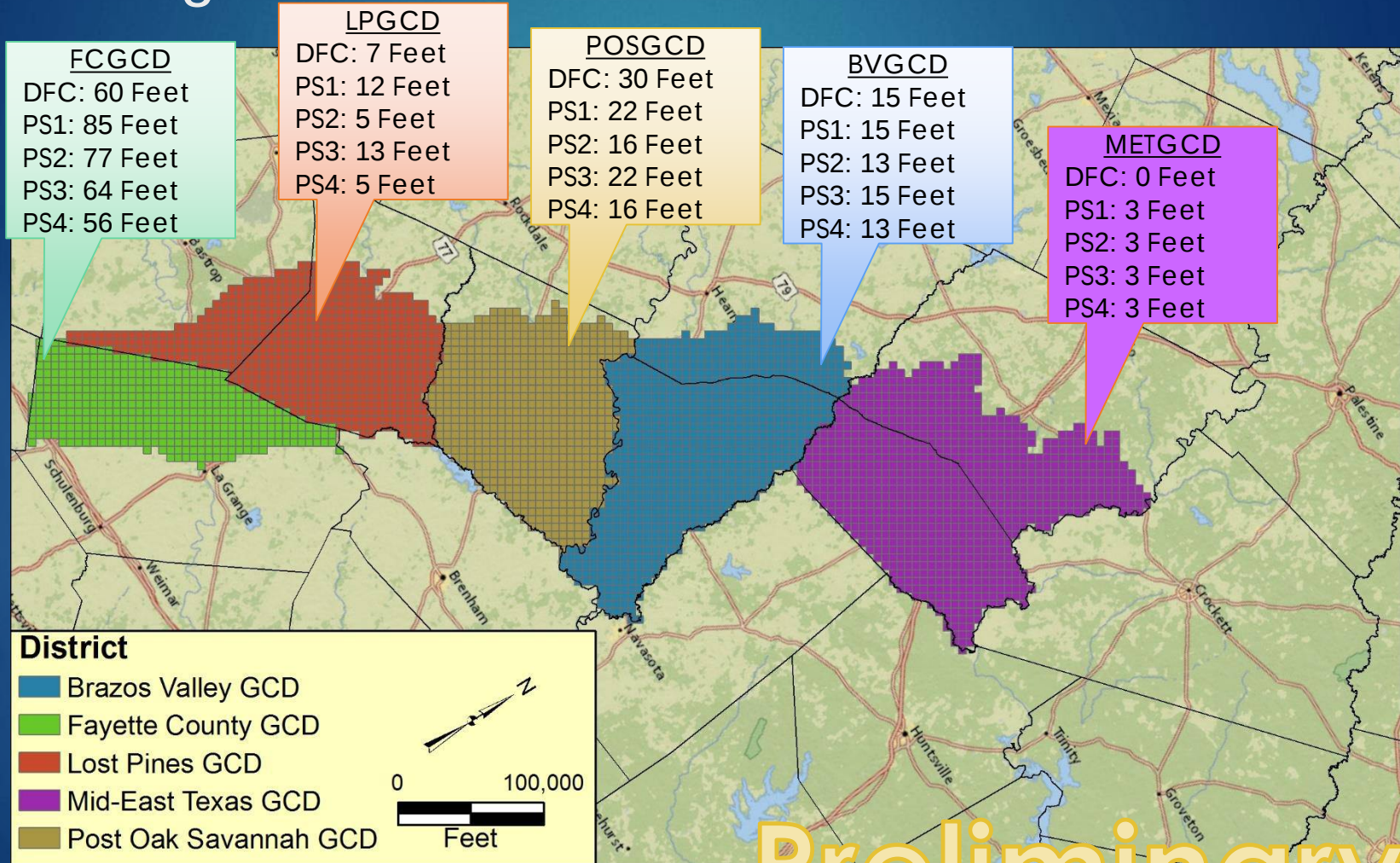
| District             | Carrizo       | Calvert<br>Bluff | Simsboro       | Hooper        | Queen<br>City | Sparta        | Total          |
|----------------------|---------------|------------------|----------------|---------------|---------------|---------------|----------------|
| Brazos<br>Valley     | 4,765         | 3,197            | 120,262        | 1,832         | 1,158         | 9,259         | 140,475        |
| Fayette<br>County    | 1,985         | -                | -              | -             | 2,709         | 2,802         | 7,496          |
| Lost<br>Pines        | 11,510        | 3,906            | 62,828         | 673           | 1,084         | 565           | 80,565         |
| Mid-East<br>Texas    | 2,851         | 6,305            | 4,342          | 5,527         | 1,245         | 5,093         | 25,363         |
| Post Oak<br>Savannah | 9,604         | 575              | 70,926         | 3,059         | 490           | 1,577         | 86,231         |
| <b>GMA 12</b>        | <b>30,715</b> | <b>13,983</b>    | <b>258,358</b> | <b>11,091</b> | <b>6,686</b>  | <b>19,297</b> | <b>340,130</b> |

# Preliminary



# Sparta Aquifer (Layer 1)

## Average Drawdown – 2000 to 2070

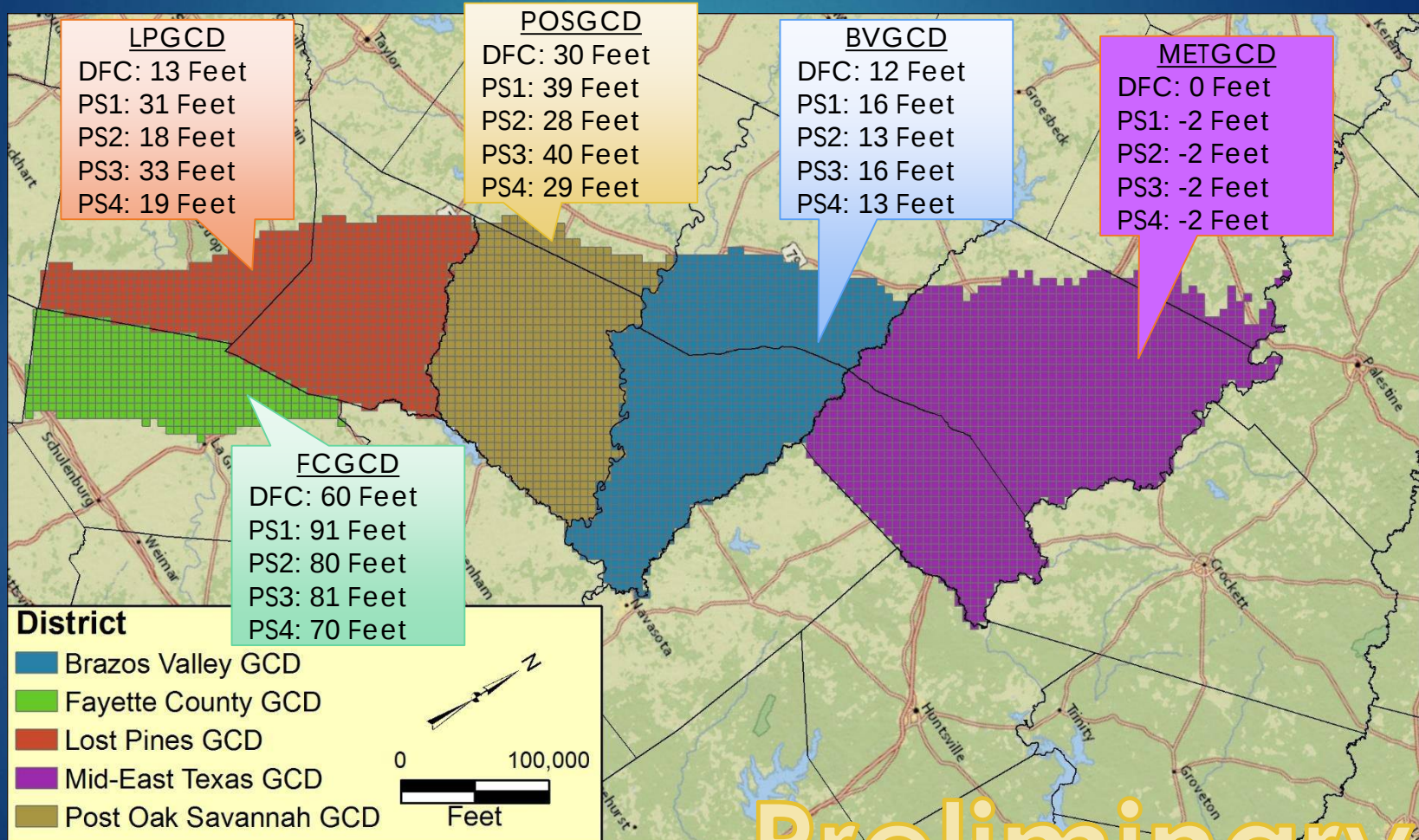


Preliminary



# Queen City Aquifer (Layer 3)

## Average Drawdown – 2000 to 2070

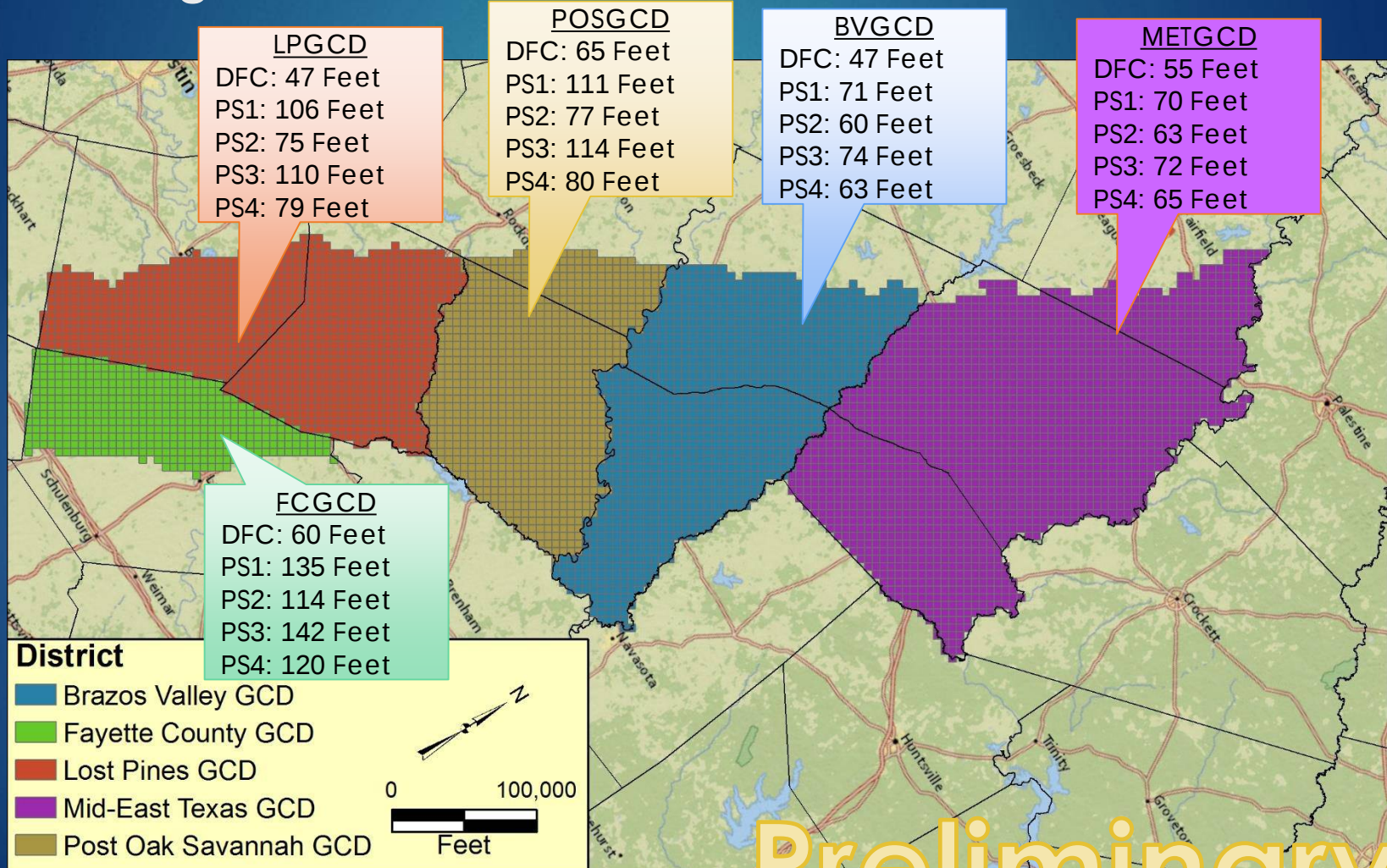


Preliminary



# Carrizo Aquifer (Layer 5)

## Average Drawdown – 2000 to 2070

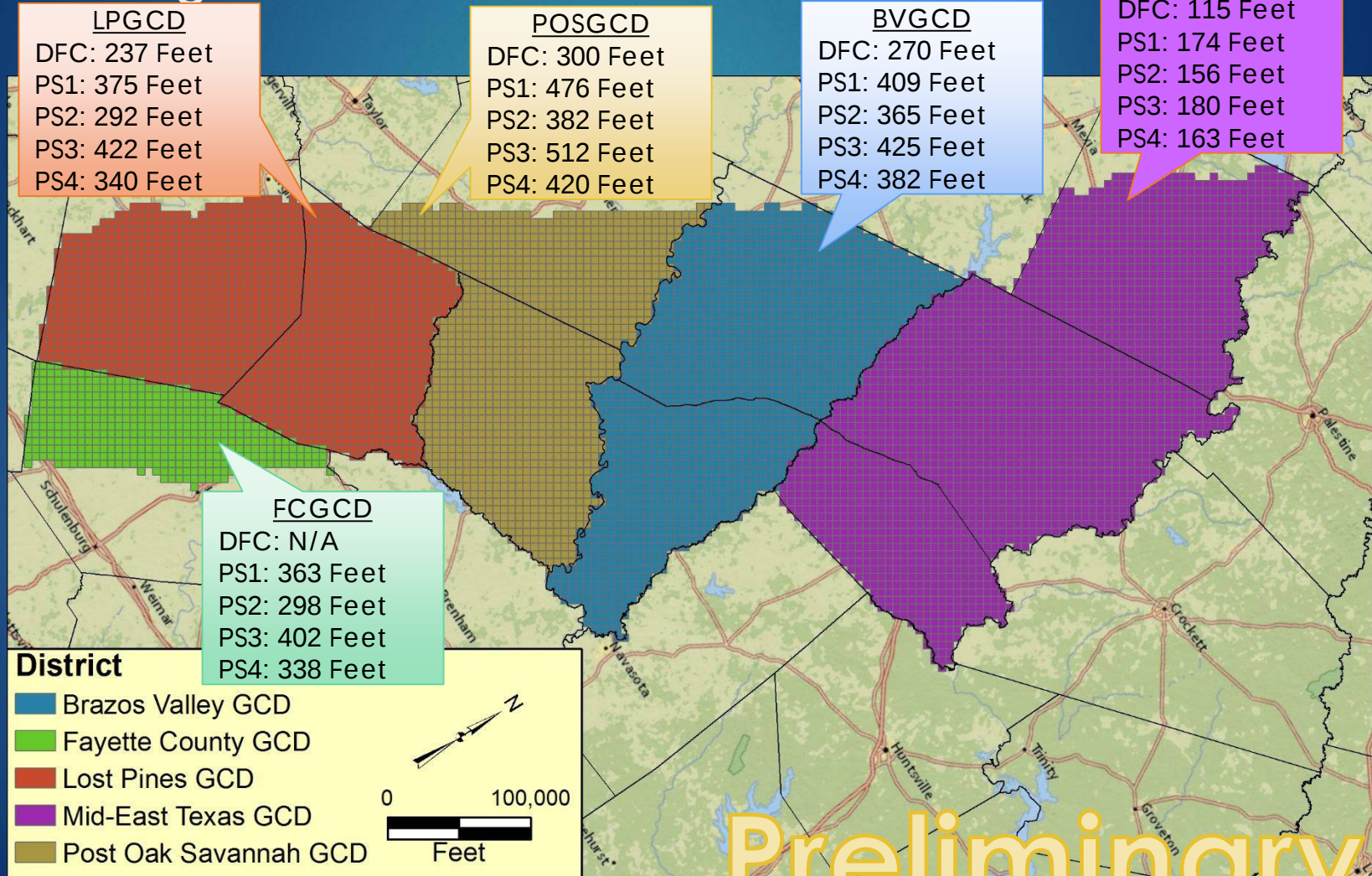


# Preliminary



# Simsboro Aquifer (Layer 7)

## Average Drawdown – 2000 to 2070



# A new standard for desired future conditions



Highest Practicable Level  
of Groundwater Production



Conservation, Preservation,  
Protection, Recharging,  
and Prevention of Waste of  
Groundwater, and Control  
of Subsidence

# DFC Considerations

Aquifer Uses or  
Conditions

Supply Needs  
and  
Management  
Strategies

Hydrological  
Conditions

Environmental  
Impacts

Subsidence  
Impacts

Socioeconomic  
Impacts

Private Property  
Rights

DFC Feasibility

Other Relevant  
Information



# Finding a balance

