Predicting Georgia’s Future Water Use Using Climatological and Sociological Factors

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Outline of Talk

• Historical context of water use in Georgia
• Climatological factors
• Sociological factors
• State response
• Climate change
Historical changes in water use and population in Georgia over time

- Groundwater
- Surface water
- Total
- Population

Withdrawals, in thousands of million gallons per day

Population, in millions

Water use by sector

- Public supply
- Rural
- Irrigation
- Thermoelectric
- Industrial

Withdrawals, in thousands of million gallons per day (by use)

Total withdrawals

Climatological factors

- Present climate
- Climate variability
- Potential future climate change
Georgia Statewide Precipitation
Historical annual precipitation
Trends in Precipitation over Time

<table>
<thead>
<tr>
<th>Climate Division</th>
<th>Annual Trend</th>
<th>Nov-March Trend</th>
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<tbody>
<tr>
<td>1</td>
<td>+2.4</td>
<td>+1.5</td>
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<tr>
<td>2</td>
<td>+2.9</td>
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<td>-0.2</td>
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<tr>
<td>8</td>
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<tr>
<td>9</td>
<td>-3.0</td>
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Trends are shown as change in inches per 100 years.
While average fall precipitation in the Southeast increased by 30 percent since the early 1900s, summer and winter precipitation declined by nearly 10 percent in the eastern part of the region. Southern Florida has experienced a nearly 10 percent drop in precipitation in spring, summer, and fall. The percentage of the Southeast region in drought has increased over recent decades.
Sociological factors

- Population distribution
- Population change
- Water conservation
- Regulatory environment
Historic and Projected Population
State of Georgia: 1900 - 2030

Year:

Population:
0 2,000,000 4,000,000 6,000,000 8,000,000 10,000,000 12,000,000 14,000,000 16,000,000
Most growth is at the top of the watershed
Regional Water Planning

Management practices to adjust demand and resource capacity

Vision and Goals

Are goals met and gaps filled?

Recommended regional water plan

Gap Analysis

Forecast of demand

Assessment of baseline resource capacity

KEY:
- Council-led products
- Information provided by EPD
- Joint EPD-Council evaluation
Identification of Gaps

Graph showing the increase in forecasted demand from 2010 to 2050, with gaps indicating the shortfall between total forecasted demand and baseline resource capacity.
Select Practices to Increase Capacity

- Baseline Resource Capacity
- Capacity reached
- Reducing demand meets needs through 2040
- Increasing capacity meets needs through 2050

Total Forecasted Demand (Broken line indicates total demand with conservation)
Climate change will alter patterns of agricultural production and human settlement.

PROJECTED CHANGE IN MEDIAN RUNOFF

The number of days per year with peak temperature over 90°F is expected to rise significantly, especially under a higher emissions scenario as shown in the map above. By the end of the century, projections indicate that North Florida will have more than 165 days (nearly six months) per year over 90°F, up from roughly 60 days in the 1960s and 1970s. The increase in very hot days will have consequences for human health, drought, and wildfires.
Summary

• Precipitation in Georgia is slowly increasing in the winter recharge period, but at slow rate

• Population growth is largest in metro Atlanta at top of watershed where storage and groundwater are limited

• South Georgia is most vulnerable to predicted climate change from both temp and precip changes

• Responses to water demand will include both reducing demand through conservation and increasing supplies through reservoirs or other means
Thank you!

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