The Advisory Committee on the Management and Protection of the State's Water Resources was created by executive order in 2003 to evaluate the ability of the State to meet its future water needs.
Advisory Committees

• First Committee Report
  May 2004

• Second Committee
  Interim Report July
  2006

• Second Committee
  Final Report July 2008
• Final Report of the Committee on the Management and Protection of the State’s Water Resources

• July 2008
Maryland Water Withdrawals

- Public Supply (47.7%)
- Commercial (1.7%)
- Domestic (6.5%)
- Industrial (5.5%)
- Thermoelectric (31.8%)
- Mining (0.7%)
- Livestock (0.9%)
- Aquaculture (1.6%)
- Irrigation (3.5%)

Marylanders Use Almost 1.5 Billion Gallons of Water a Day
Challenges

- Population Growth
- Water Quality
- Patterns of Land Use
- Increase in Irrigated Agriculture
- Climate Change
Maryland’s Population Will Continue to Grow

Regional Population Growth

- 1970 Census
- 2000 Census
- Projected 2030

Population (thousands)

- Lower Eastern Shore
- Upper Eastern Shore
- Western Maryland
- Southern Maryland
- Washington Suburban
- Baltimore Region
Figure 2. Population Growth in Rapidly Growing Counties. These seven counties are expected to grow by more than 50 percent between 2000 and 2030.
Figure 6. Projected population increase from 2005 to 2030 in Maryland.
Water Quality Issues

- Human activity
  - Past disposal practices
  - On site sewage disposal systems
  - Contamination from the surface
  - Emerging pollutants
  - Polluted runoff
- Naturally occurring substances
- Salt water intrusion
Active Public Water Systems that have at any time exceeded the drinking water standard of 10 parts per million of nitrate.

O’Brien, 2007

Figure 12. Occurrence of nitrate in Maryland Public Water Systems.
Areas where arsenic in ground water may exceed the drinking water standard of 10 parts per billion.

Bolton, 2007

Figure 9. Distribution of arsenic in ground water in Maryland.
Areas where iron in ground water may exceed the secondary drinking water standard of 300 parts per billion and manganese in ground water may exceed the secondary drinking water standard of 50 parts per billion.

Bolton, 2007

Figure 8. Distribution of iron and manganese in ground water in Maryland.
Areas of salt and brackish water intrusion related to ground-water withdrawals.

Figure 13. Distribution of salt water and brackish water intrusion in Maryland.
Protecting the land
2002 Land Use / Land Cover for Maryland

Legend
- Development
- Agriculture
- Forest
- Water

Miles
2030 Land Use for Maryland
Current Trend Scenario

Legend
- Development
- Agriculture
- Forest
- Water
Competition for Water

- Public supply
- Irrigation
- Power Production
- Recreation
• Public supply, domestic wells, aquaculture and irrigation uses are increasing.

• Commercial, industrial, thermoelectric and livestock uses have been stable.

Figure 2–5. Fresh Water Withdrawal Categories that show an increasing trend from the period, 1985-2001.

Figure 2–6. Fresh Water Withdrawal Categories that show a decreasing trend or no observable trend for the period 1985-2001.
Public supply, thermoelectric, domestic wells, irrigation and aquaculture water use in Maryland are expected to increase 16% by 2030.

<table>
<thead>
<tr>
<th></th>
<th>2000 Water Demand</th>
<th>Projected Water Demand Increase by 2030</th>
</tr>
</thead>
<tbody>
<tr>
<td>Public Supply</td>
<td>824</td>
<td>+ 58</td>
</tr>
<tr>
<td>Thermoelectric</td>
<td>379</td>
<td>+ 54</td>
</tr>
<tr>
<td>Domestic Self-Supplied</td>
<td>77</td>
<td>+ 17</td>
</tr>
<tr>
<td>Industrial</td>
<td>66</td>
<td>*</td>
</tr>
<tr>
<td>Irrigation</td>
<td>42</td>
<td>+ 84</td>
</tr>
<tr>
<td>Aquaculture</td>
<td>20</td>
<td>+ 20</td>
</tr>
<tr>
<td>Commercial</td>
<td>21</td>
<td>*</td>
</tr>
<tr>
<td>Livestock</td>
<td>10</td>
<td>*</td>
</tr>
<tr>
<td>Mining</td>
<td>8</td>
<td>*</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>1,447 (mgd)</strong></td>
<td><strong>+ 233 (mgd)</strong></td>
</tr>
</tbody>
</table>

(* Not projected)
Irrigation Use by Month in Maryland’s Coastal Plain

- **Surface Water**
- **Ground Water**

<table>
<thead>
<tr>
<th>Month</th>
<th>Surface Water (Mil. gal. per day)</th>
<th>Ground Water (Mil. gal. per day)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jan</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Feb</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Mar</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Apr</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>May</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>Jun</td>
<td>200</td>
<td>180</td>
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<tr>
<td>Jul</td>
<td>160</td>
<td>100</td>
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<tr>
<td>Aug</td>
<td>80</td>
<td>120</td>
</tr>
<tr>
<td>Sep</td>
<td>40</td>
<td>60</td>
</tr>
<tr>
<td>Oct</td>
<td>10</td>
<td>5</td>
</tr>
<tr>
<td>Nov</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Dec</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>
Climate Change

- Changed pattern of precipitation
- Increased evaporation
- Sea level rise (salt water intrusion)
- Higher temperatures increase demand
  - Drinking water
  - Irrigation
  - Power production
• Maryland must develop a more robust water resources program.

• The staffing, programmatic, and information needs must be adequately and reliably funded.

• Specific legislative, regulatory and programmatic changes should be implemented.
A More Robust Water Resources Program

- Critical basic data
- A Statewide plan
- Regional Planning
Critical Basic Data

- Coastal Plain Aquifer Study
- Fractured Rock Water Supply Study
- Expanded Monitoring Network
Figure 1. Generalized physiography and hydrogeology of Maryland.
Coastal Plain Aquifer Study

Figure 2. Maryland's major Coastal Plain aquifers.
Fractured Rock Water Supply Study

Figure 3. Cross-section showing hydrogeologic framework in the Piedmont of Maryland.
Recommended increase from 115 to 157 gages Statewide
Recommended increase from 141 to 240 wells Statewide

- Active observation wells as of July 2006
- Additional observation wells needed

- Baltimore Metropolitan Region
- Potomac River and Washington Metropolitan Region
- Central Region
- Western Region
- Southern Region
- Eastern Region
A Statewide Water Supply Plan

- Education and Outreach
- Conservation
- Water quality
- Inter-basin transfers
- Ecological integrity
- Source protection
- Allocation policies
- Water reuse
Regional Planning

- Cooperative
- By region, watershed, aquifer
- Focus on safeguarding supplies
Regional Planning

- Political boundaries are largely irrelevant to surface and ground water supplies
- Governments must overcome the preference for planning along jurisdictional lines
Protect Those on Individual Wells

- Additional testing
- Periodic retesting
- Outreach
Discourage The Use of Individual Wells in Areas at High Risk for Contamination

Figure 3. Cross-section showing hydrogeologic framework in the Piedmont of Maryland.
Strengthen Programs

- Water conservation
- Water reuse
- Demand management
Funding

- Permit fee for water appropriations
- Funding for the two hydrologic studies
- Funding for the expanded monitoring network
- Assistance to local governments
Funding Required to Implement All Suggestions

Funding Requirements

Year

$ (Millions)

1 2 3 4 5 6 7 8

0 2 4 6 8 10 12

1 2 3 4 5 6 7 8
Outreach

- Water supply challenges are likely to become more frequent and intense
- A well informed public is essential
- Individual choices matter
- Political will matters
All Advisory Committee Reports are available on MDE’s website under new PUBLICATIONS - more publications

www.mde.state.md.us