Maryland's Piedmont Region Now Has Ample Water Most of the Time, ***BUT*****.....**

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U.S. Geological Survey
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The "*BUT*" is the Problem

- Two factors that bring us here today are:
  - Increasing water demand
  - Recurring droughts
- The 2002 drought caused some water shortages in Maryland's Piedmont
- Water demand continues to grow and the next drought is only a matter of time
- Coordinated planning at local and State levels, based on sound scientific data and principles, can help us avoid or at least mitigate such situations into the future

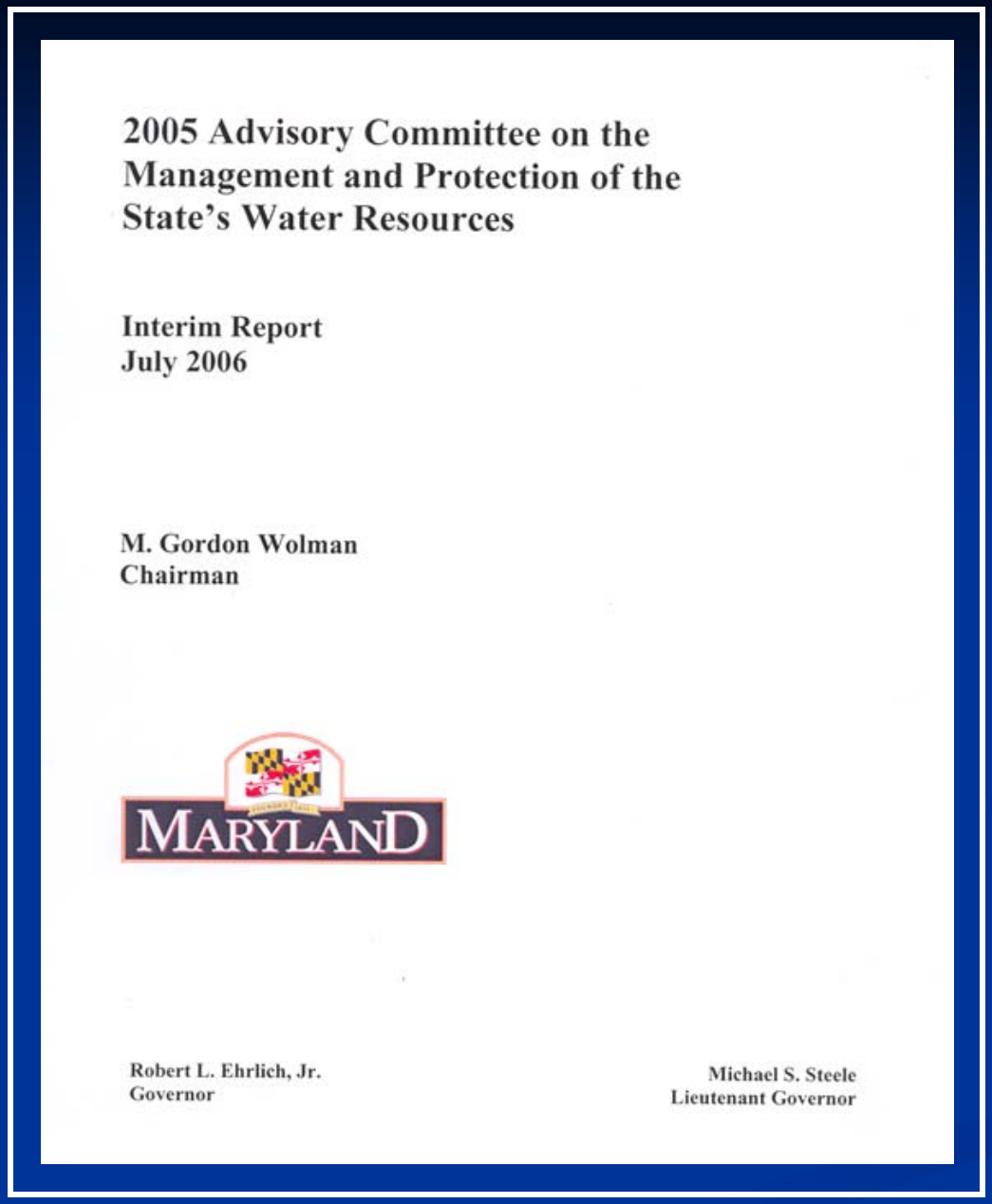
Advisory Committee on the Management and Protection of the State's Water Resources

Purpose of Committee

"To provide advice to the State on policies and programs relating to the management, development, conservation, and protection of the State's water resources"

Advisory Committee Overview

- Committee formed after 2002 drought
- Two convenings of Committee
  - 2003-2004
  - 2005-2008
- 15-20 members of varied backgrounds
- First Committee produced report in May 2004
- Second Committee produced an interim report in July 2006 and will produce a final report in July 2008



July 2006 Interim Report of the 2005-2008 Advisory Committee

http://www.mde.state.md.us/ResearchCenter/Publications/index.asp

Relevant Recommendations

July 2006 Interim Report

Relevant Recommendations in July 2006 Interim Report

- Develop a State Water Resources Management Plan within three years to provide guidance for MDE in carrying out its water management responsibilities, and for local governments developing the plans required under new legislation enacted in 2006

Relevant Recommendations in July 2006 Interim Report

- Continue comprehensive evaluation of the State's watersheds to determine their adequacy in meeting expected demands

- Expand ground water and surface water monitoring to support resource management decisions

Relevant Recommendations in July 2006 Interim Report

- Provide support for local water supply planning by providing information and technical assistance as required by House Bill 1141, and implementing the recommendations of the Interagency Technical Assistance Committee on Wastewater Treatment Systems

Relevant Recommendations in July 2006 Interim Report

- Establish regional planning initiatives to more fully integrate planning processes among State, county, and municipal governments

- Enact legislation to protect the sources of drinking water supplies to insure their long-term availability

2007 Activities

2005-2008 Advisory Committee

2007 Activities of 2005-2008 Advisory Committee

- Funding
  - Subcommittee working on this aspect
  - Goal is to identify ways to finance water supply planning and management activities
  - Various funding mechanisms are being explored, including fees
  - Plan to meet with various stakeholder groups to garner support and develop recommendations for appropriate and equitable funding options

2007 Activities of 2005-2008 Advisory Committee

- Water Quality
  - Subcommittee working on this aspect
  - Addressing how water quality affects availability of potable water
  - Will describe the occurrence and distribution of water quality problems that impact the potability of Maryland's waters
  - Will recommend strategies for State and local governments to use to incorporate water quality issues into planning processes

2007 Activities of 2005-2008 Advisory Committee

- Use of Water Originating on State Land
  - Subcommittee just forming
  - Draft DNR policy now under review, and Advisory Committee providing feedback
  - Requests increasing; DNR concerned about environmental impacts of using State water
  - Draft policy proposes criteria to be used to determine when it is appropriate to allow water resources under State lands to be used by adjacent entities

2007 Activities of 2005-2008 Advisory Committee

- Guidance on Implementing House Bill 1141
  - HB 1141 became law in May 2006
  - Requires local governments to include a water resources element in their Comprehensive Plans by October 1, 2009
  - The new water resources element will ensure that land use planning addresses the sustainability of water supply and quality
  - Carroll County has volunteered to be a pilot for including a water resources element in their Comprehensive Plan

Considerations for Water Supply Development in the Piedmont Region of Maryland

Goal of Water Supply Development

- Goal of water supply development is to provide enough water for users without major impacts on other users and the resource
- Achieving this goal can be difficult in a heavily populated, complicated setting like the Maryland Piedmont
- Considering some basic concepts can be helpful

Water Budget

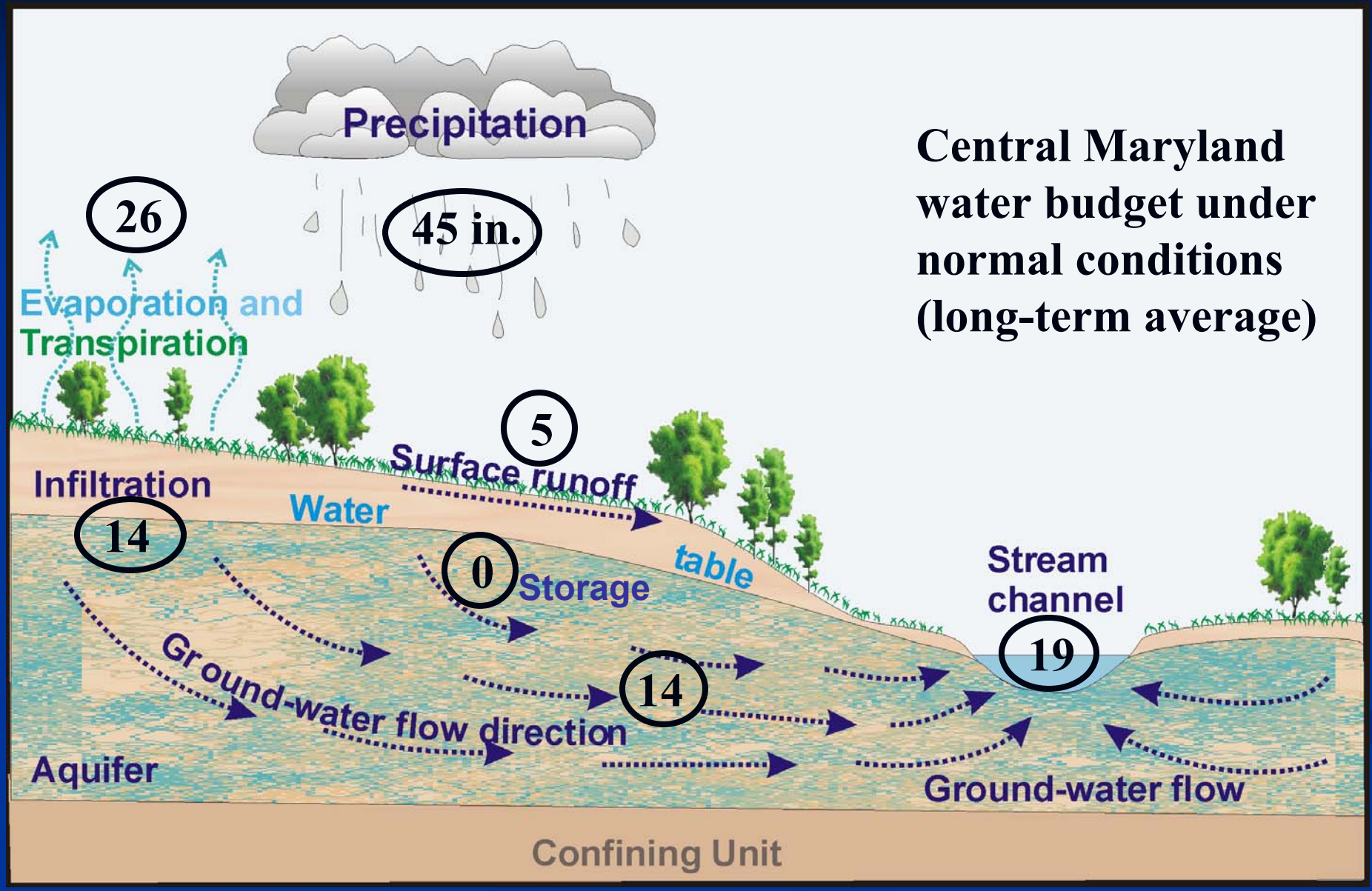
- Simply an accounting of the amount of water provided by precipitation in a watershed, and what happens to it once it reaches the land surface

- Precipitation =

  Evapotranspiration + Runoff + Infiltration

- Need to know the water budget for a watershed in order to understand the effects of water withdrawals on the water resource

Average Annual Water Budget



Central Maryland water budget under normal conditions (long-term average)

Water is a Single Resource

- Streams and ground water are interconnected components of the same water resource
- Withdrawing water from one component is likely to affect the other
- Cumulative withdrawals from streams and ground water must be considered when determining the amount of water available for development in a watershed

Water is a Regional Resource

- Watersheds are not constrained by political boundaries
- Ground water flow systems may not coincide with watershed boundaries
- Water supply development must take into account the regional context in which water occurs; regional planning the best approach

Impacts of Withdrawing Surface Water from Streams

- Reduced flow downstream
  - Less water for other users
  - Less water to assimilate effluent
  - Less water for ecological resources
  - Return water of different quality

Impacts of Withdrawing Ground Water from Wells

- Lower water table
  - Less water for nearby wells
  - Return water of different quality
- Reduced streamflow downstream
  - Less water for other users
  - Less water to assimilate effluent
  - Less water for ecological resources

Minimum Instream Flow

- As water is withdrawn from streams, ecological resources in those streams can become stressed
- Fish, insects, waterfowl need certain habitat and flow conditions to flourish and survive
- The amount of alteration of habitat and flow conditions that aquatic organisms can bear is currently a major research topic

Sustainable Yield

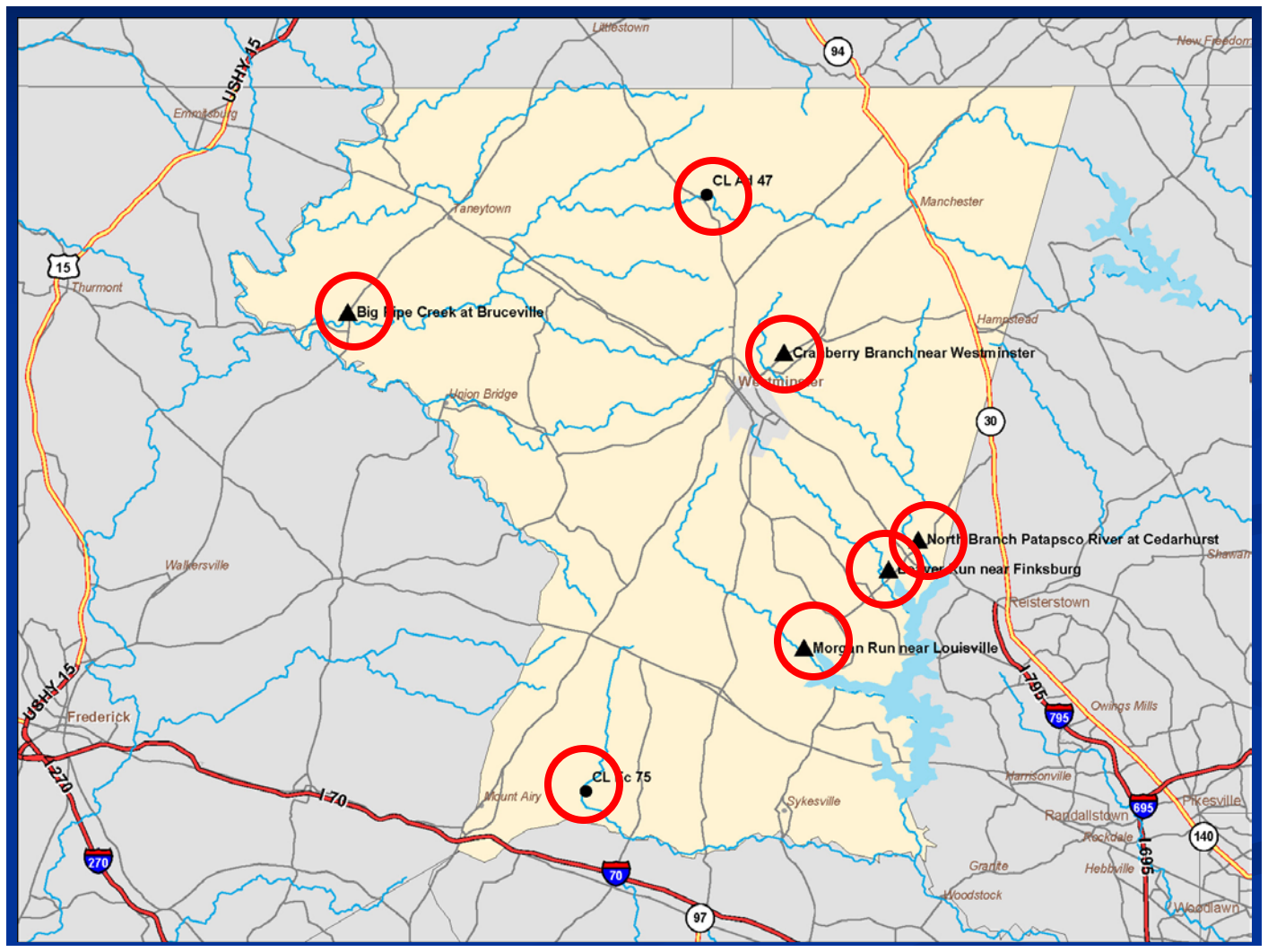
- Sustainable yield is the ultimate goal of water supply development, but no simple formula
- How much yield can be sustained depends not only on the availability of water, but also on the level of impacts considered acceptable
- The level of acceptable impacts is a socioeconomic decision that involves many stakeholders

Sustainable Yield in Maryland

- In Maryland's Piedmont, a reasonable rule of thumb that has been used to approximate sustainable yield is the ground water recharge associated with a 1-in-10-year drought

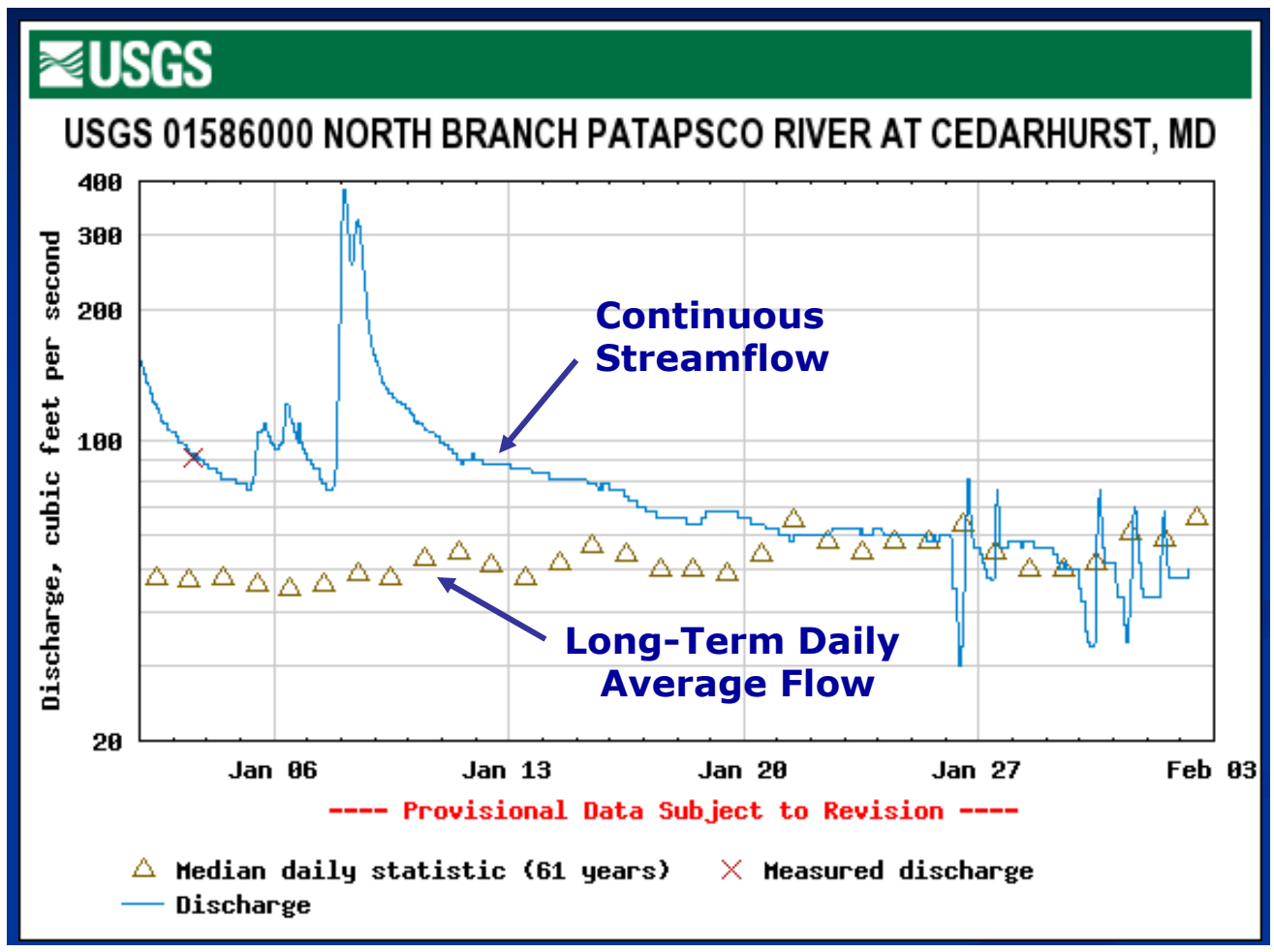
- This has been considered to be a conservative estimate that will allow withdrawals to continue during a moderate drought without drying up the resource

Water Resources Data



State Network Stream Gages and Observation Wells in Carroll County

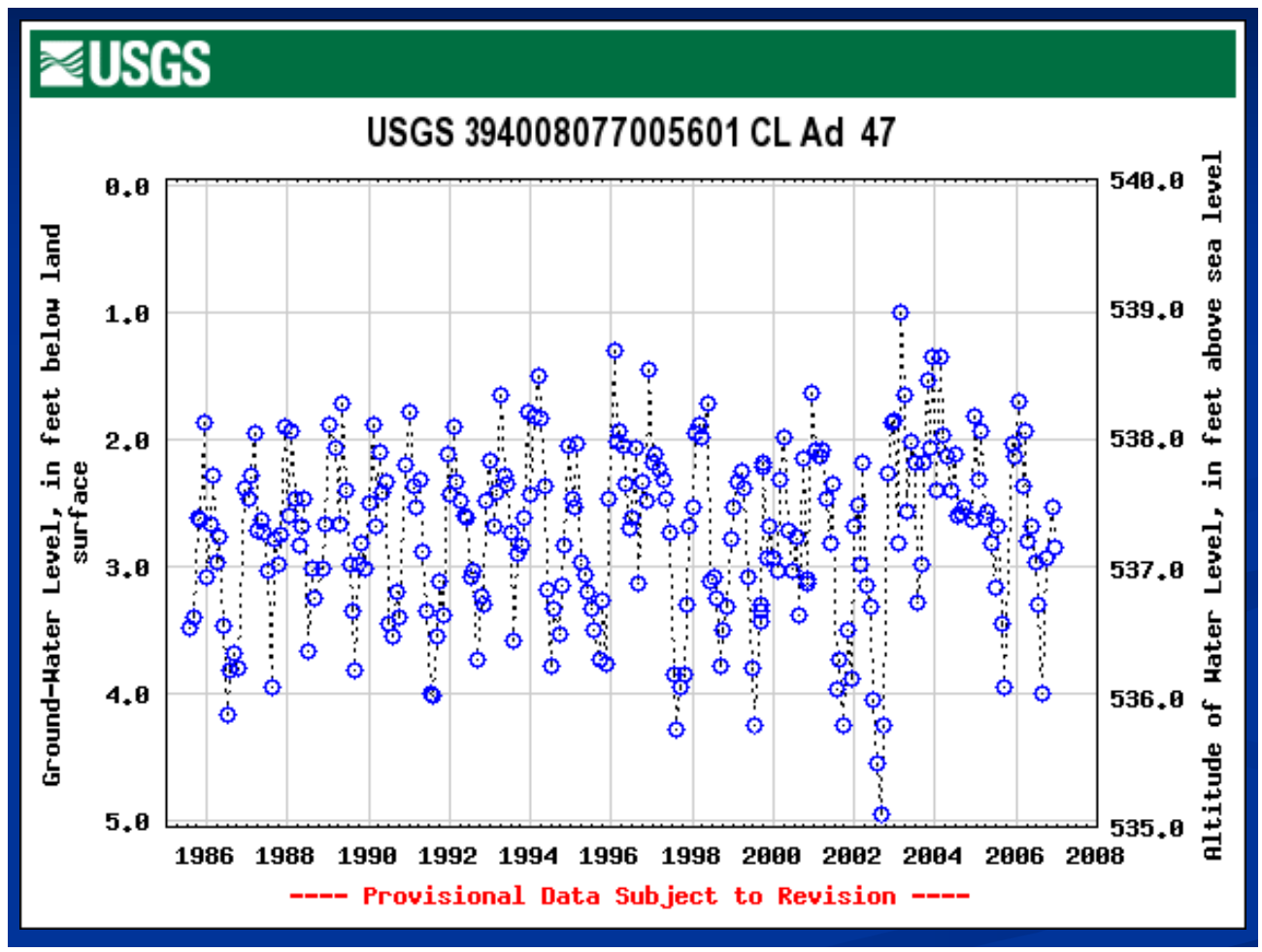
Streamflow Data



Hydrograph of the Last 30 Days of Streamflow in the North Branch Patapsco River at Cedarhurst, Md.

http://waterdata.usgs.gov/md/nwis/uv/?site_no=01586000&PARAmeter_cd=00065,00060,00062,00054

Ground-Water Level Data



Hydrograph of Monthly Ground-Water Levels in Carroll County Observation Well CL Ad 47, near Union Mills

http://nwis.waterdata.usgs.gov/md/nwis/gwlevels/?site_no=394008077005601&

Proposed Piedmont Study

- Develop improved GIS database of water availability information
- Develop software to estimate water availability
- Determine minimum streamflows to protect stream biota
- Determine factors affecting ground water availability in different settings
- Study water balance and watershed processes in two research watersheds

Conclusions

- Water supply development in the Piedmont of Maryland can be complicated and controversial
- Withdrawals of water have impacts on other users and ecological resources
- Goal of water supply development is to meet water demand with acceptable impacts on other users and ecological resource

Conclusions

- Holistic, regional planning is best way to achieve that goal
- Data on streams and ground water are needed to support sound decisions