Virginia Coastal Plain Groundwater Issues

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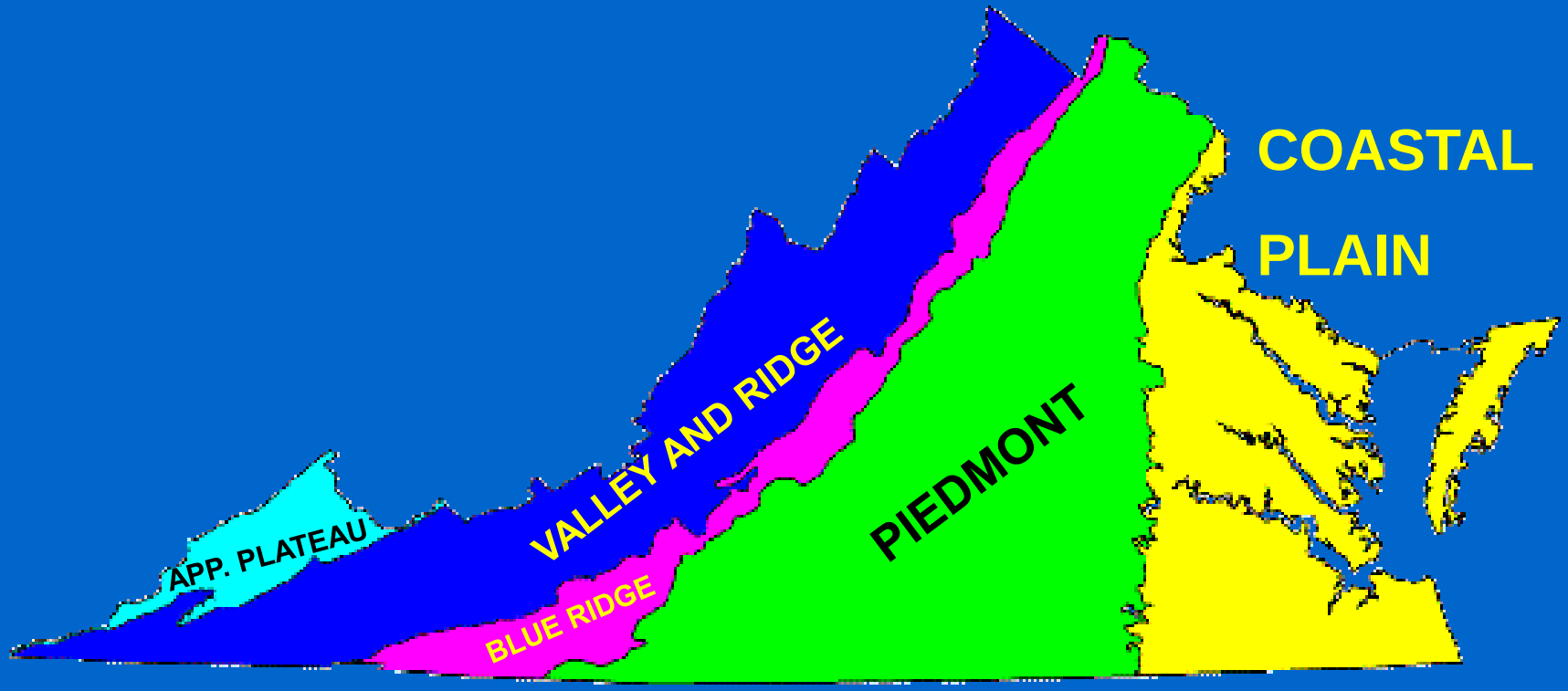
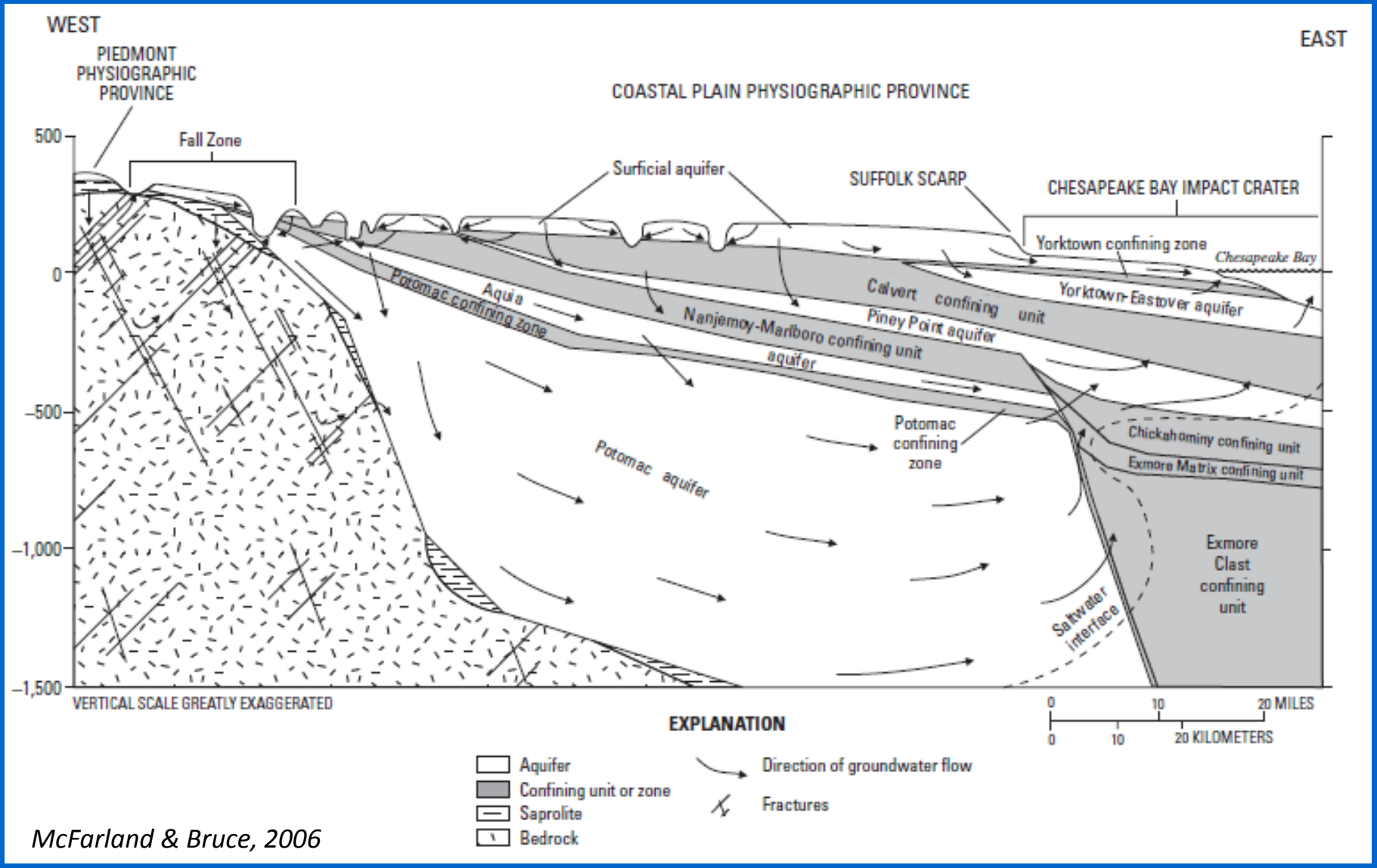
DOC Listening Session

February 5, 2014

Virginia Physiographic Provinces



VA Coastal Plain Aquifer Cross-Section

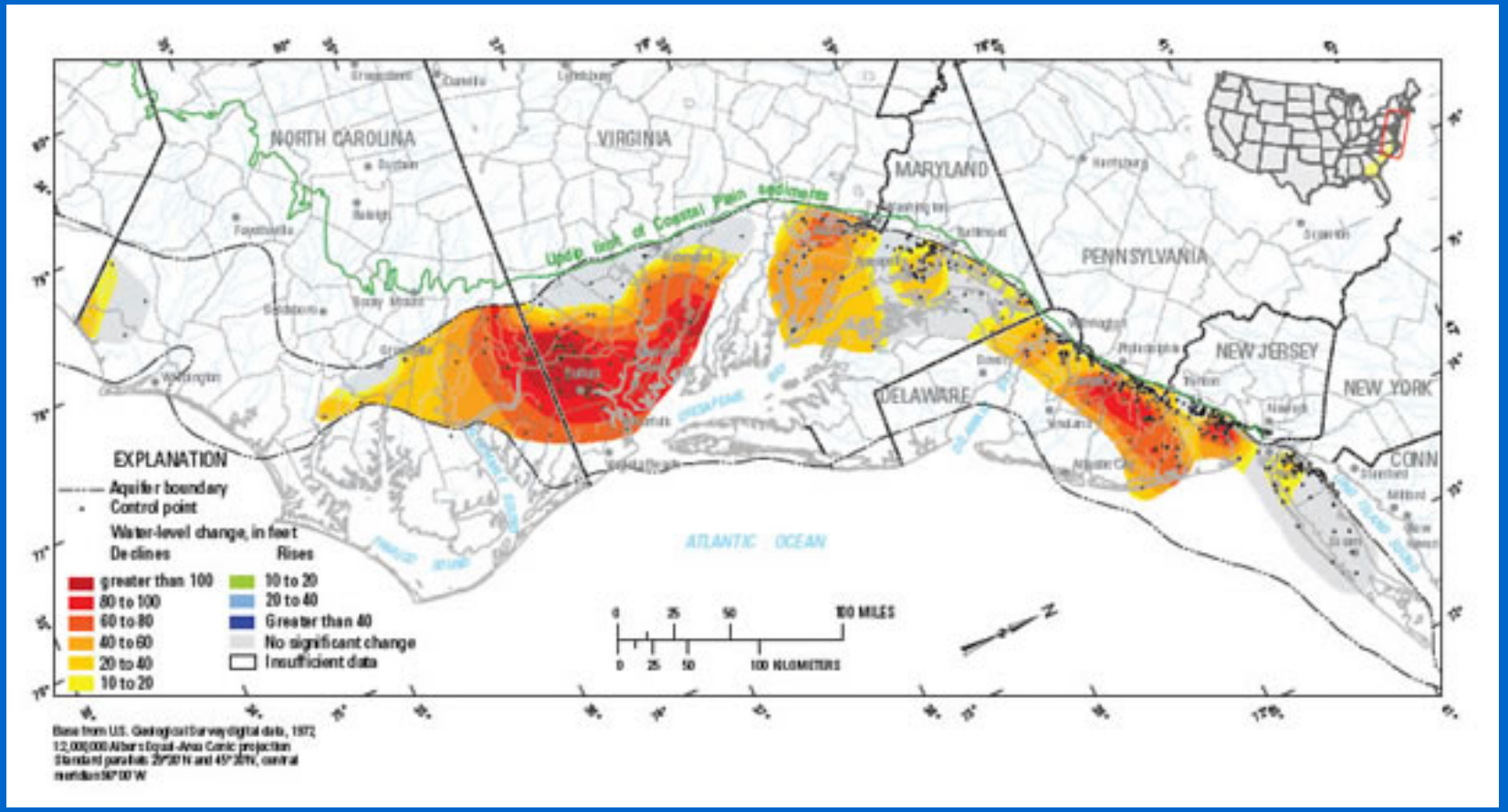


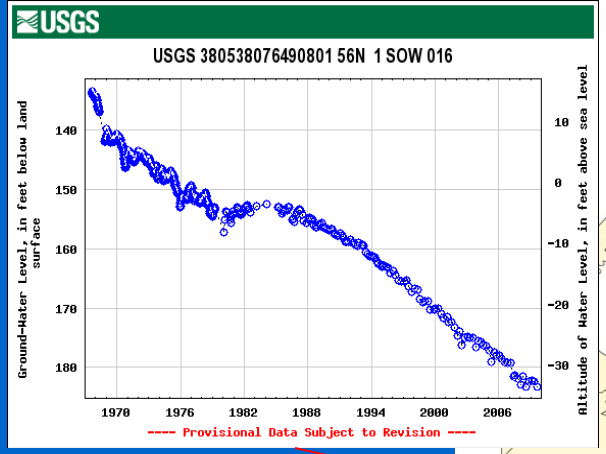
McFarland & Bruce, 2006

Management Issues

- Reversal of the hydraulic gradient (groundwater flow) leads to salt water intrusion
- Declining water levels
- Subsidence and loss of storage

Largest Water Level Declines in Mid-Atlantic

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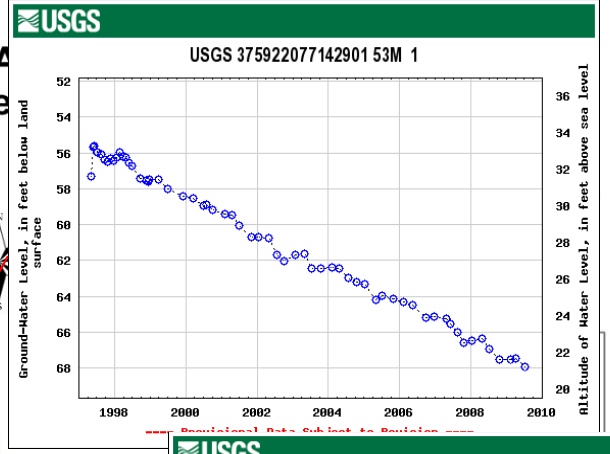
Ground-Water Level, in feet below land surface
Altitude of Water Level, in feet above sea level
---- Provisional Data Subject to Revision ----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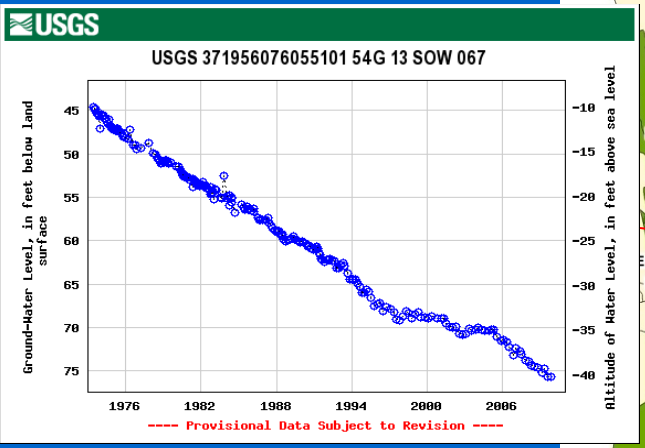
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Altitude of Water Level, in feet above sea level
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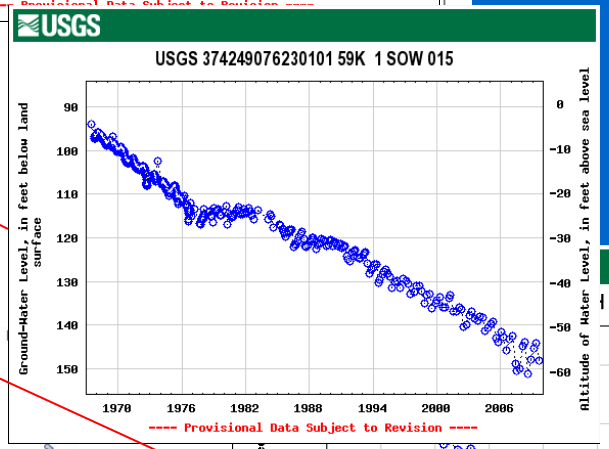
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Altitude of Water Level, in feet above sea level
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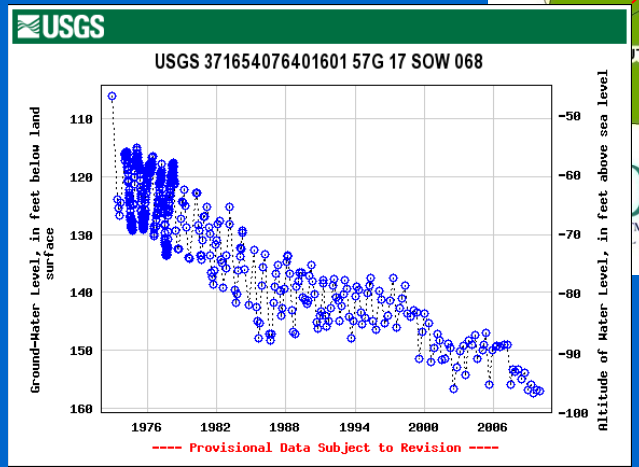
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Altitude of Water Level, in feet above sea level
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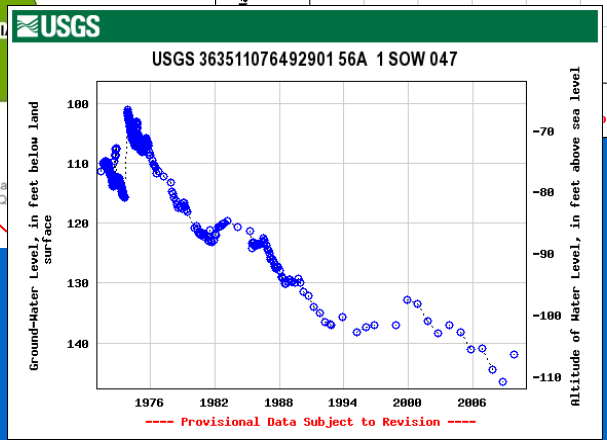
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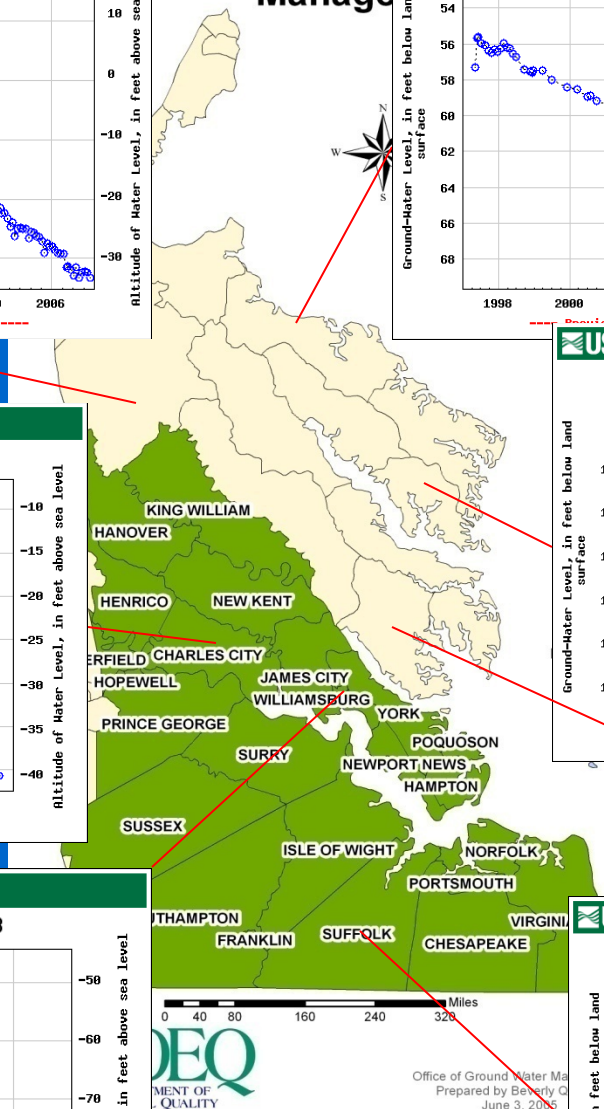
KING WILLIAM
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SURRY
POQUOSON
NEWPORT NEWS
HAMPTON
SUSSEX
ISLE OF WIGHT
NORFOLK
PORTSMOUTH
FRANKLIN
SUFFOLK
CHESAPEAKE
Miles
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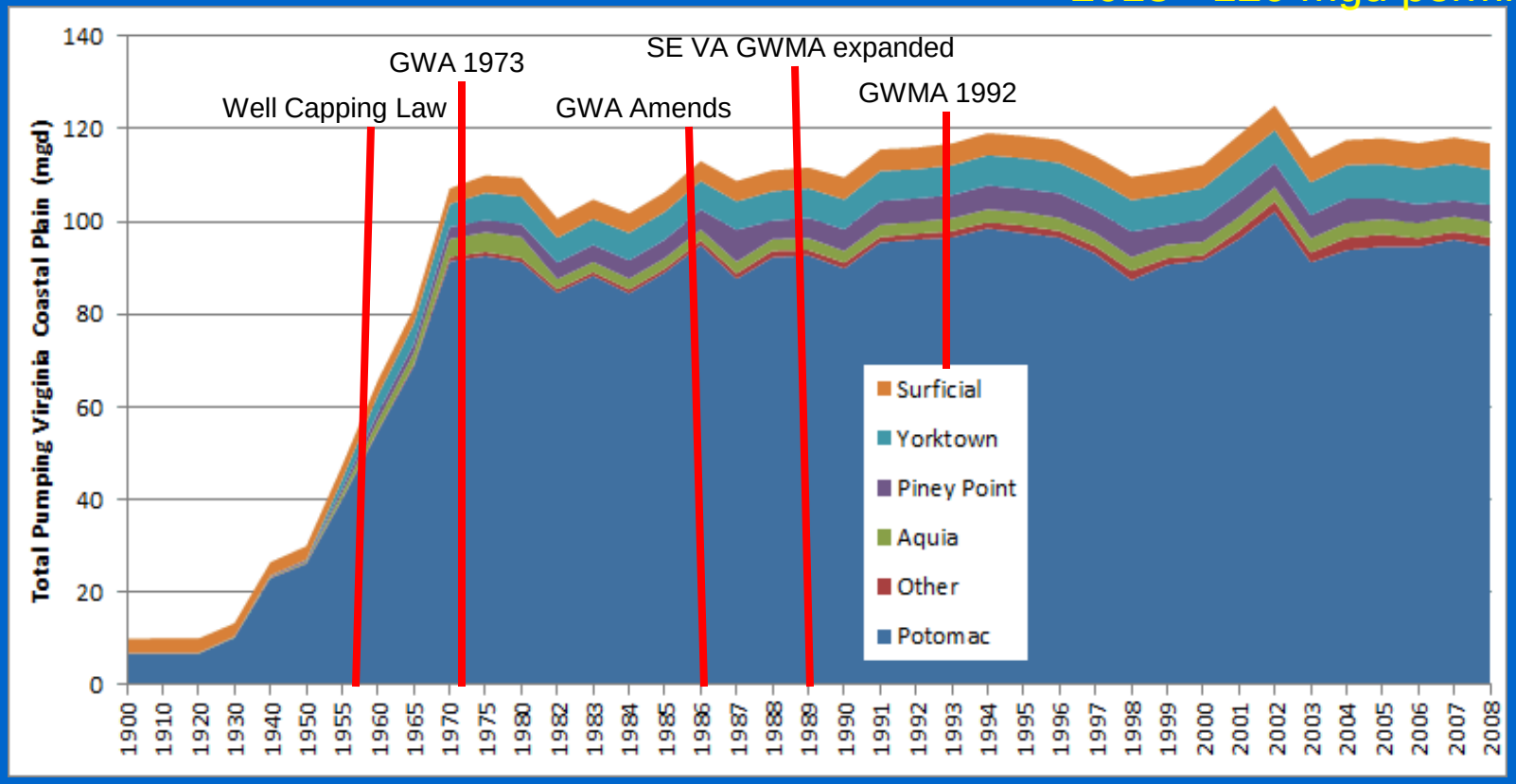
Virginia Groundwater Withdrawals by Aquifer

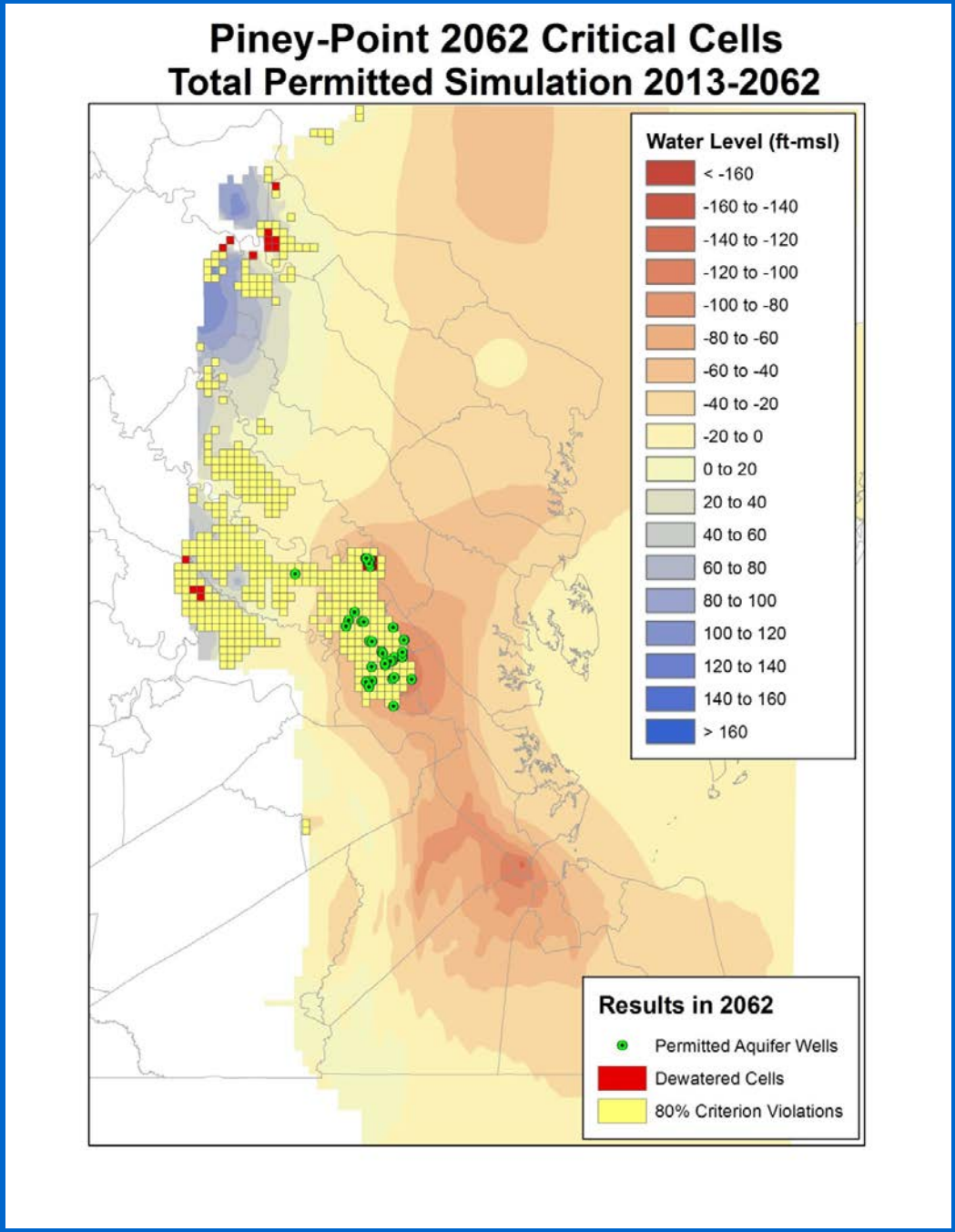
1973 - 212 mgd “rights”

1989 - 243 mgd “rights”

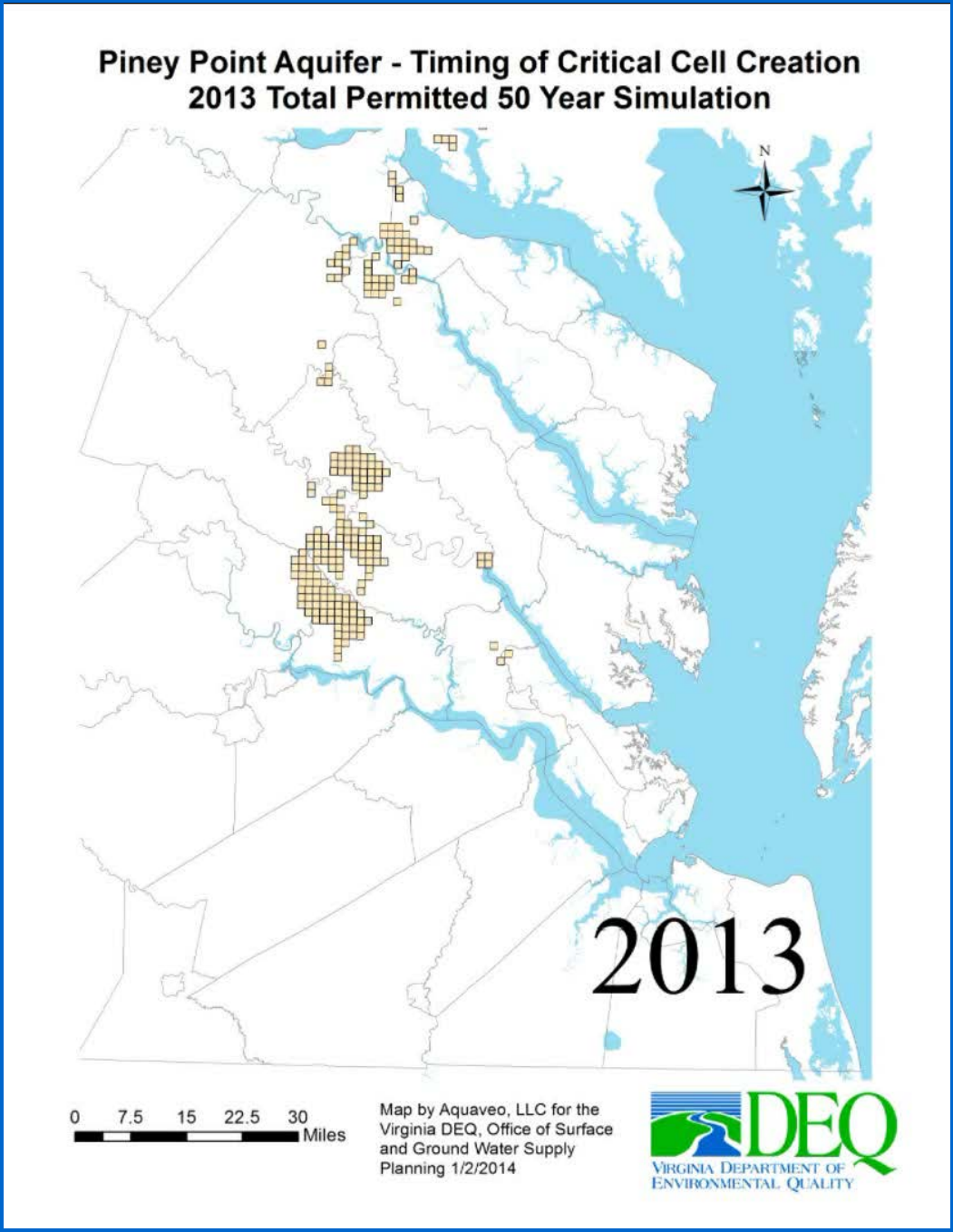
2013 - 120 mgd permitted



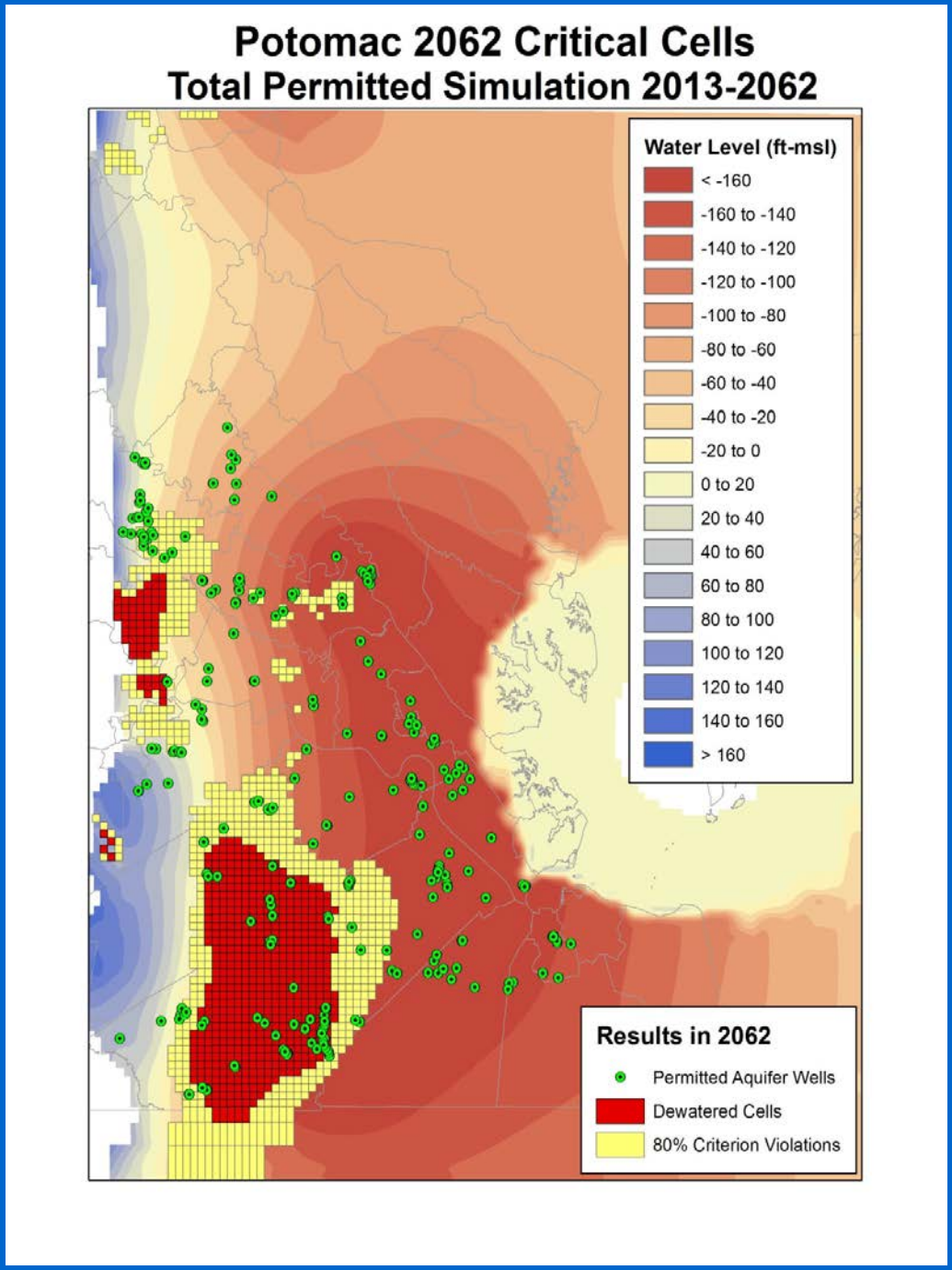
2013 Total Permitted: Piney Point



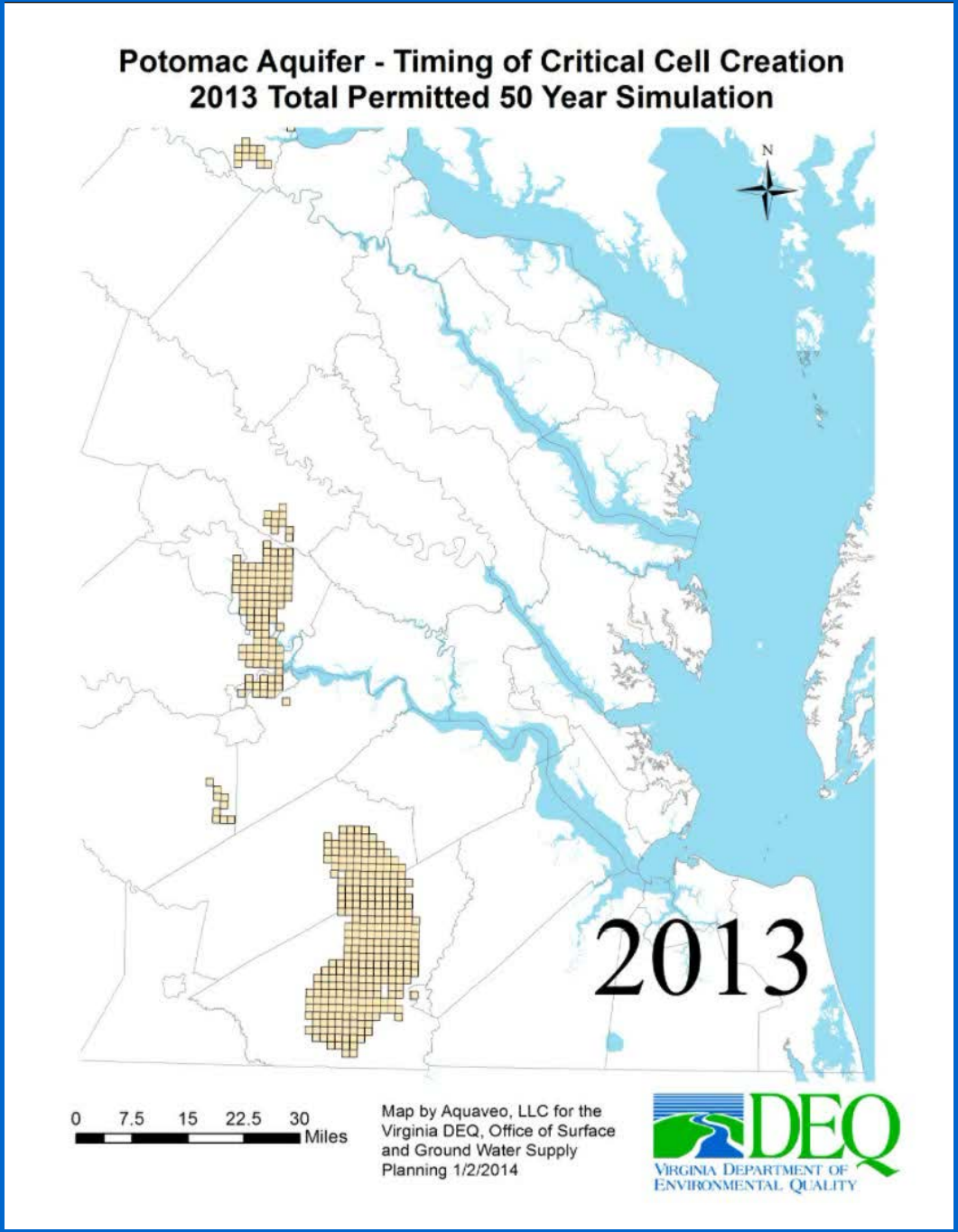
Critical Cell Propagation: Piney Point



2013 Total Permitted: Potomac



Critical Cell Propagation: Potomac



Conclusions

- Water levels continue to decline in the primary aquifers.
- Land is subsiding.
- Salt water intrusion is occurring.
- Primary aquifers are not being pumped sustainably for the long-term.

Other State's Responses

- Maryland – No irrigation withdrawals from the Potomac Aquifer. No new permits in areas where water levels have reached 80% of pre-development head.
- North Carolina – Reduce all existing withdrawals from the Potomac Aquifer by 30-75% over 15 years. Began 2006. State provided funds to convert to other sources. No new withdrawals from Potomac Aquifer.
- Georgia–South Carolina – Designated areas where no additional withdrawals are allowed and other areas where only incremental withdrawals are allowed. Mandatory conservation to reduce existing max withdrawals and GW monitoring.
- Savannah-Hilton Head Regional Management Area – Pumping limited based on areas reaching 500 mg/l Chloride in less than 113 years.
- Florida – Regional pumping caps on all withdrawals. All withdrawals including agr. are metered and conservation/efficiency mandated.

Options Resulting From Peer Review

- Regulatory options include:
  - Reduce pumping
  - Spread out pumping
  - Modify management goals
  - Issue permits in regional or aquifer groupings
  - Implementation of greater water conservation
- Program recommendations include:
  - More data collection:
    - water levels
    - water quality
    - land subsidence
  - Implement new generation modeling tool
  - Increase program resources

Short-term Actions Taken

- Amend GWMA regulations to:
  - Expand the management area
  - Determine regulatory compliance using full area of impact
  - Use land surface instead of pre-pumping head
  - Add greater clarity on expectations for use of alternative sources and water conservation
- Implement use of new (2009) model
- Collaborate with other agencies:
  - Specific data on well location and construction
  - Un-captured withdrawals
- Reinstate GW quality sampling within chloride network starting with 20-25 samples/year
- Allow for drought contingencies in permits

Short-term Actions Under Review

- Begin moving existing pumps above the top of the Potomac Aquifer
- Improvements to groundwater withdrawal reporting
- Continue to increase GW quality samples to 50 per year
- Work with VEDP and local governments regarding availability of GW in recruitment locations
- Review program and funding resources

Other Longer-term Policy Options

- Optimize the new model to spread out withdrawals and evaluate impact
- Add subsidence and intrusion package to the model
- Evaluate drawdown criteria for subsidence/salt water intrusion
- Continue to increase annual GW quality samples

Other Longer-term Policy Options (cont.)

- Facilitate greater use of alternatives such as wastewater reuse, surface water conjunctive use, and water recycling
- Consider additional regulatory changes
- Evaluate need for an across the board reduction target and implementation schedule

Suggestions?