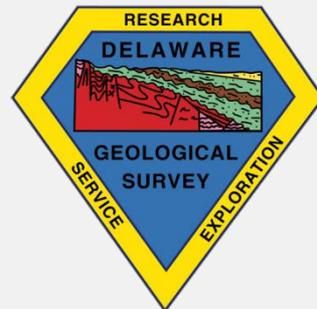
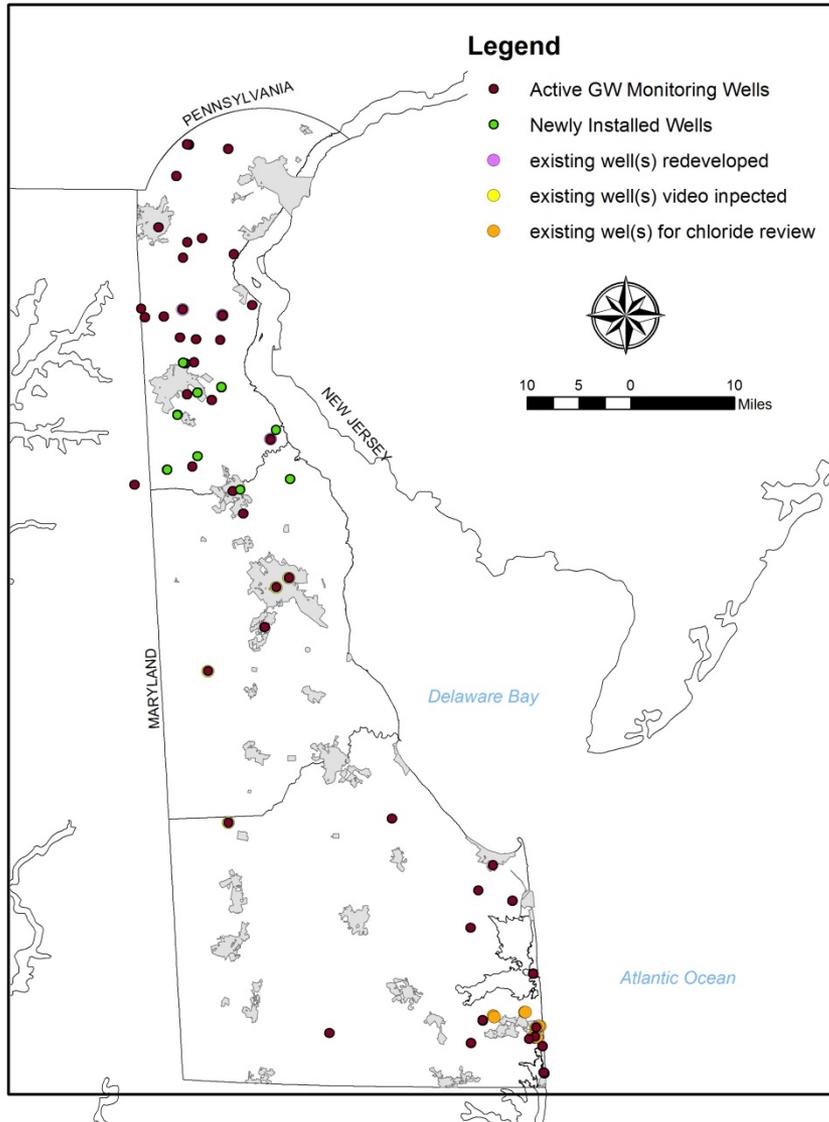


# Delaware Groundwater Monitoring Network: Statewide, Southern New Castle – Northern Kent Counties, & plans for future monitoring

Delaware Geological Survey



# DGS monitoring network



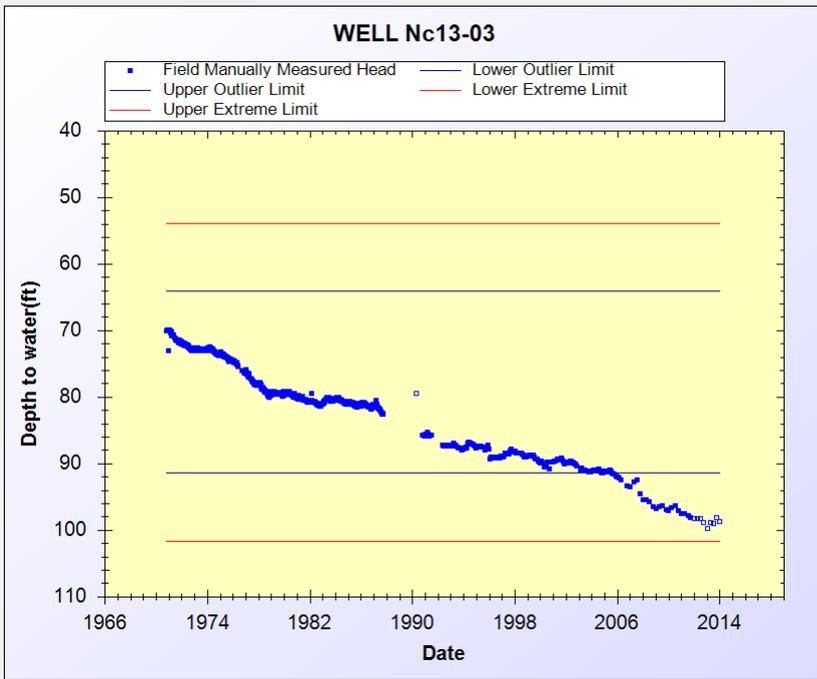
<b>102</b>	<b>Active wells</b>
<b>14</b>	<b>Aquifers</b>
<b>11</b>	<b>Monthly measured wells</b>
<b>109</b>	<b>Quarterly measured wells</b>
<b>66</b>	<b>Data loggers</b>
<b>2</b>	<b>Streams</b>

**Water pressure/temperature**

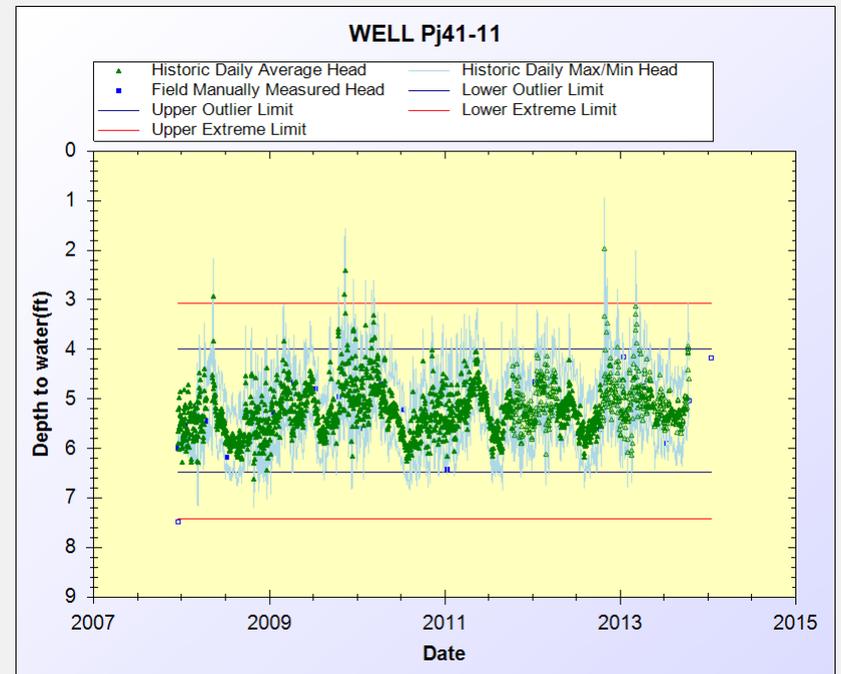
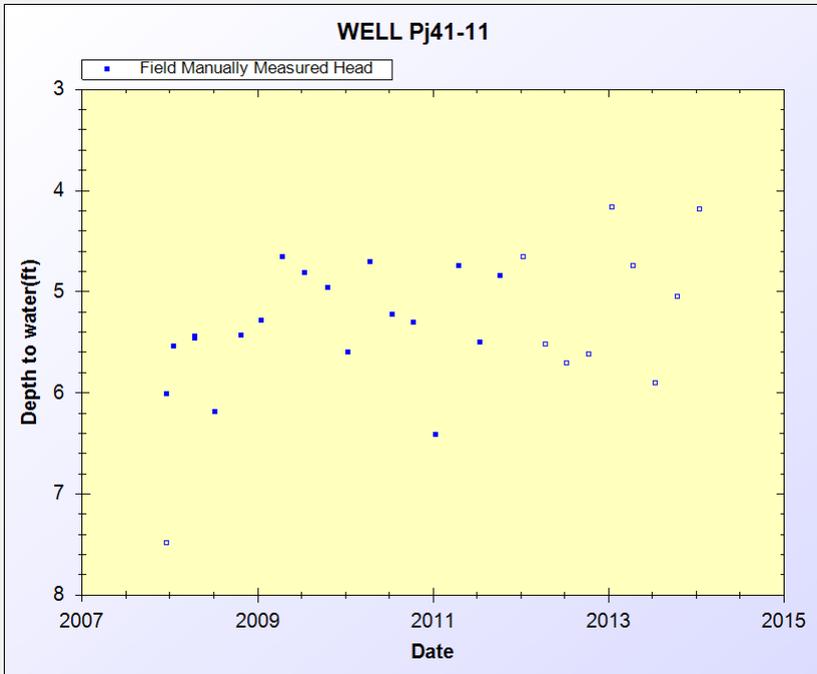
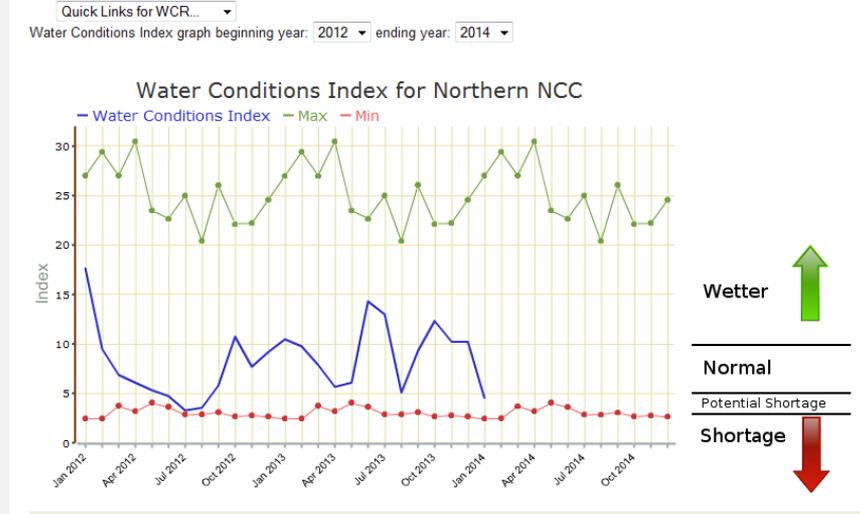
**WQ when funded**

**Documented QA process**

**Internet access to data and data plots**



### Water Conditions Index for Northern New Castle County





# Water Supply Coordinating Council

- WSCC reporting process noted deficiencies in gw monitoring – SNCC/NKC highest priority
- WSCC approval in 2008, funded FY '12, spent June 2014
- Coordinated with New Castle County, Smyrna, DNREC, DDA
- Work focus on shallower (<600 ft) aquifers
- Build infrastructure, make basic physical & chemical measurements for water availability & sustainability planning



# MAJOR CONCEPTS/STUDY DESIGN

- Groundwater is “sole” source of potable water
- There is a lot of water and information, but
  - not always where we need it
  - not of the right quality
- Increased demand for aquifers to be used for wastewater and stormwater disposal, and ASR
- Leverage existing knowledge and infrastructure
- Modernize infrastructure and support tools for state of practice assessment and planning

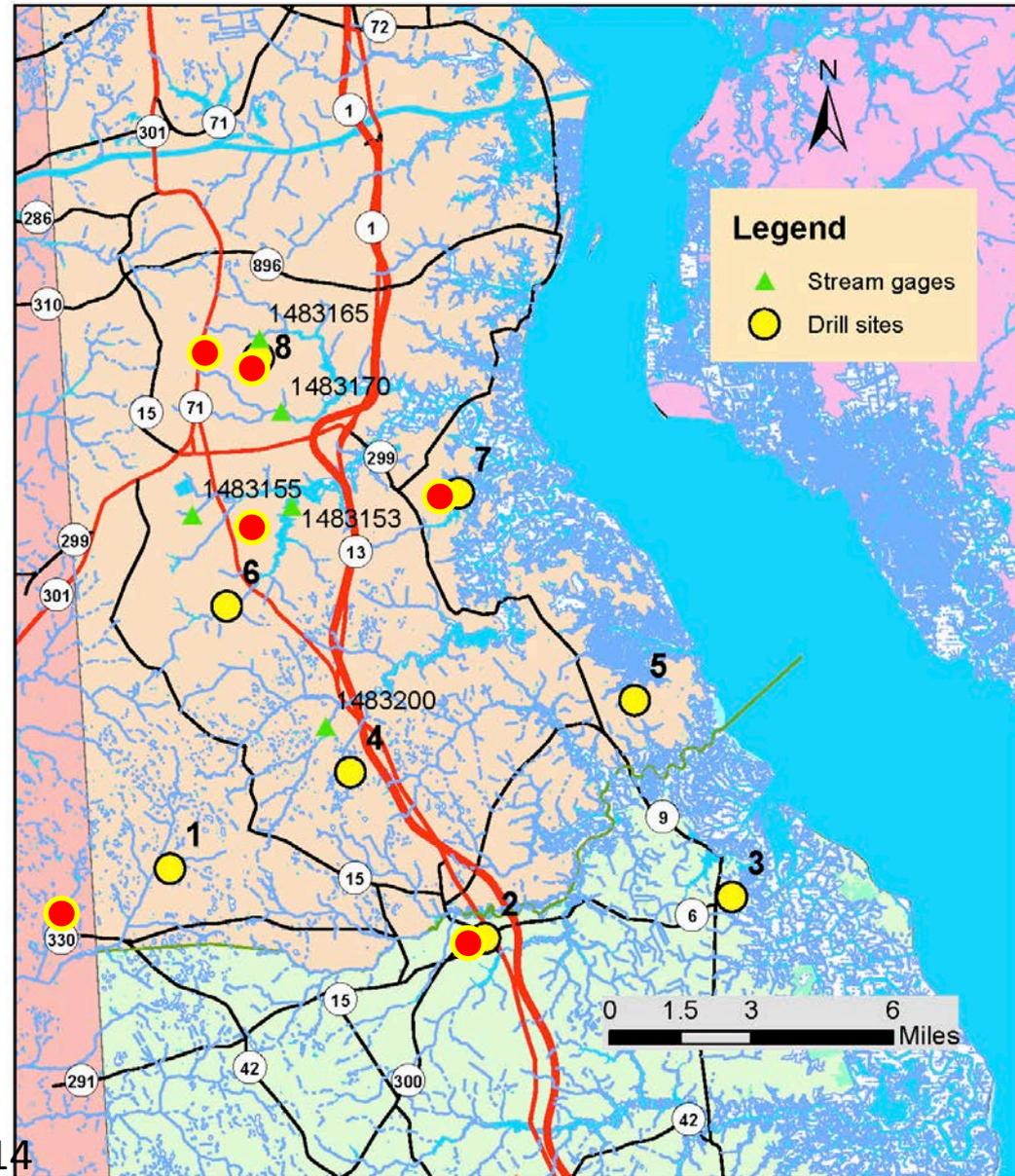
# SNCC-NKC Monitoring Sites

● Monitoring well installs

1. BSF – Peters Tract
2. Smyrna
3. WBWA
4. BSF HQ
5. CSWA
6. WMP
7. WF1
8. WF2

● Existing monitoring wells added to network

▲ Stream gages with USGS identifier





# Quantity - Key Findings

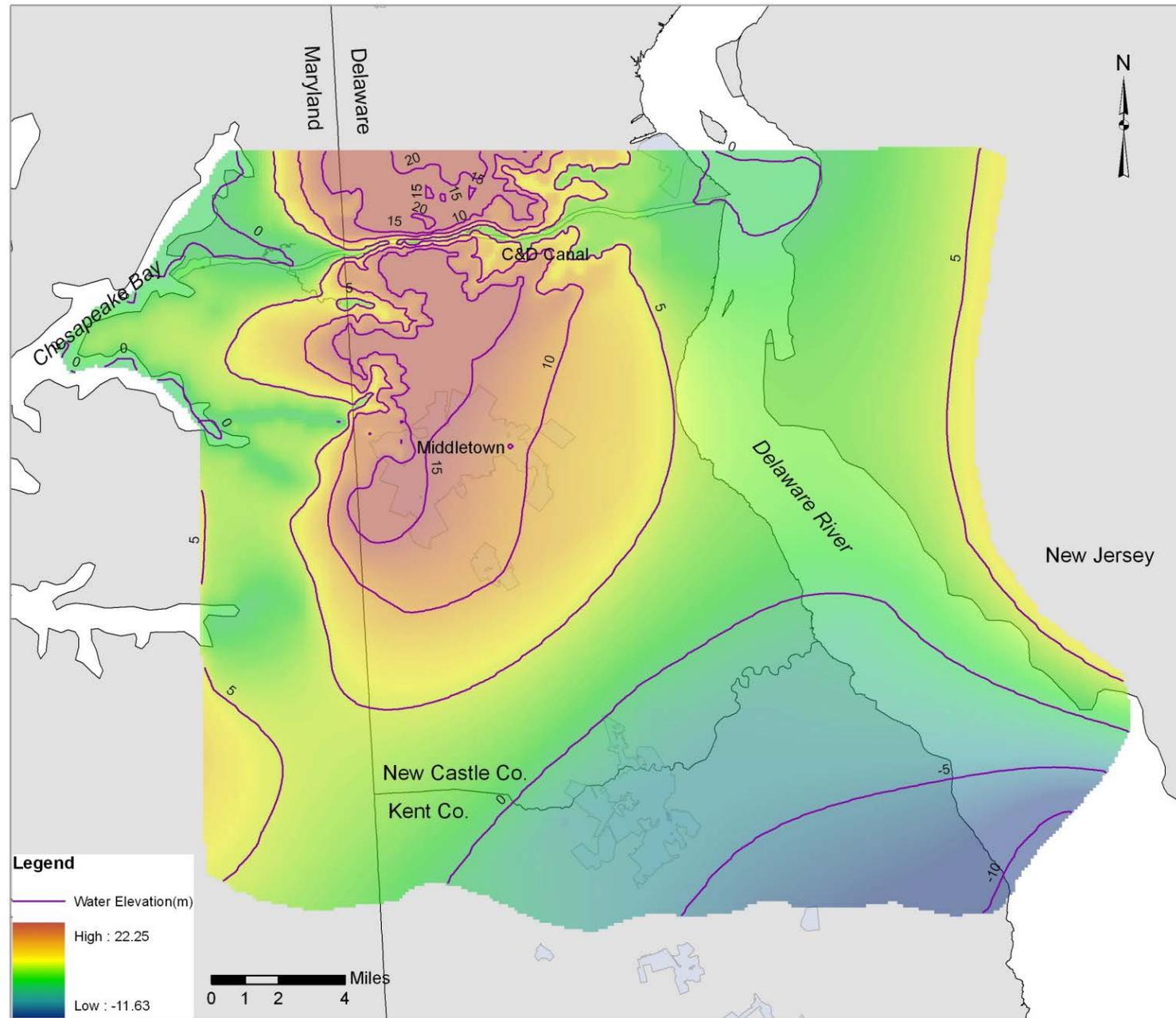
- **Northern Kent County** – very poor yield potential for Piney Point and Rancocas Aquifers, **Blackbird State Forest** – very good to excellent yield potential for Rancocas Aquifer, **Magothy Fm** not a reliable water source
- Regional/local pumping influences observed
- New head data compare well with model predictions by He and Andres, and indicate more water present than USGS SIR 2008-5145
- Recharge areas identified



Example:  
Mt Laurel  
aquifer

Model  
predicted  
regional head  
distribution

Recharge  
area north of  
Middletown  
& south of  
canal





# Quality - Key Findings

- Elevated Arsenic in 17% of monitoring wells (4 in Mt. Laurel and Rancocas, consistent with MD, NJ findings). Awaiting results from domestic wells
- Elevated chloride in Piney Point (530) and Mt Laurel (210) at WBWA
- GW replenishment rate estimates for deeper Rancocas and Mt. Laurel range 6000-16000 yrs (7 samples), older than H&A model estimates

# What next?

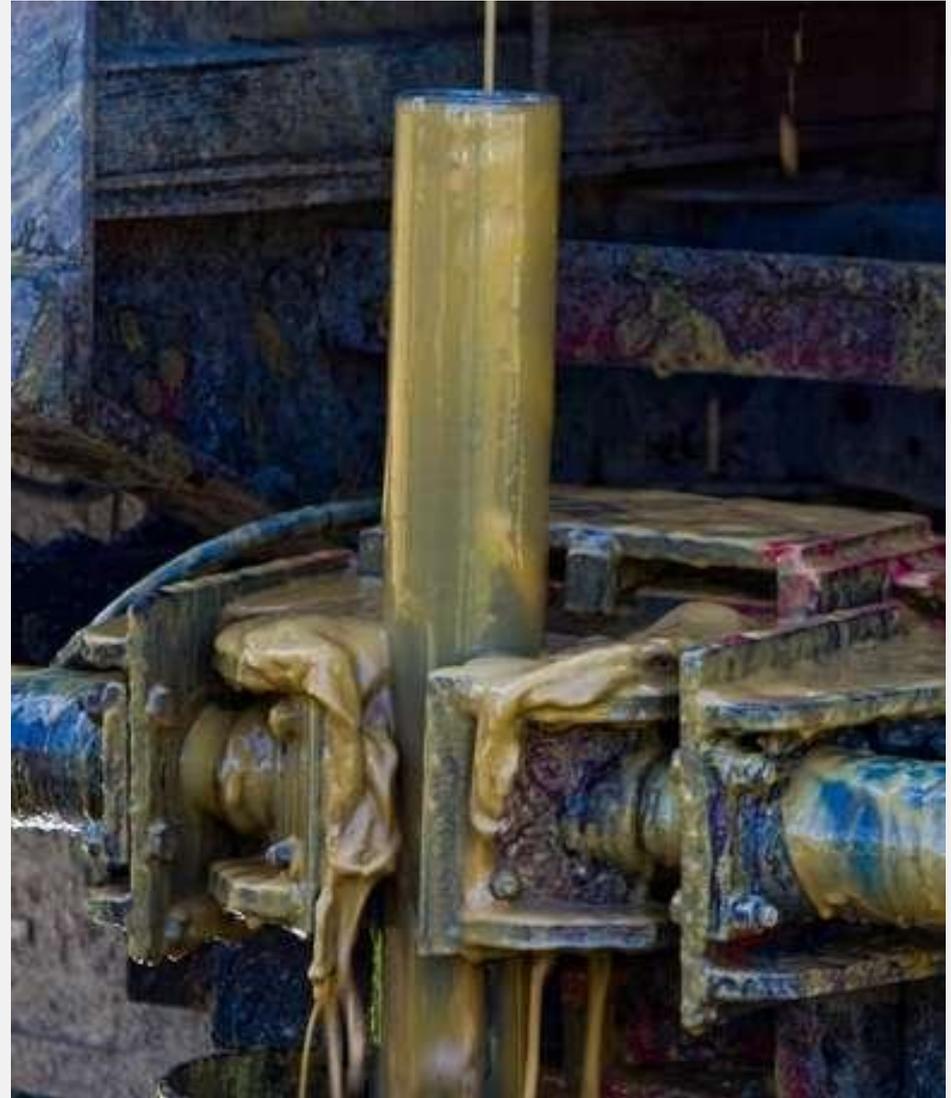
**A)** Monitoring infrastructure help for Kent and Sussex – new and repairs needed

Water supply competition in some areas

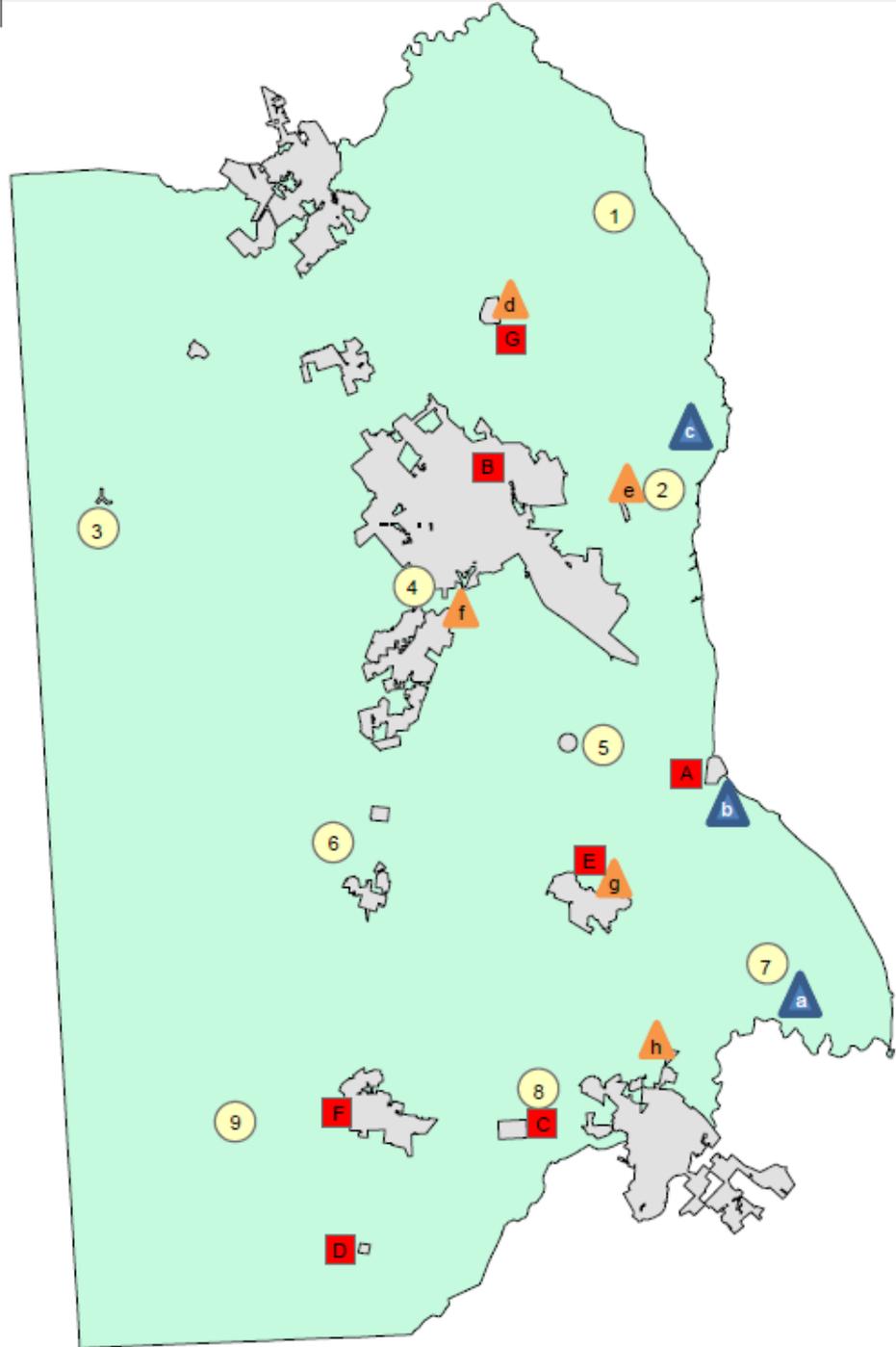
Plans for salinity and sea-level rise require new information

Water supply concerns will impact economic growth

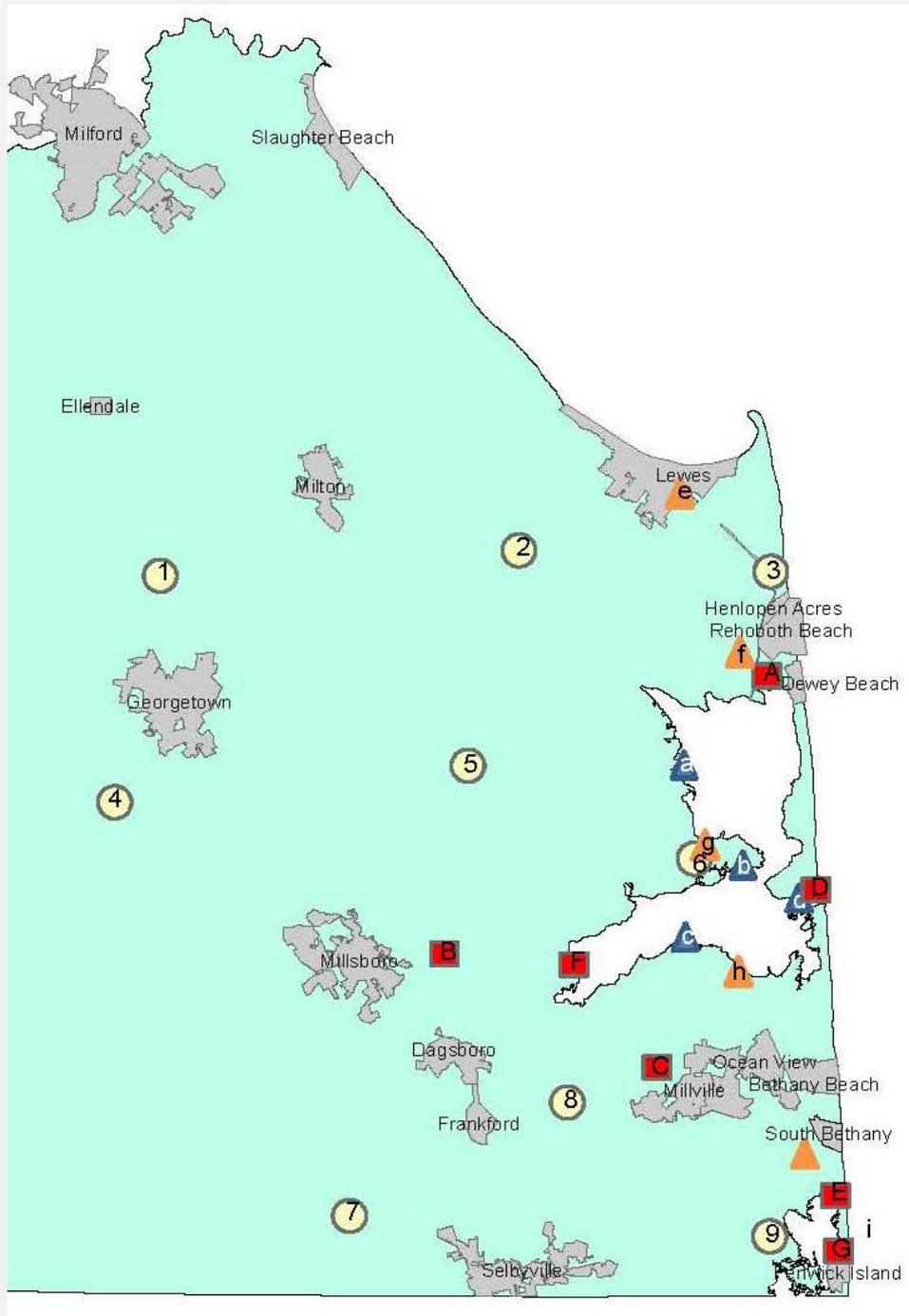
**B)** CB WIP & TMDL monitoring



# Kent Co Monitoring



- Wells
  - Surface water
  - Salinity
  - Estimated cost ~ \$740K
- gw SW



# Eastern Sussex

- Wells 
- Surface water 
- Salinity  gw  sw
- Estimated cost ~ \$650K



# CB WIP & TMDL Monitoring

- DDA and DNREC-WAMS have long-term need to monitor shallow gw for N and P
- Best way to spend \$ - Gov't or private sector?

questions?

