

Eastern Shore Groundwater 2017 Progress

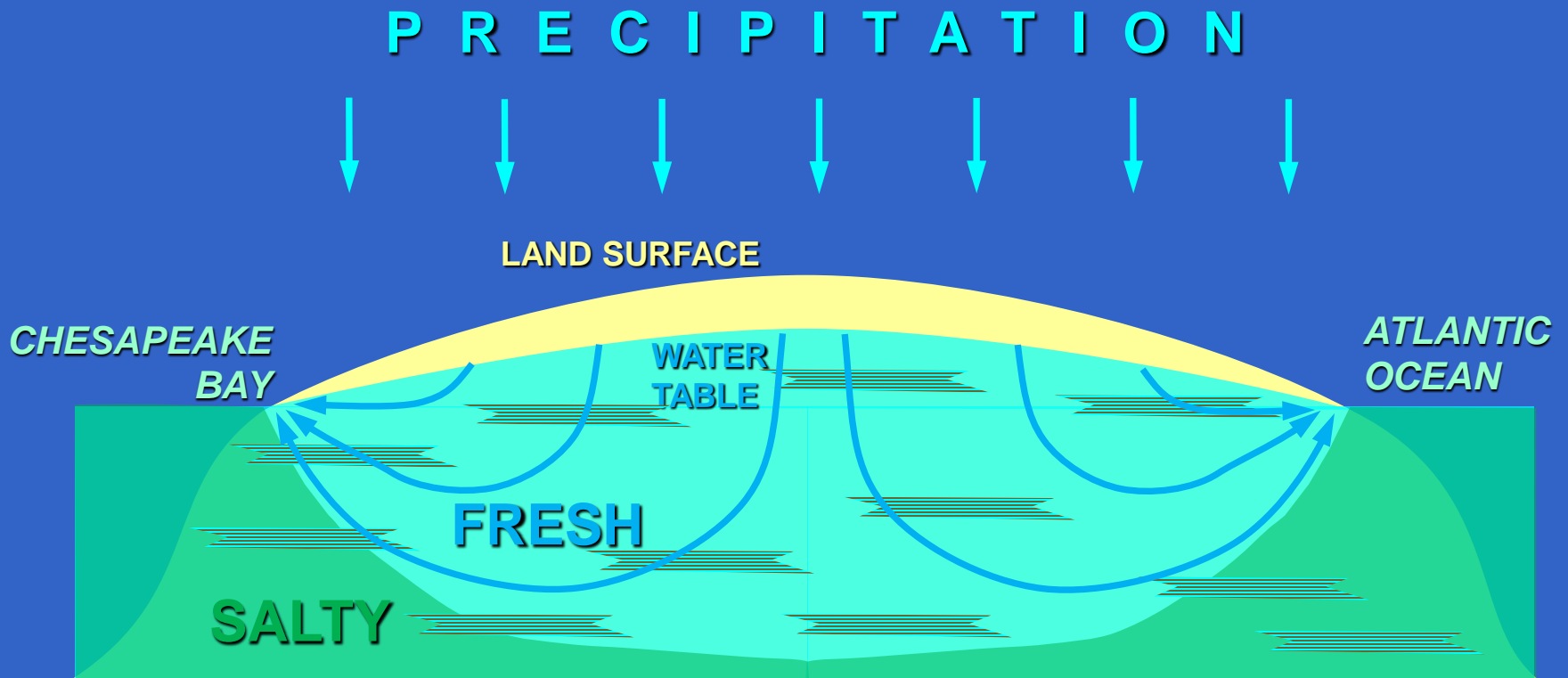
1. A-N PDC well-logging program

- third logging run
- log-analysis advances

2. DEQ-funded study

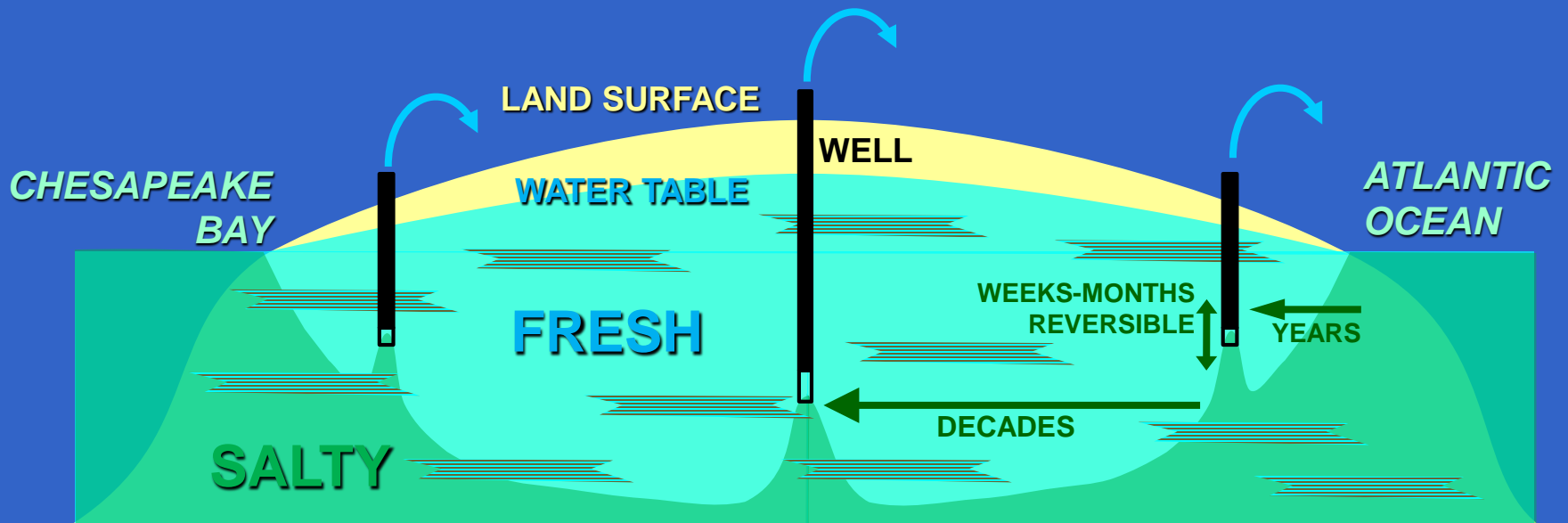
- hydrogeologic framework
- paleochannels
- salinity
- 2017-2019

Groundwater Flow



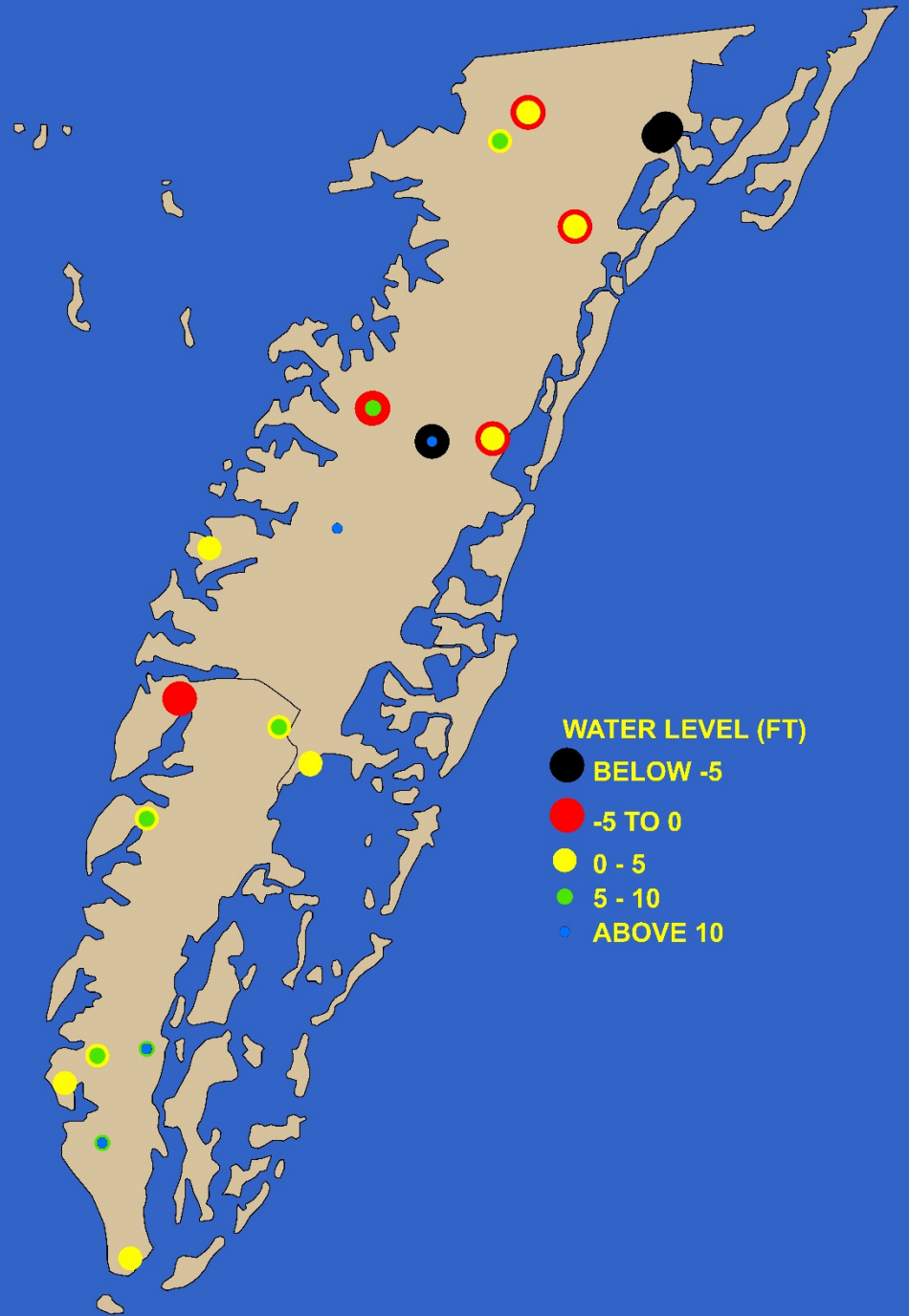
*** VERTICAL SCALE GREATLY EXAGGERATED ***

Pumping-Induced Saltwater Movement

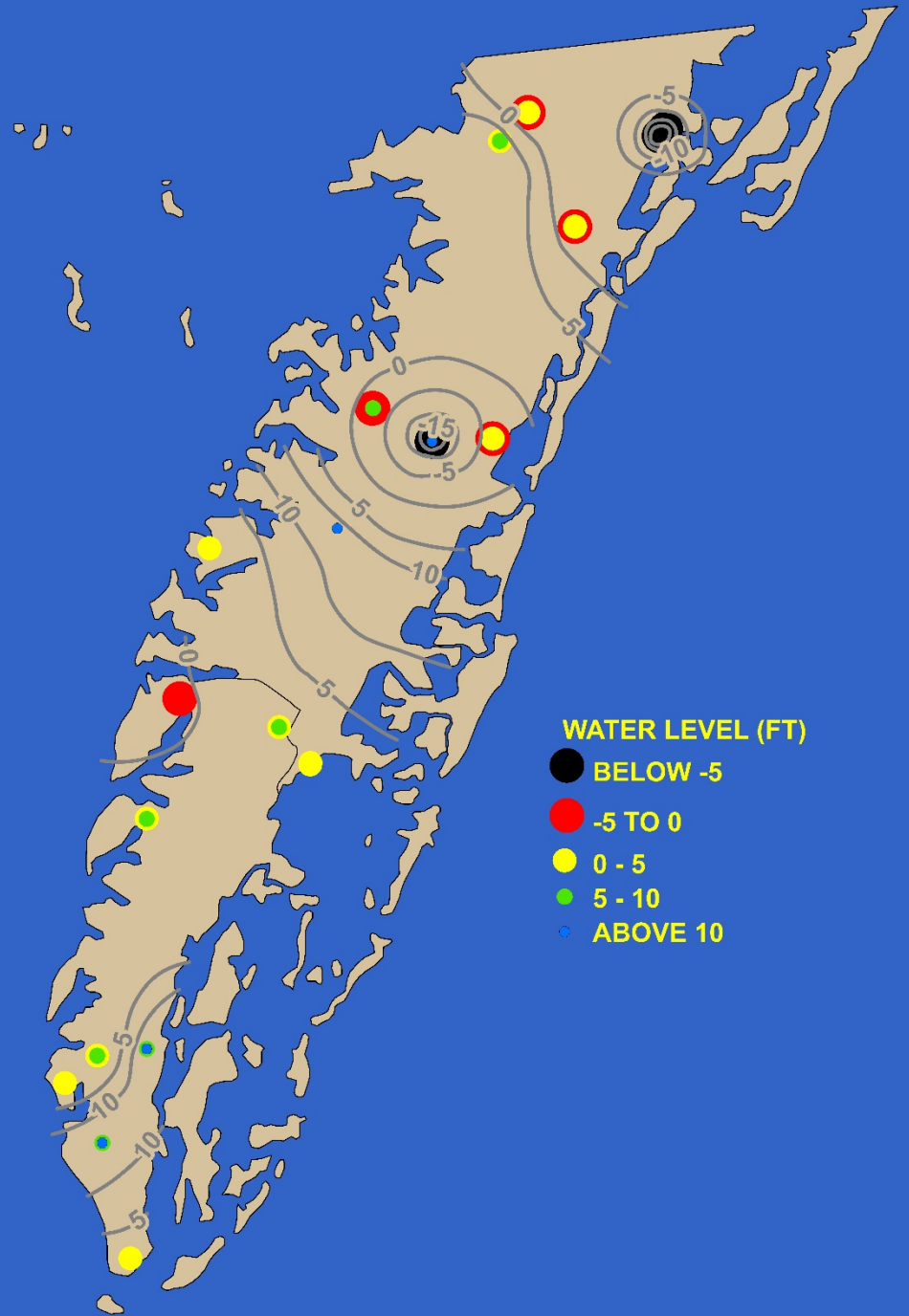


***** VERTICAL SCALE GREATLY EXAGGERATED *****

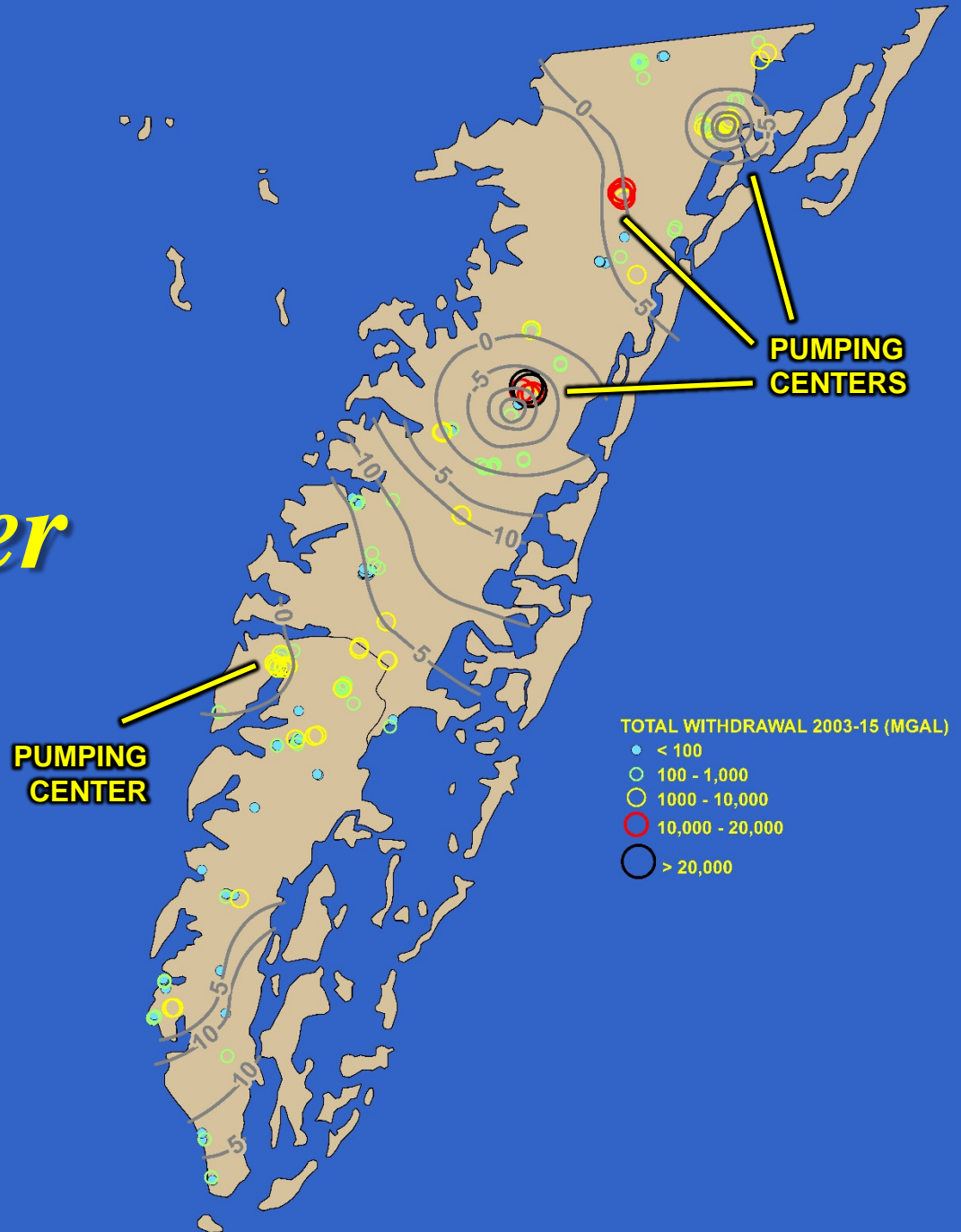
2016 Confined Groundwater Levels



2016 Confined Groundwater Levels



2016 Confined Groundwater Levels



2016 Confined Groundwater Levels

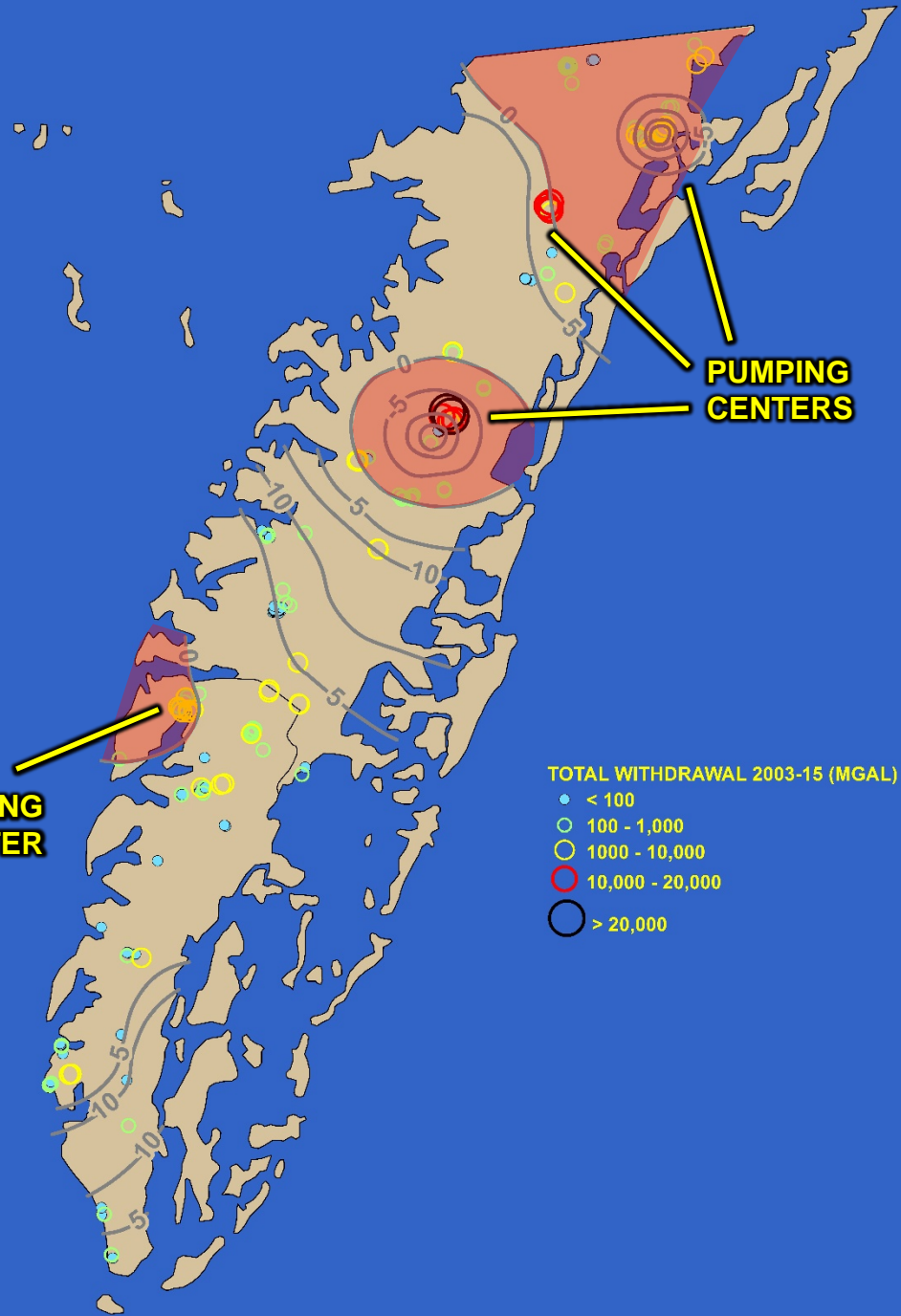
BELOW SEA LEVEL

PUMPING
CENTER

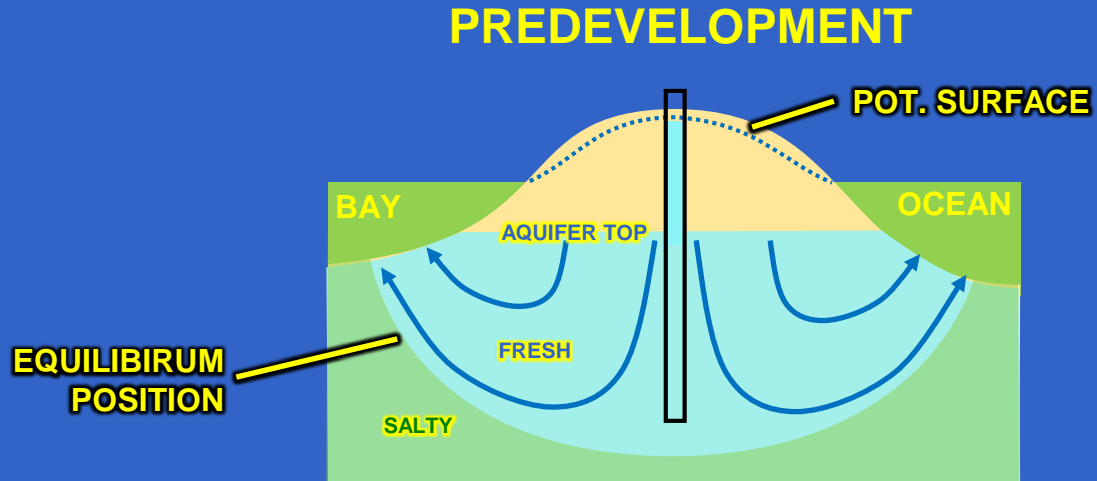
PUMPING
CENTERS

TOTAL WITHDRAWAL 2003-15 (MGAL)

- < 100
- 100 - 1,000
- 1000 - 10,000
- 10,000 - 20,000
- > 20,000

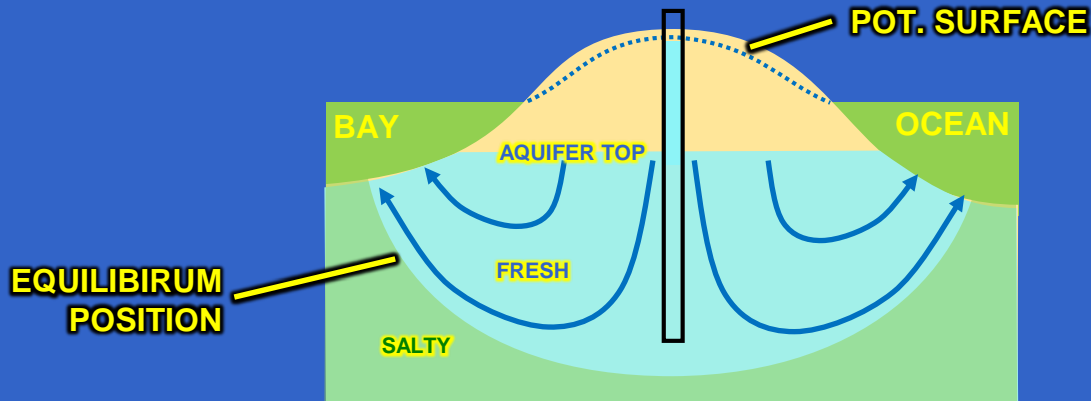


Saltwater Position

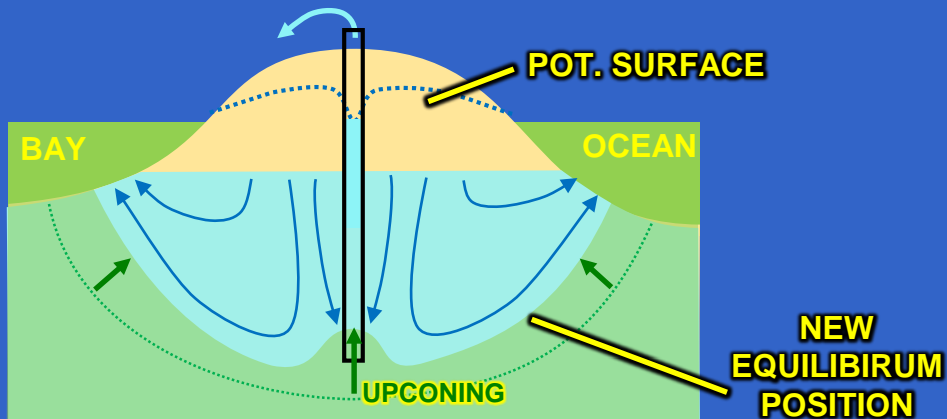


Saltwater Position

PREDEVELOPMENT

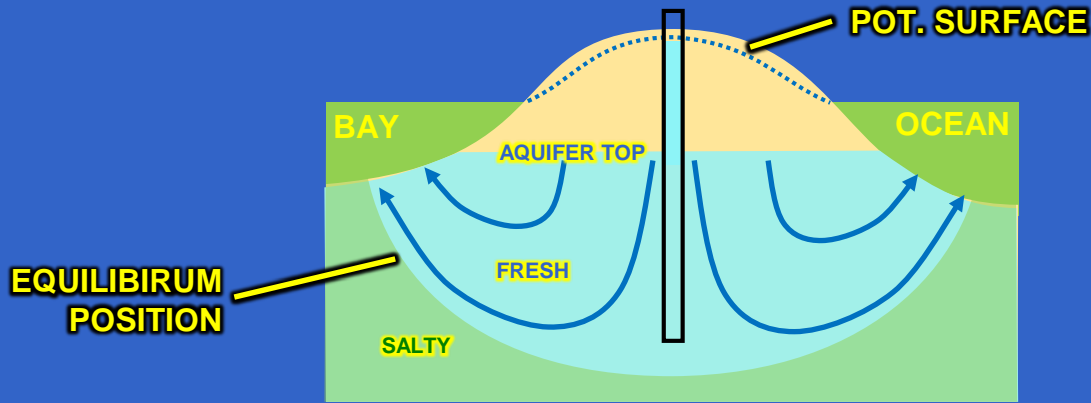


DRAWDOWN ABOVE SEA LEVEL

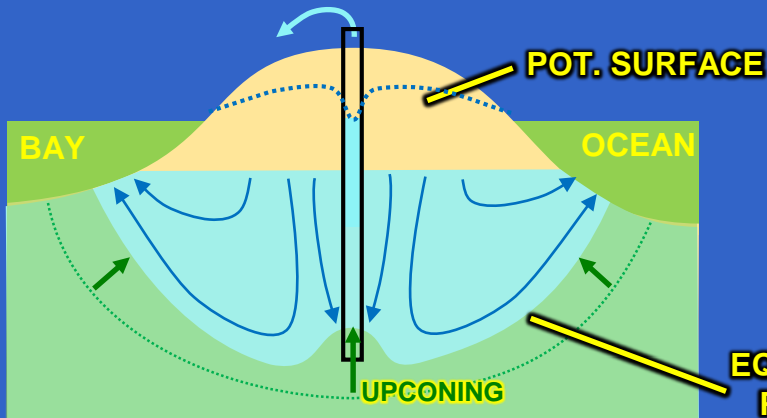


Saltwater Position

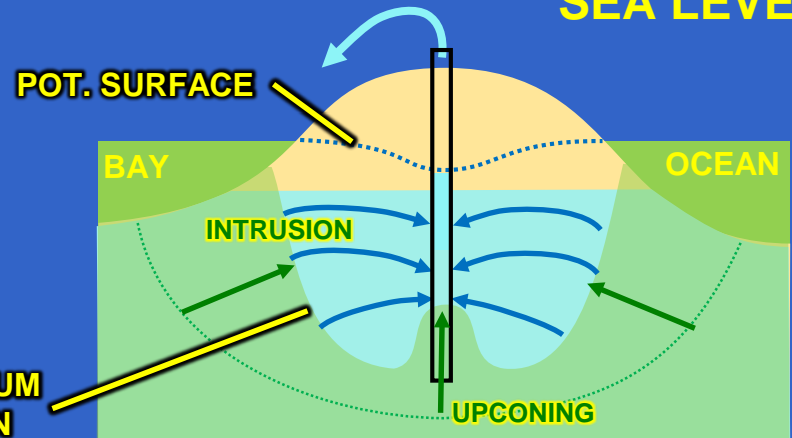
PREDEVELOPMENT



DRAWDOWN ABOVE SEA LEVEL

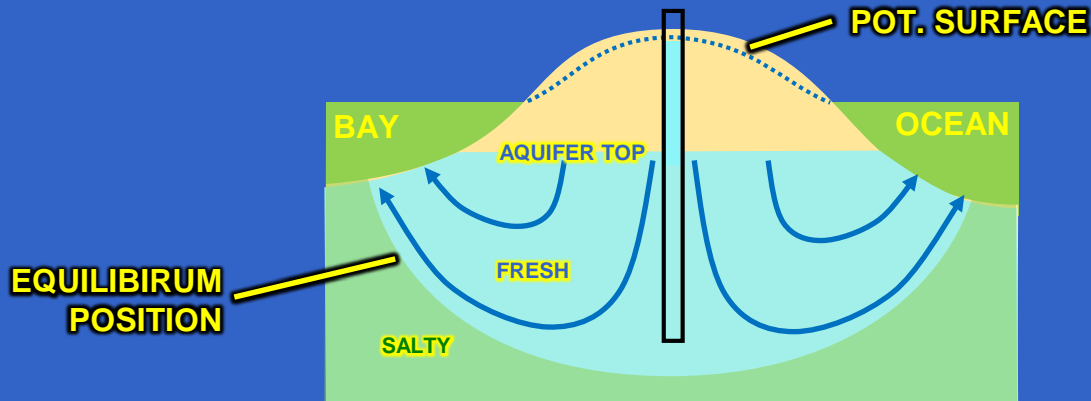


DRAWDOWN BELOW SEA LEVEL

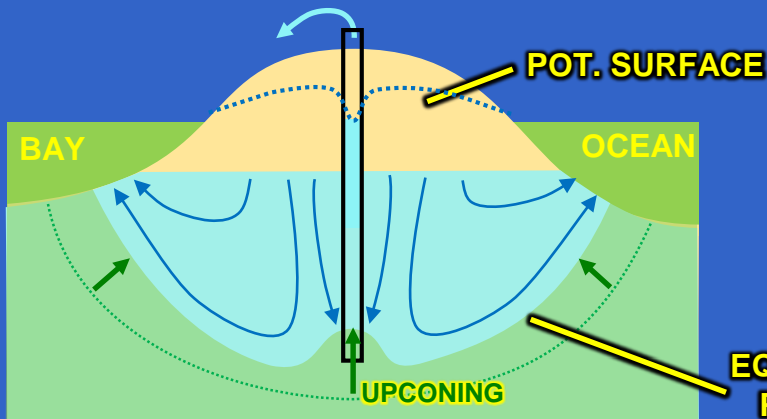


Saltwater Position

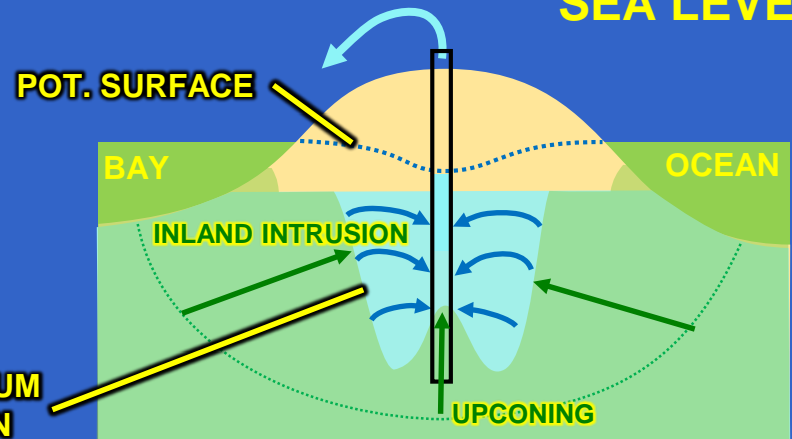
PREDEVELOPMENT



DRAWDOWN ABOVE SEA LEVEL

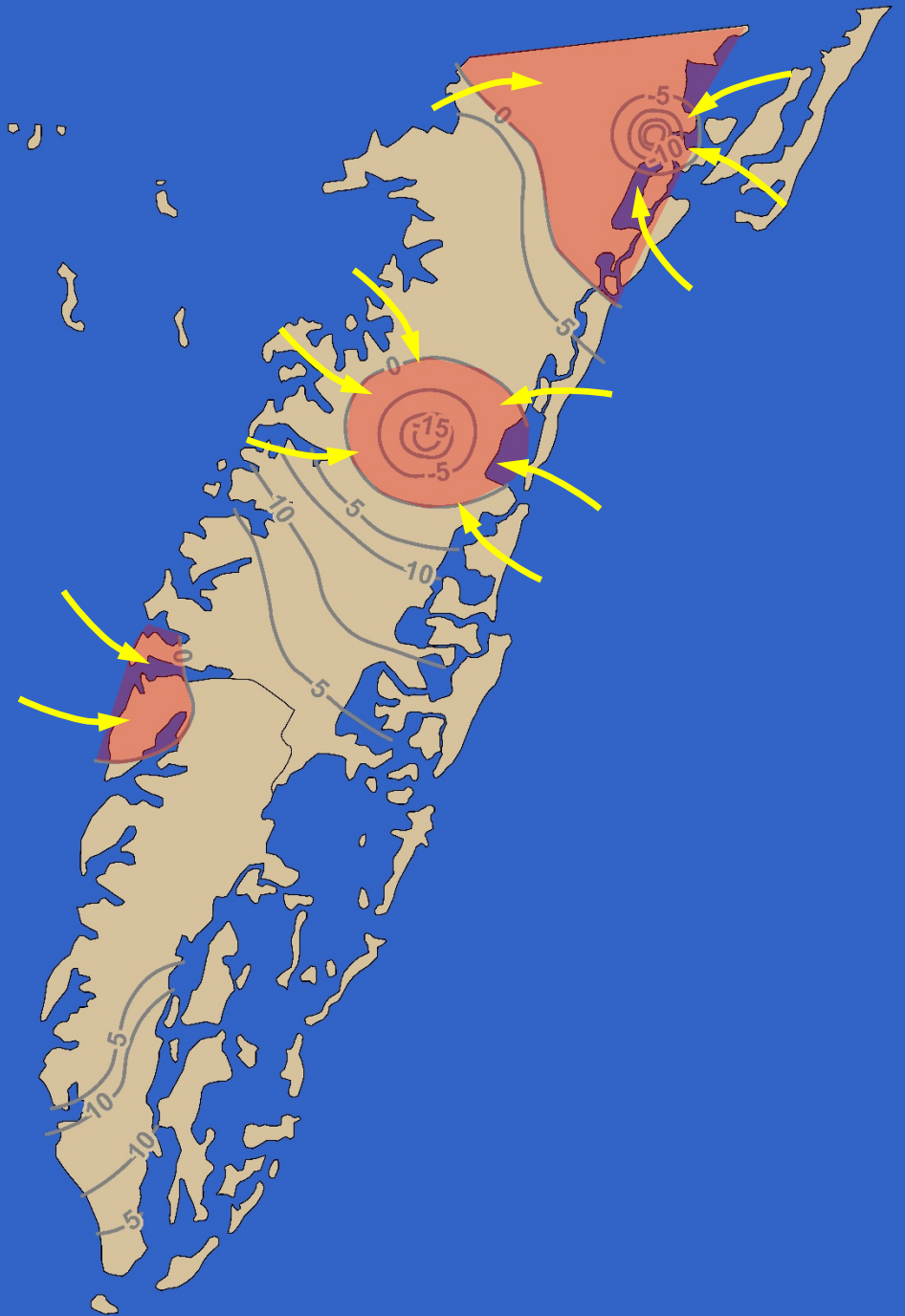


DRAWDOWN BELOW SEA LEVEL



Potential Inland Intrusion

 BELOW SEA LEVEL



Eastern Shore Groundwater 2017 Progress

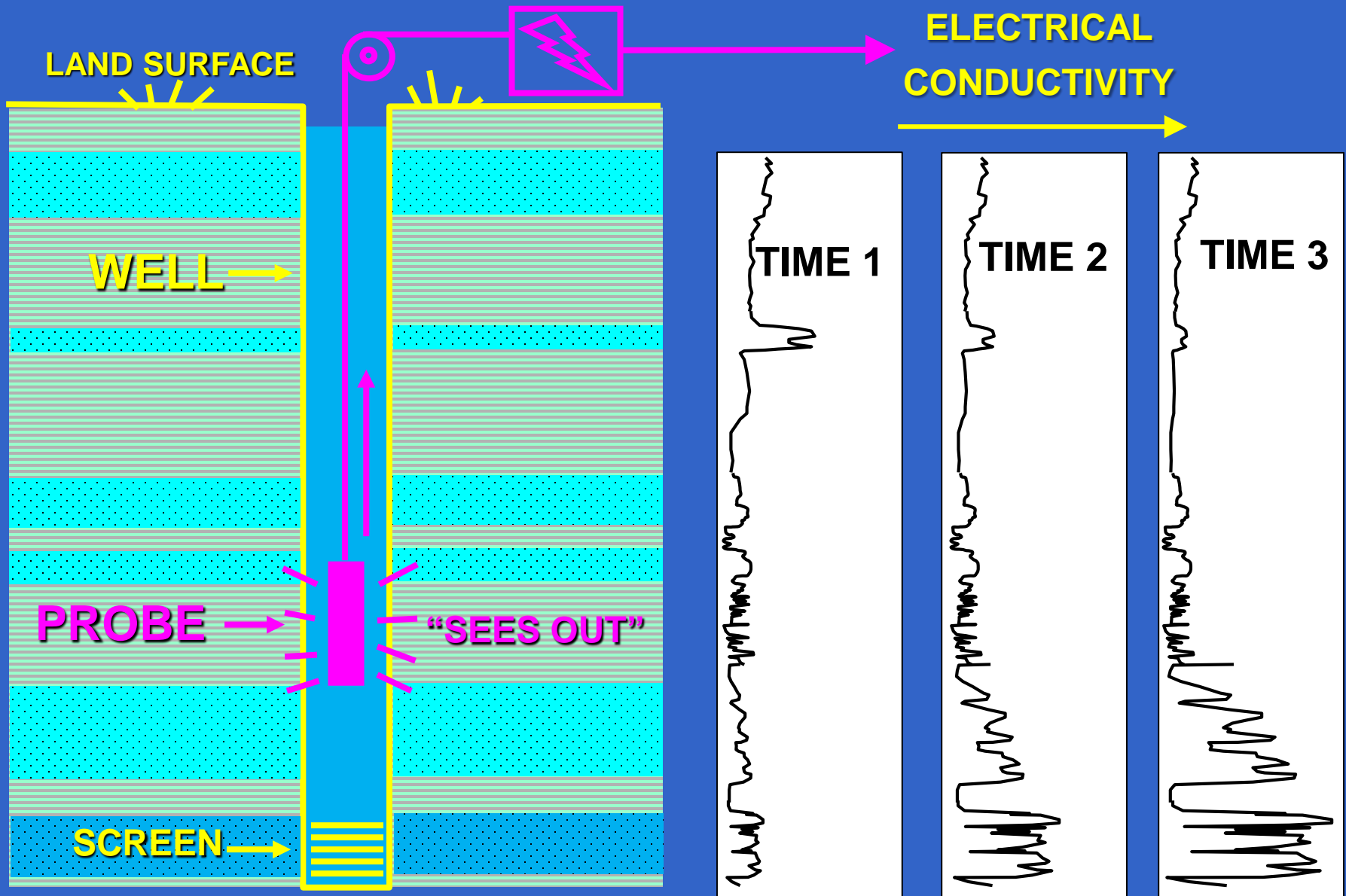
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- **third logging run**
- **log-analysis advances**

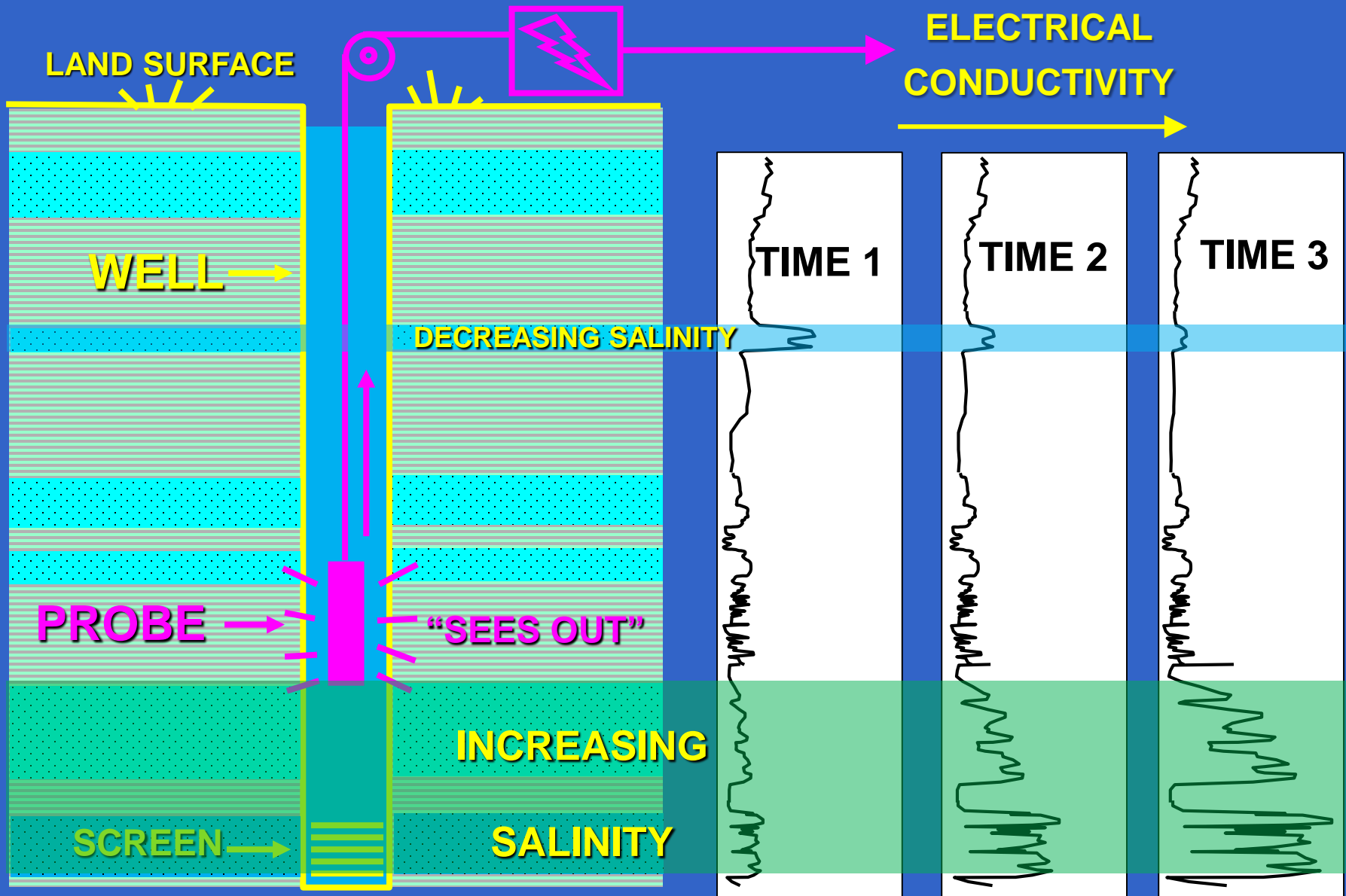
2. DEQ-funded study

- **hydrogeologic framework**
- **paleochannels**
- **salinity**
- **2017-2019**

Well-Log Monitoring

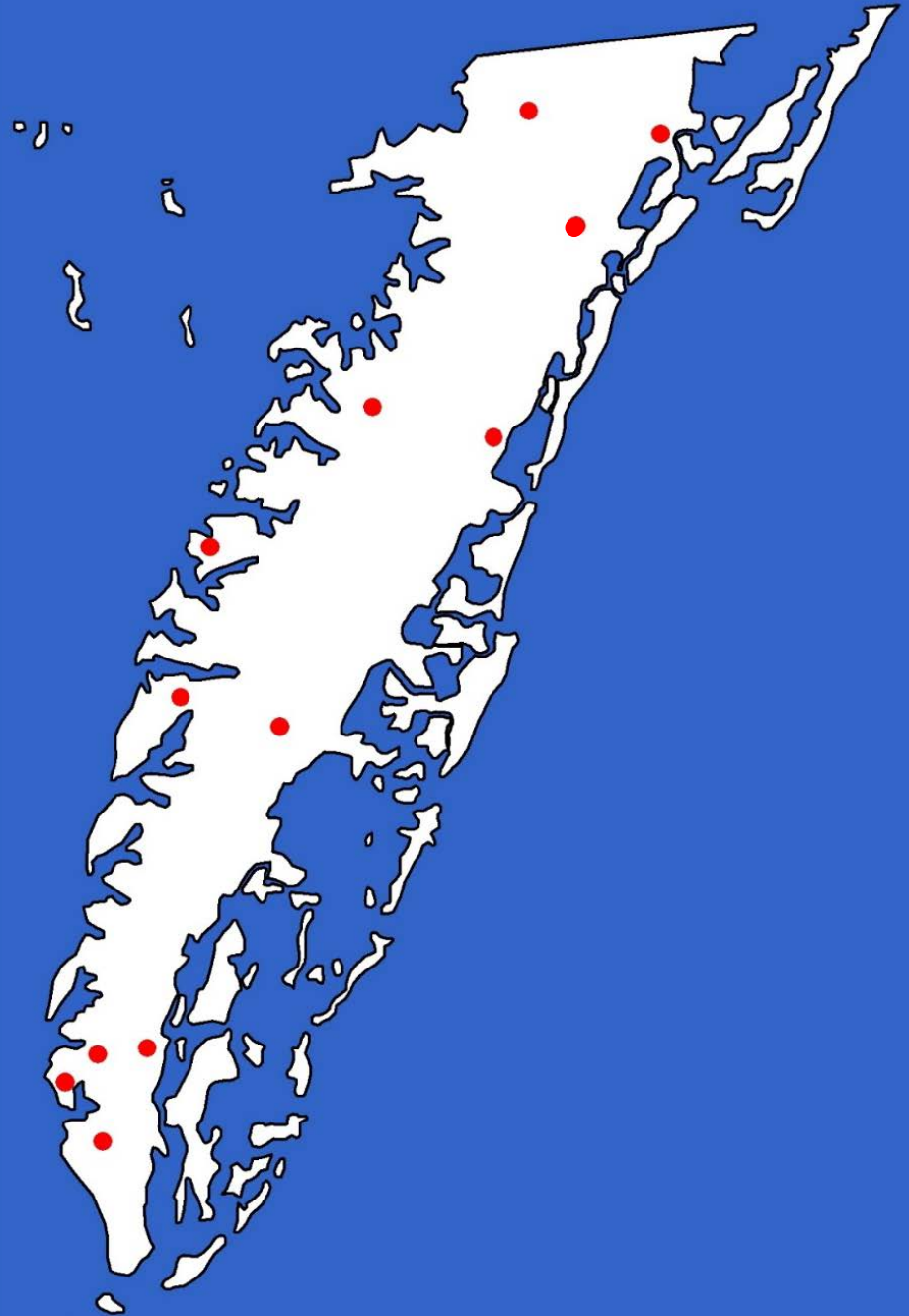


Well-Log Monitoring



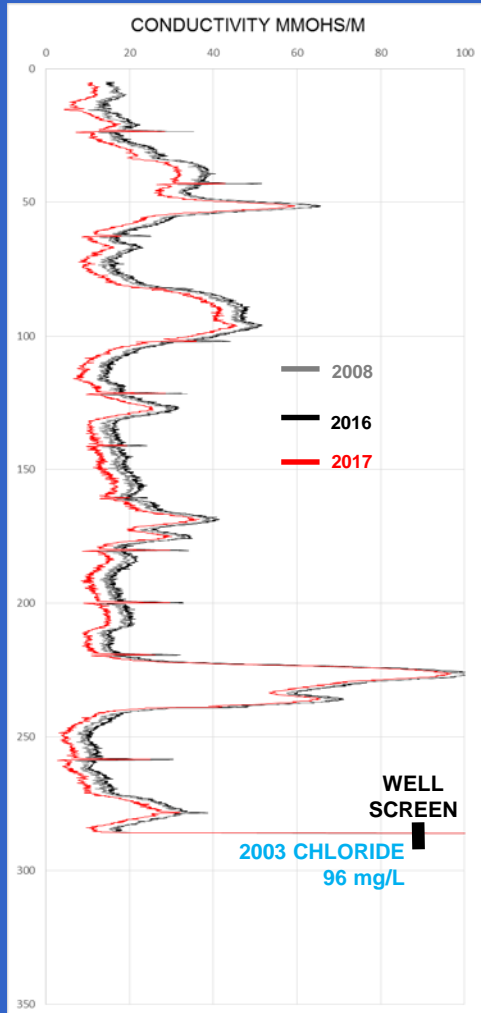
Well-Logging Network

- 12 USGS-DEQ observations wells
- sampled 2003
- logged 2008, 2016, 2017

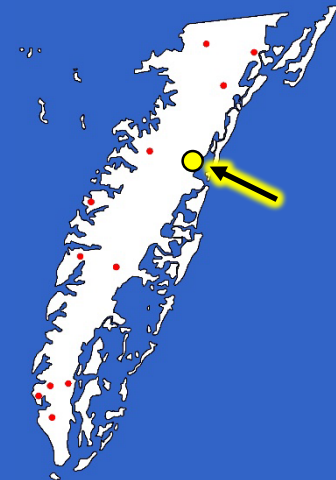
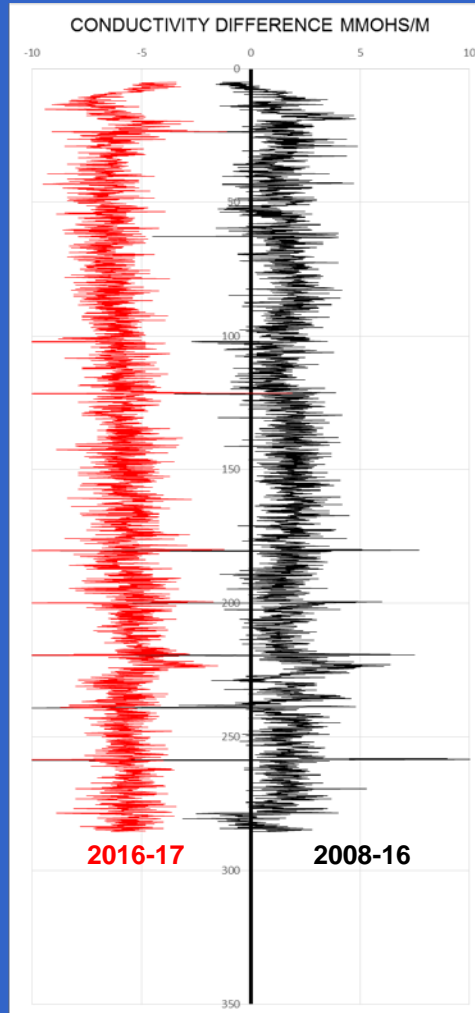


Well 66K 2 Baylys Neck

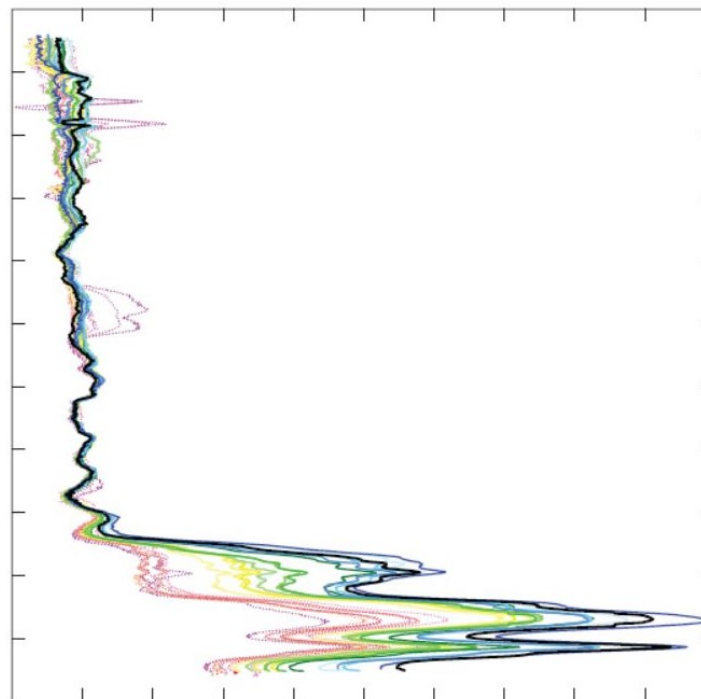
LOG



DIFFERENCE BETWEEN LOGS



**Collection, Processing, and Quality Assurance
of Time-Series Electromagnetic-Induction Log
Datasets, 1995–2016, South Florida**



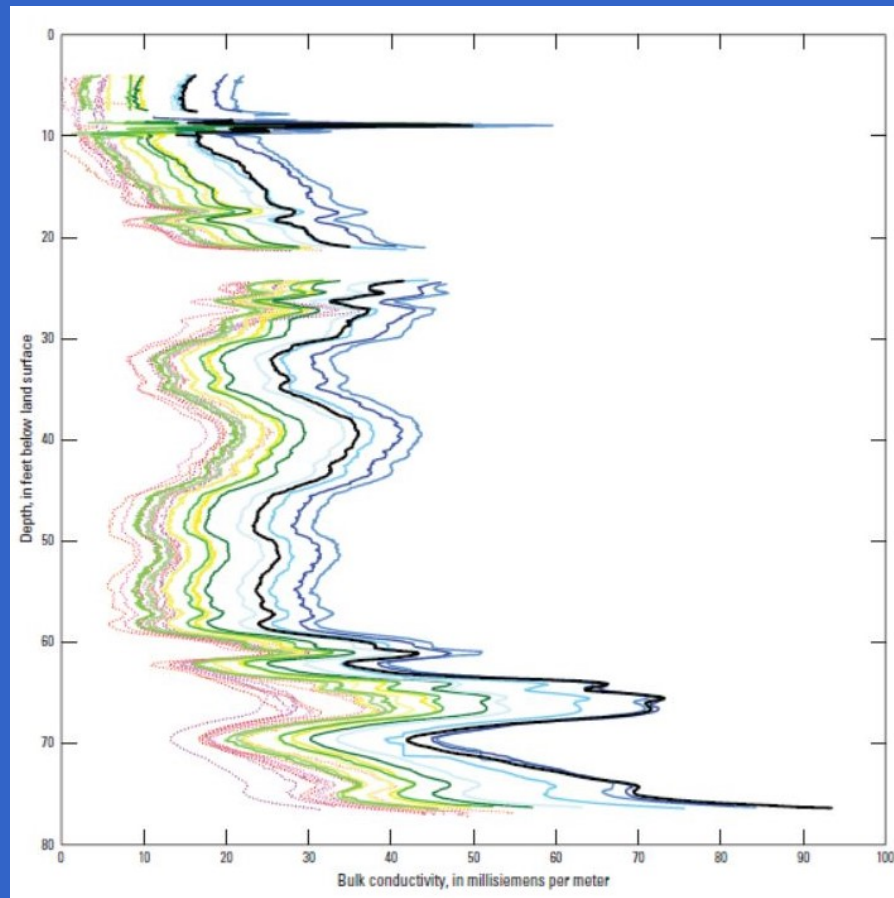
Open-File Report 2016–1194

***Log
Analysis
Advances***

***USGS
Open-File Report
2016-1194***

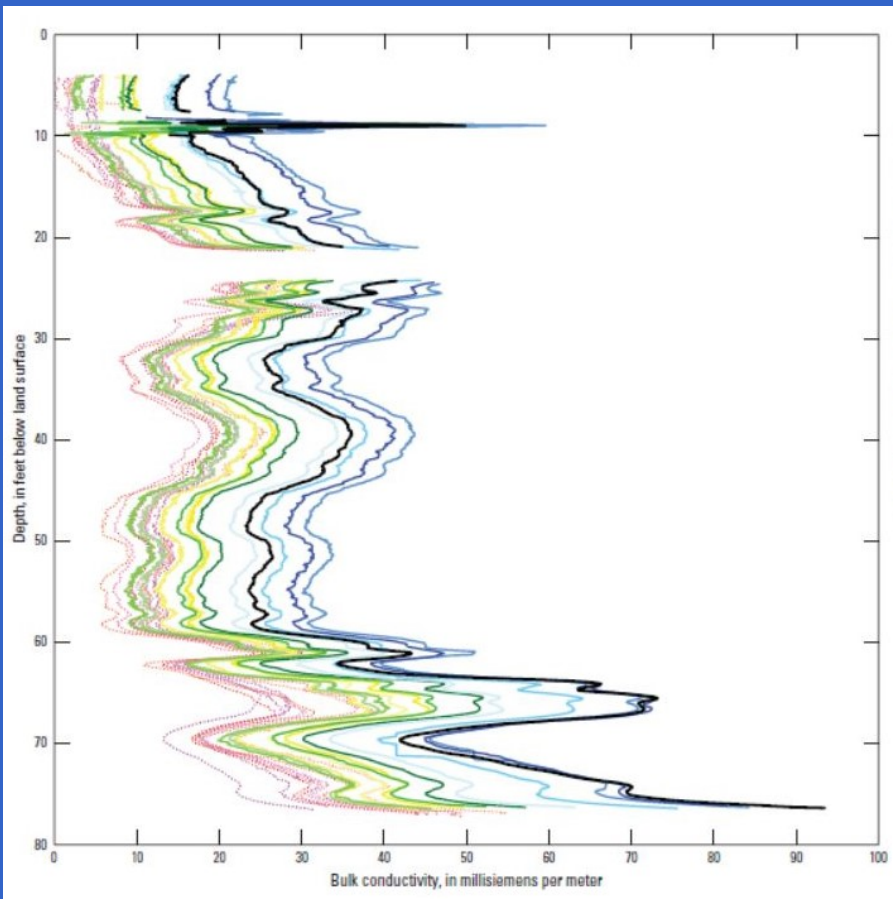
South Florida Well Logging

UNADJUSTED LOGS

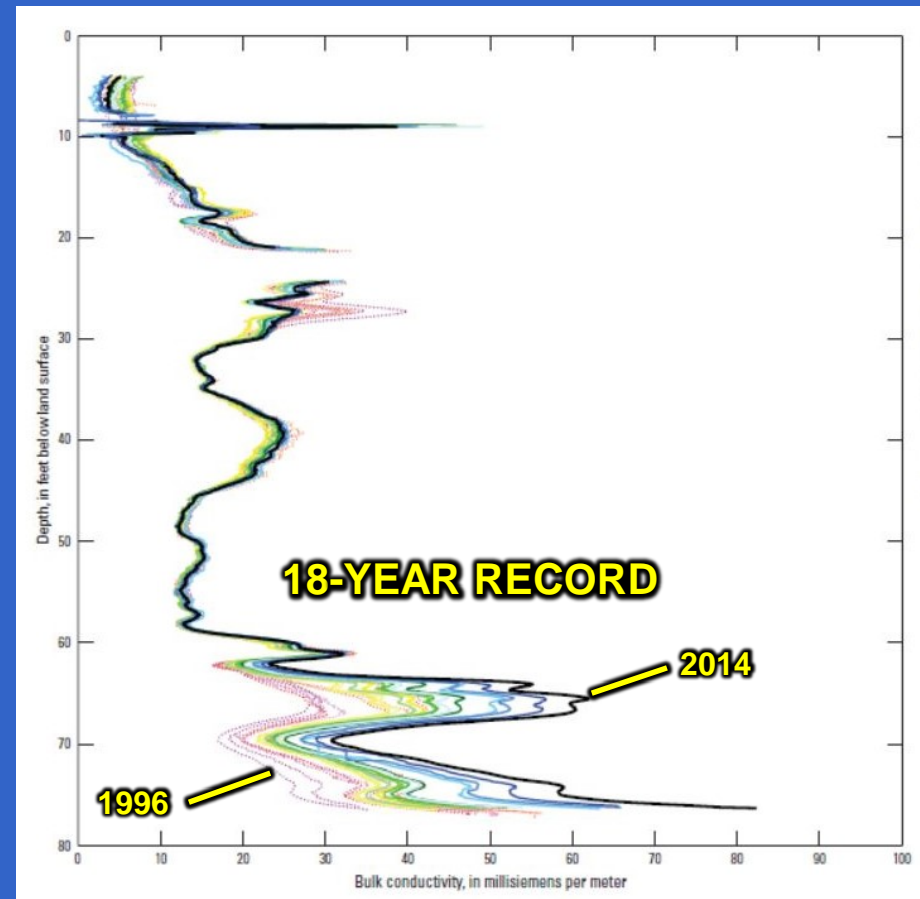


South Florida Well Logging

UNADJUSTED LOGS

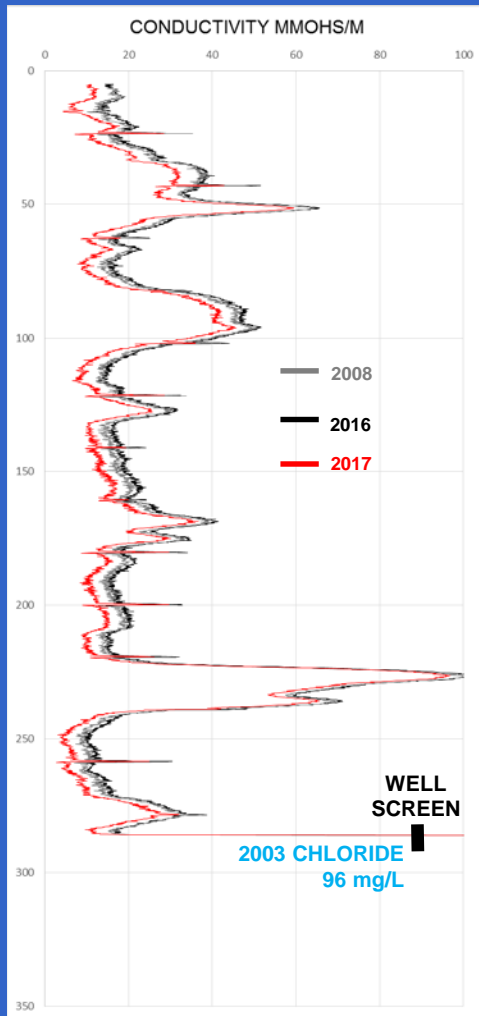


ADJUSTED LOGS

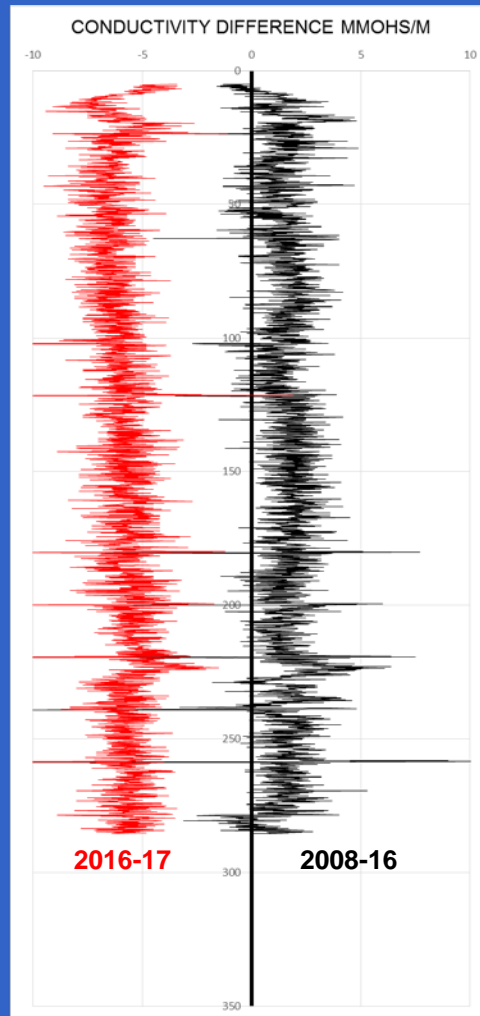


Well 66K 2 Baylys Neck

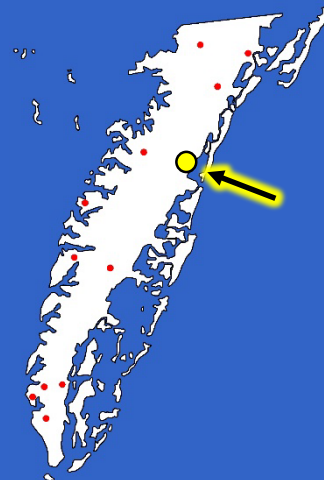
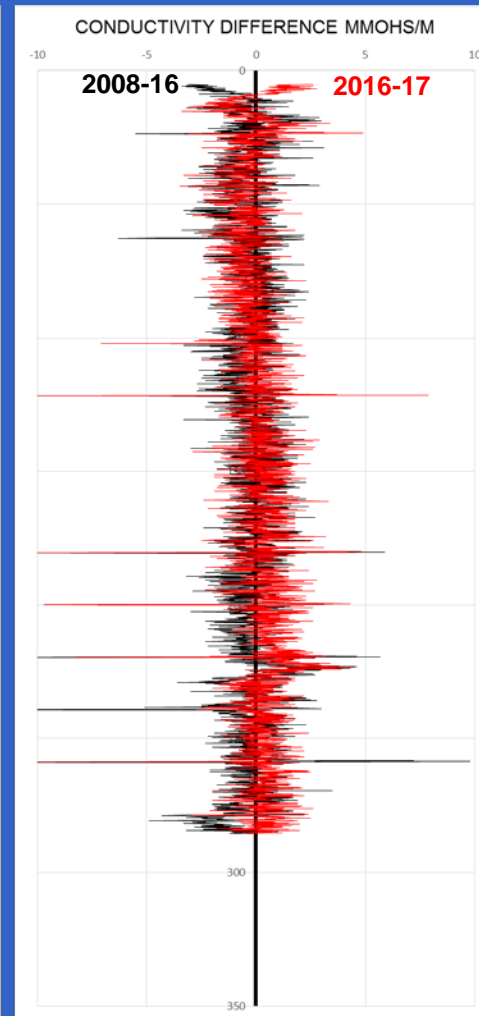
LOG



DIFFERENCE BETWEEN LOGS

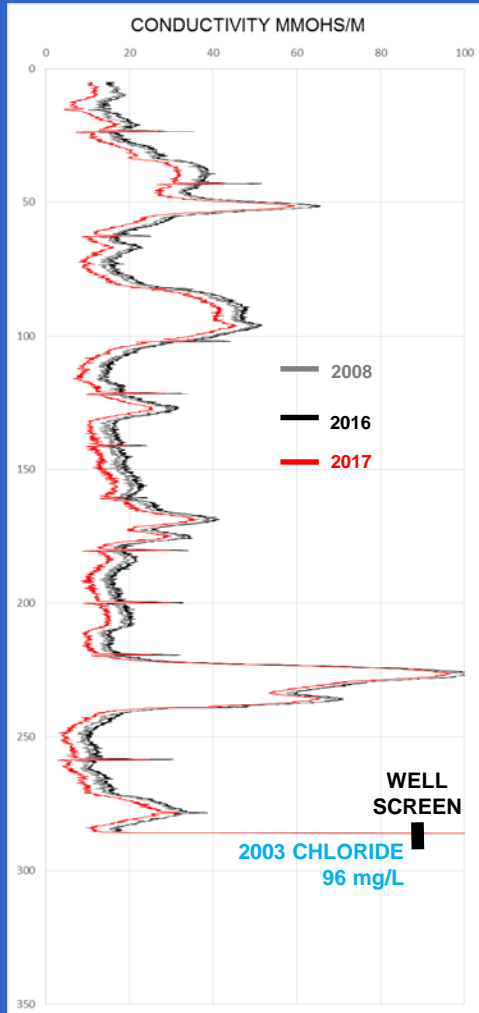


ADJUSTED DIFFERENCE

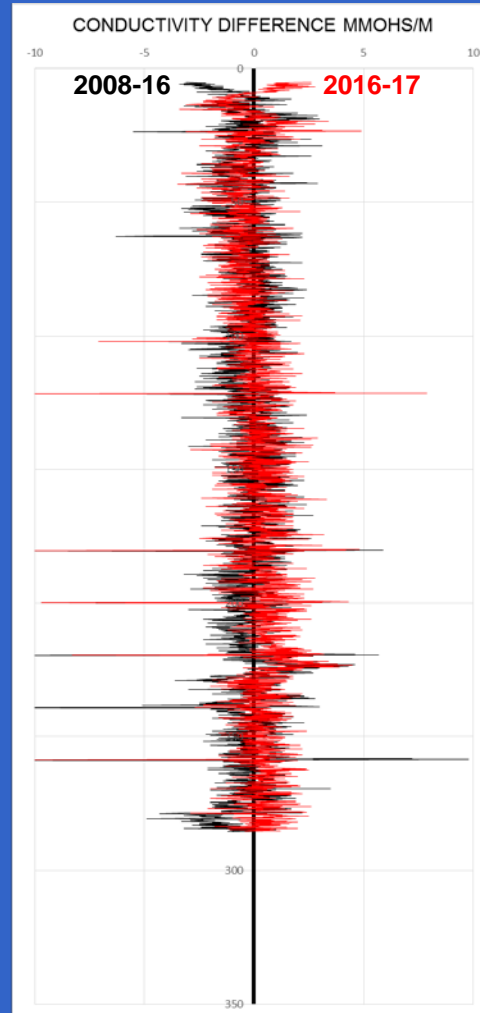


Well 66K 2 Baylys Neck

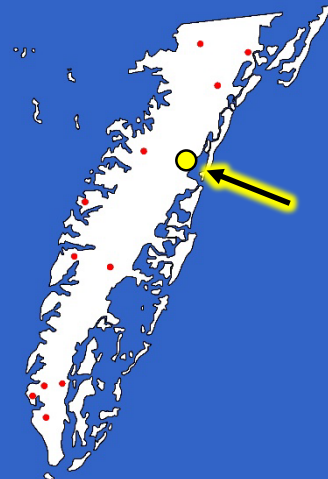
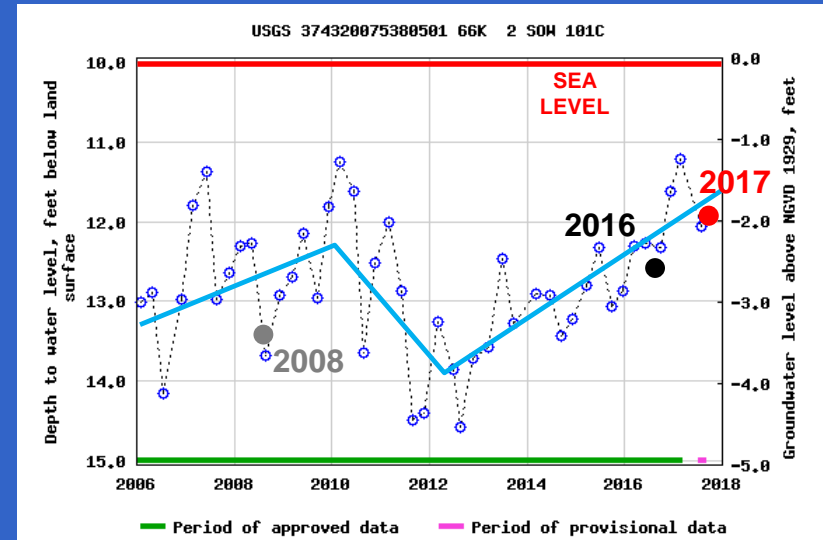
LOG



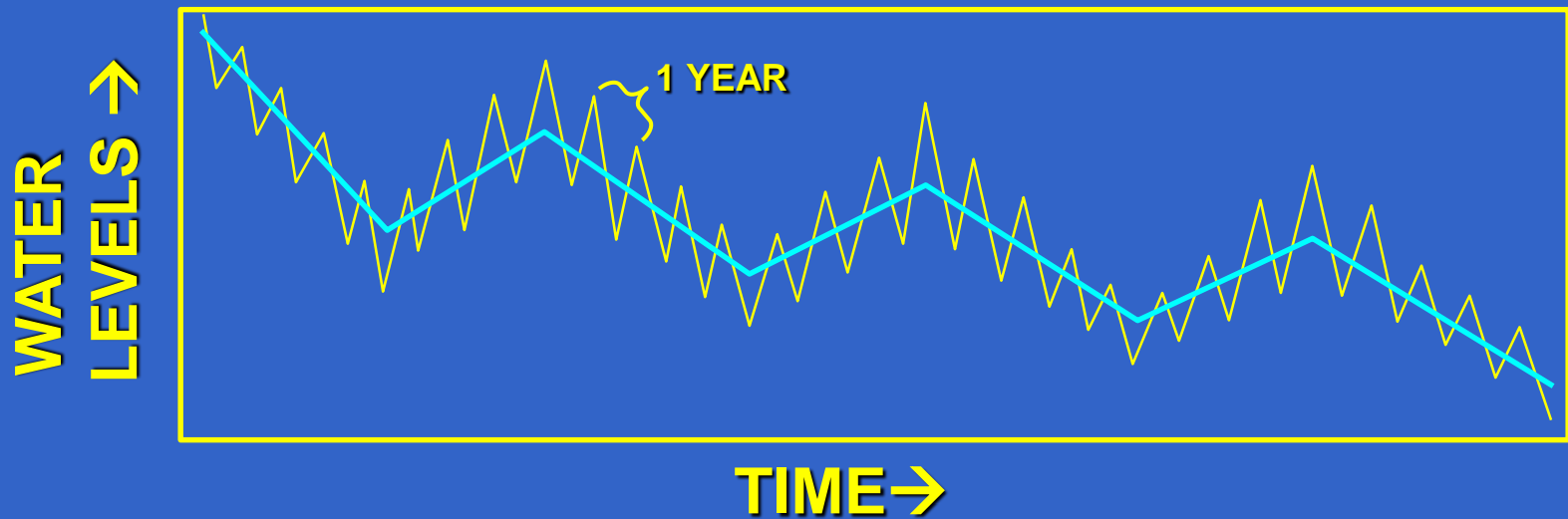
DIFFERENCE BETWEEN LOGS



WATER LEVELS

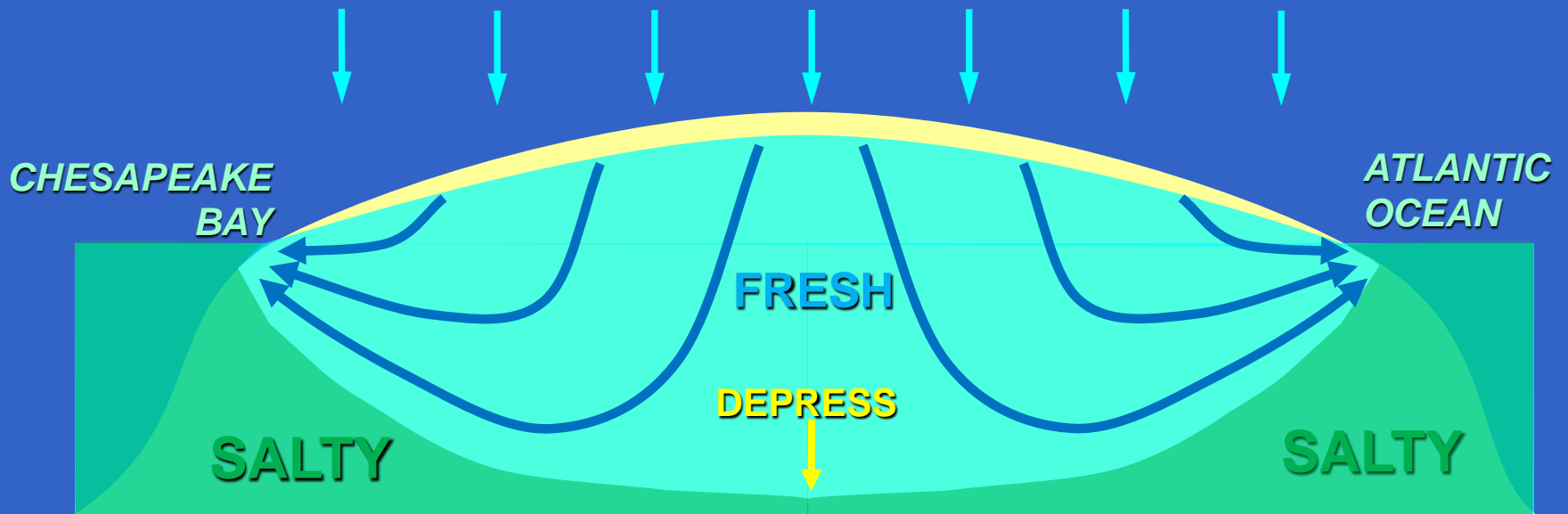


Water Levels

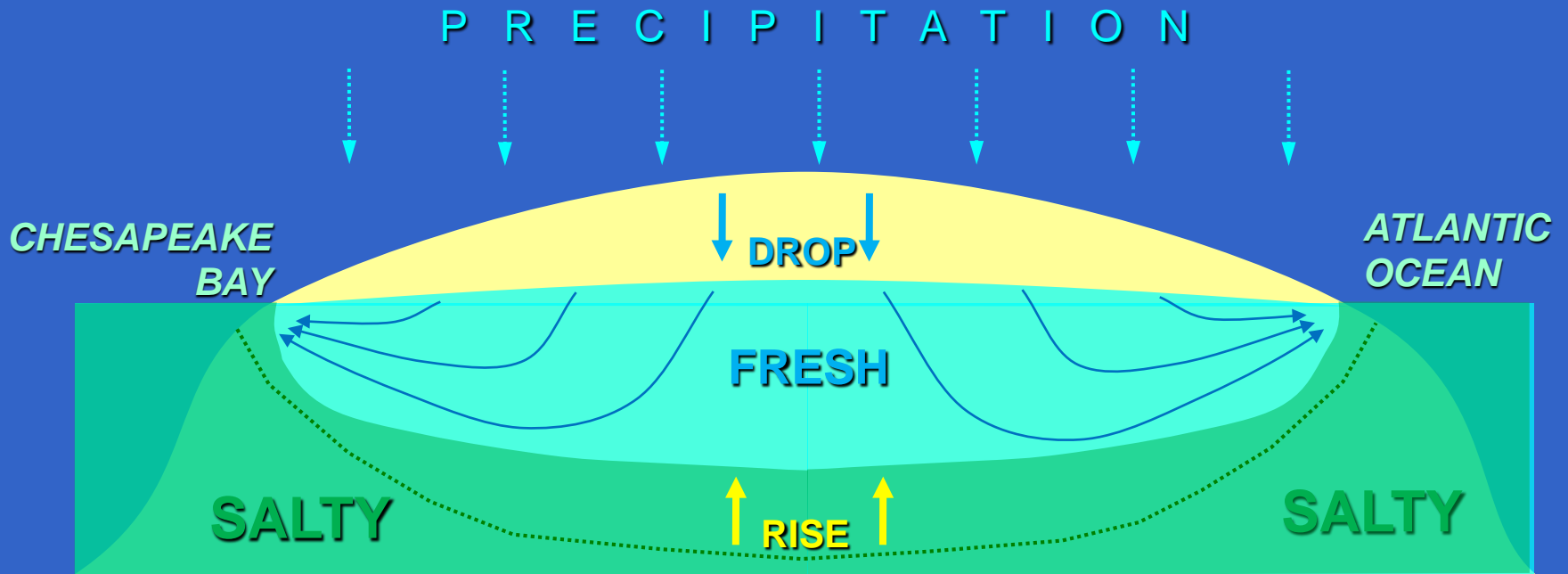


High Recharge or Low Withdrawal

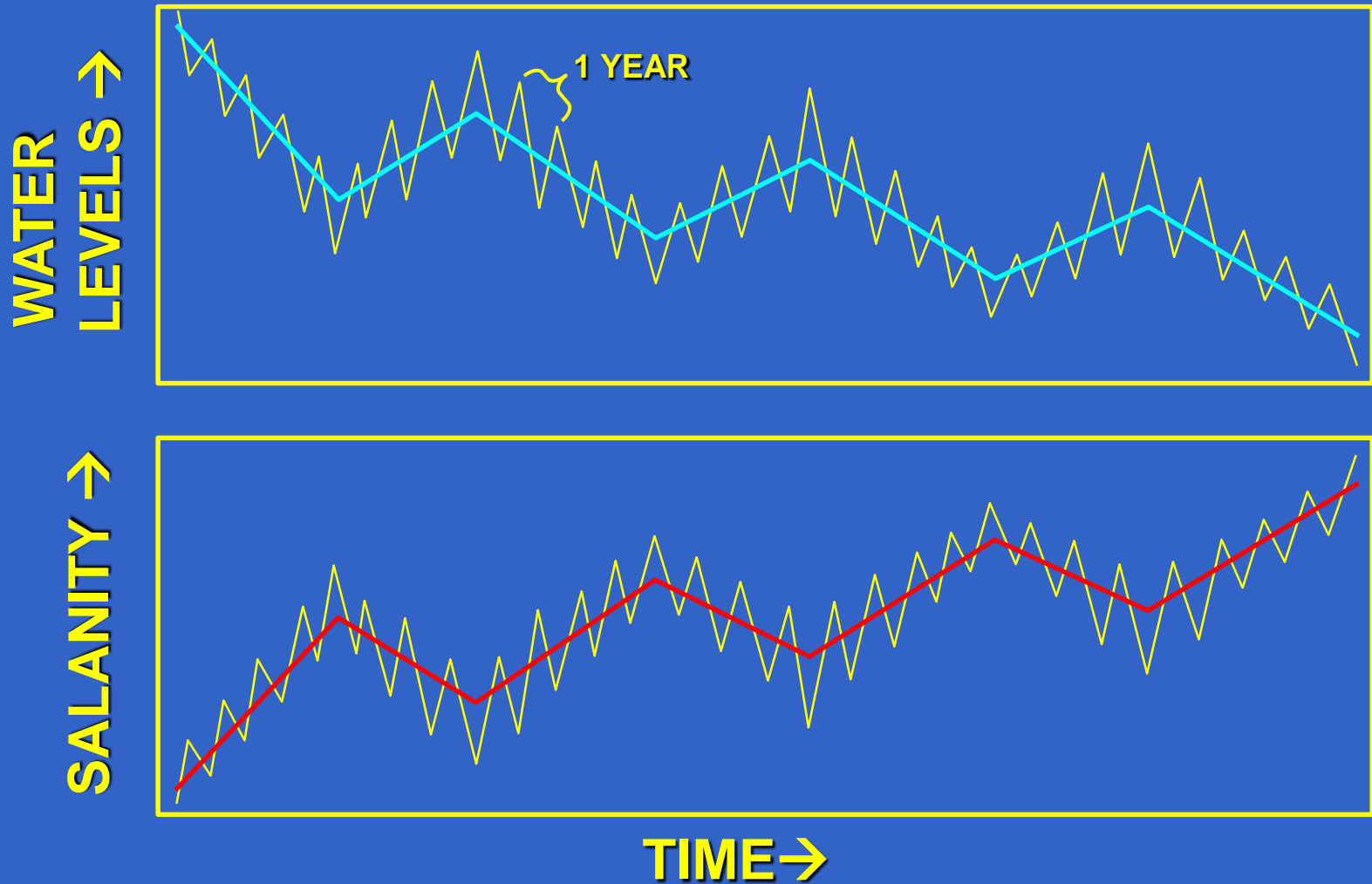
P R E C I P I T A T I O N



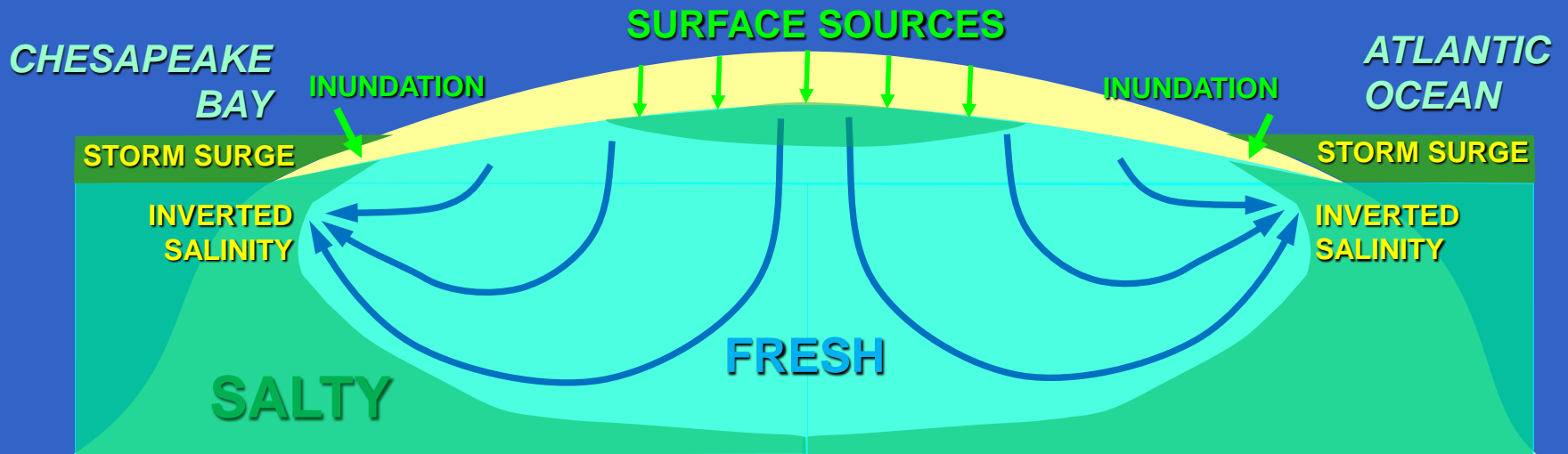
Low Recharge or High Withdrawal



Water Levels and Salinity



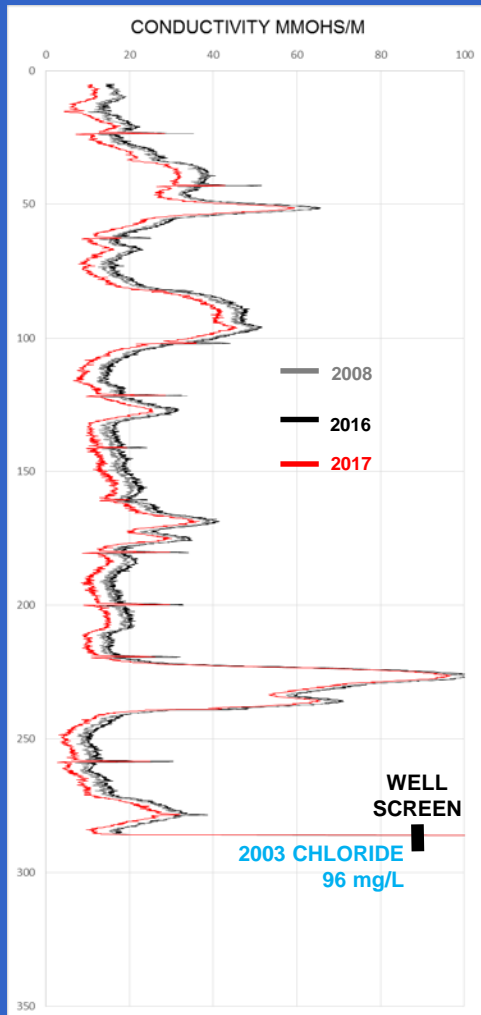
Shallow Effects



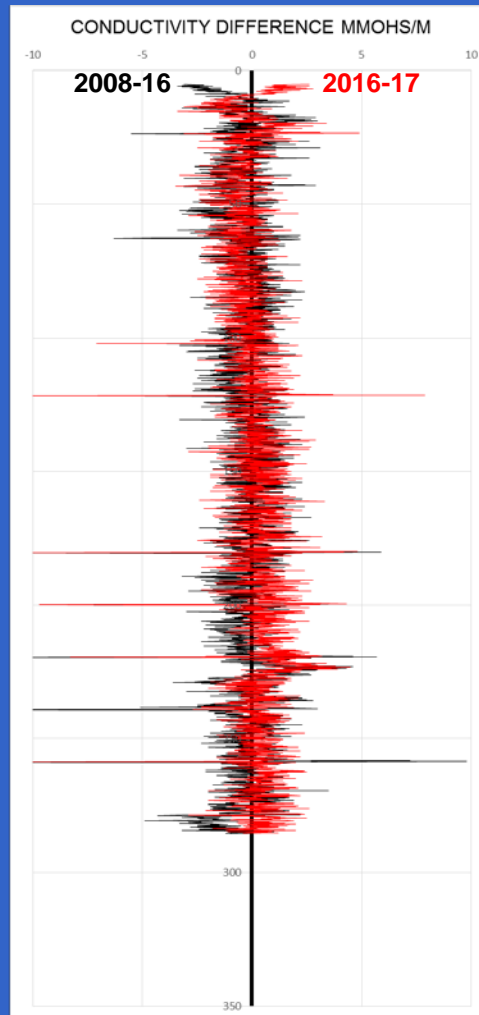
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Well 66K 2 Baylys Neck

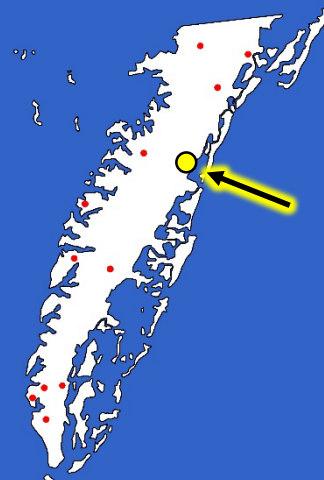
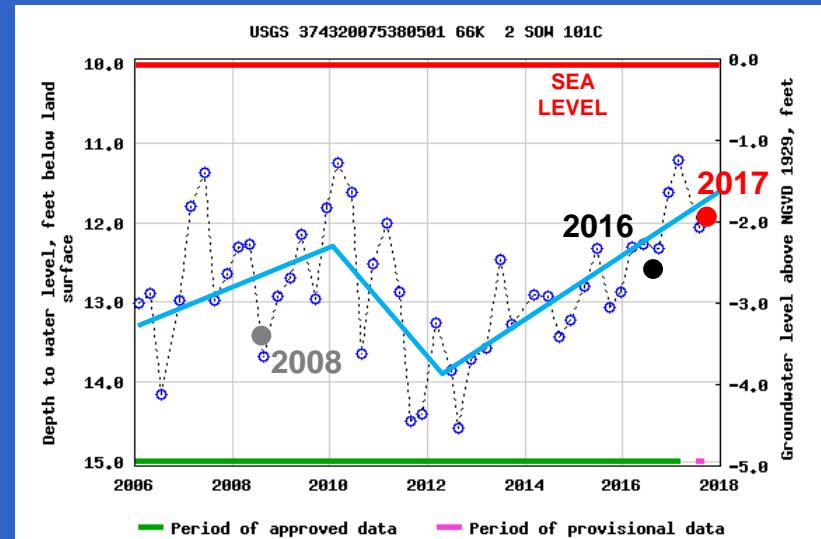
LOG



DIFFERENCE BETWEEN LOGS

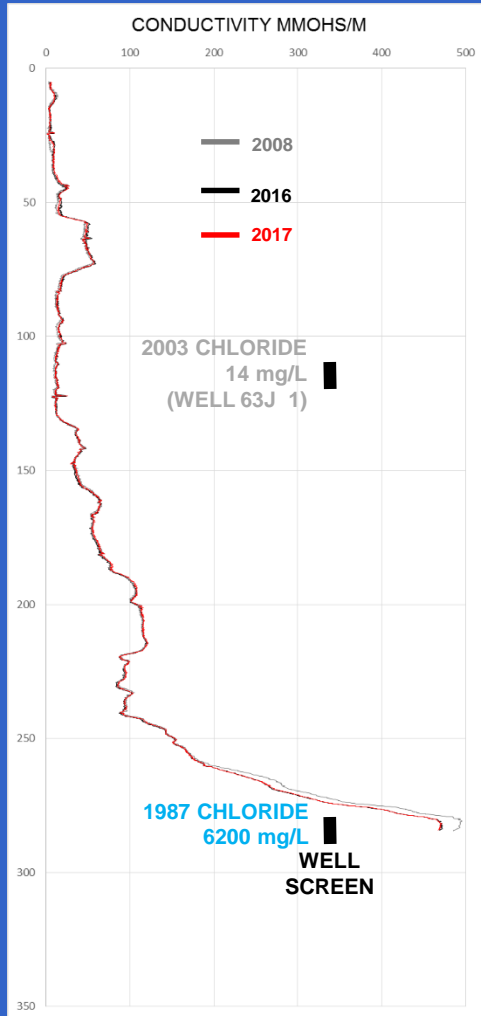


WATER LEVELS

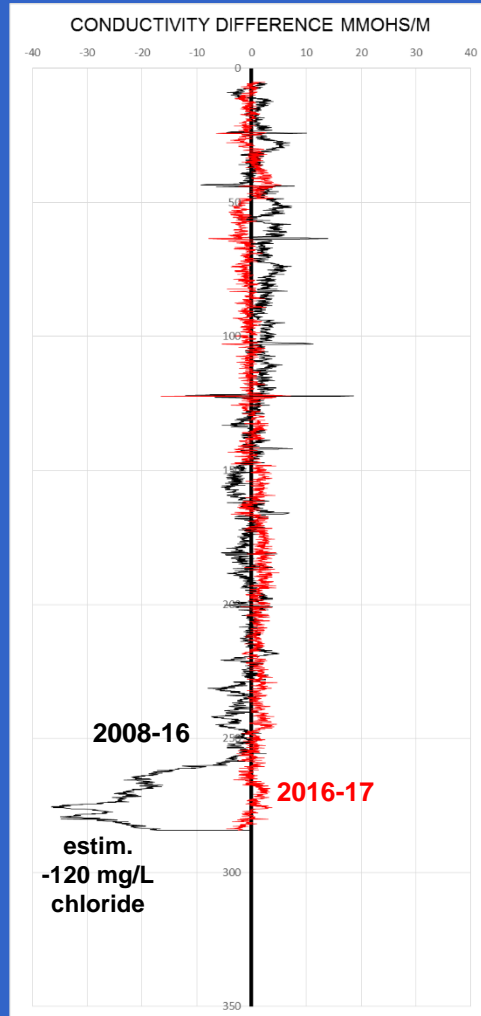


Well 63J 3 Concord Wharf

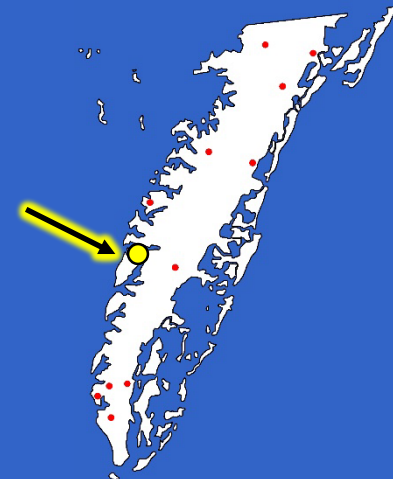
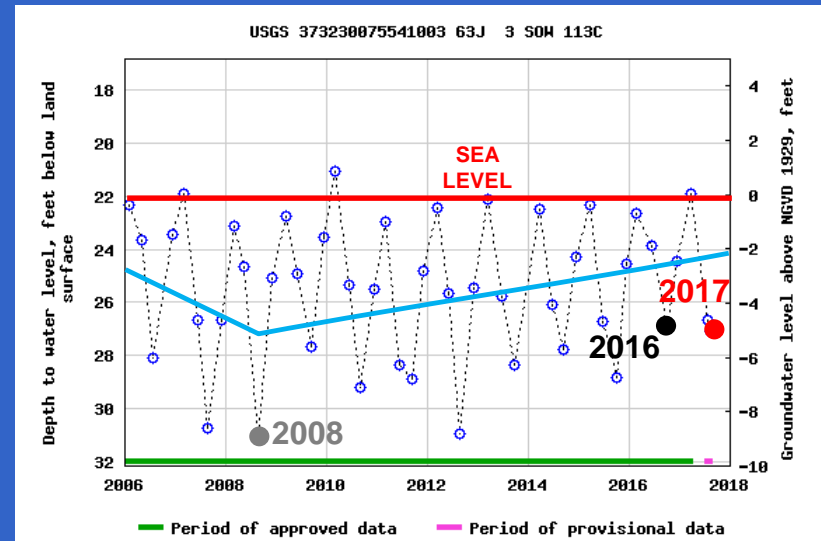
LOG



DIFFERENCE BETWEEN LOGS

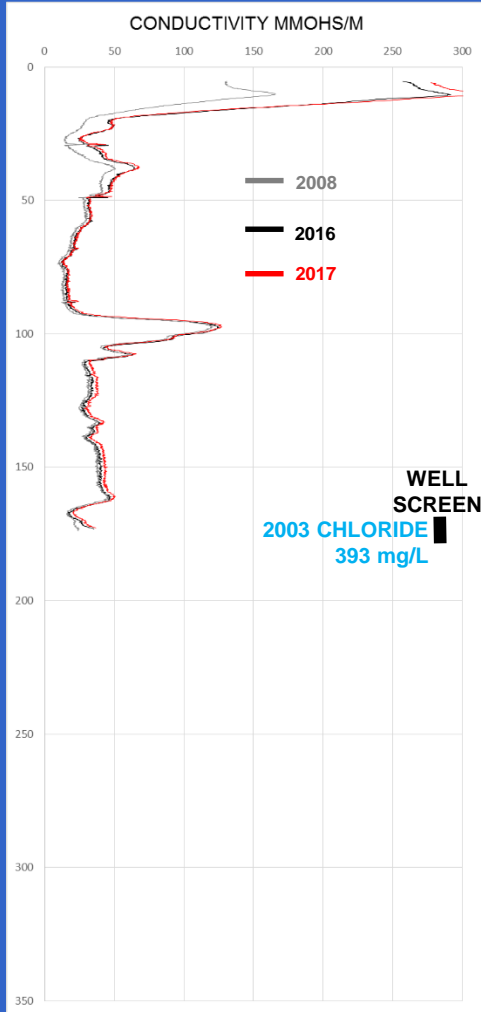


WATER LEVELS

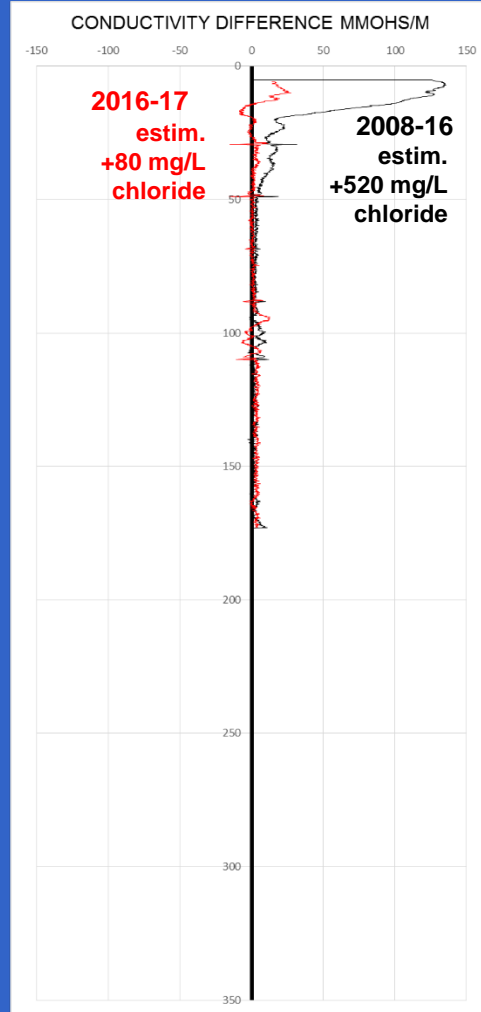


Well 64K 7 Hacks Neck

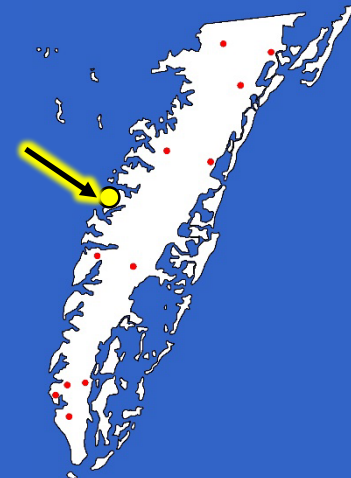
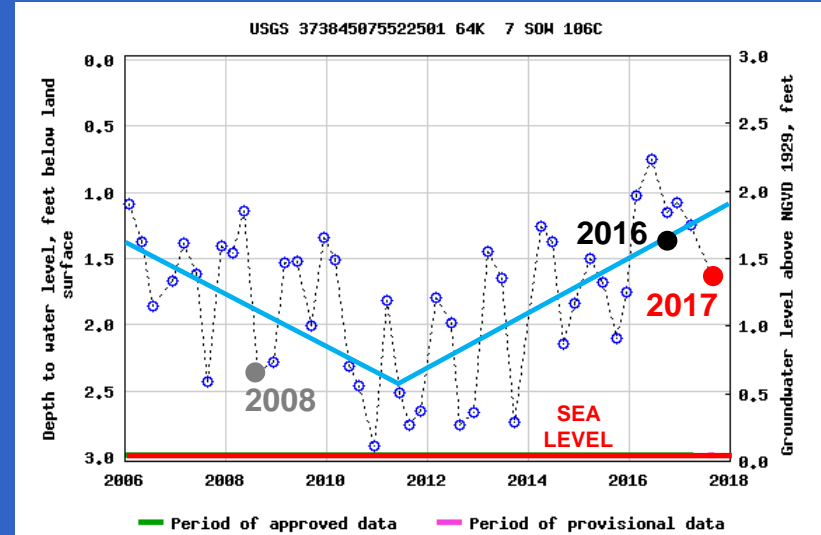
LOG



DIFFERENCE BETWEEN LOGS

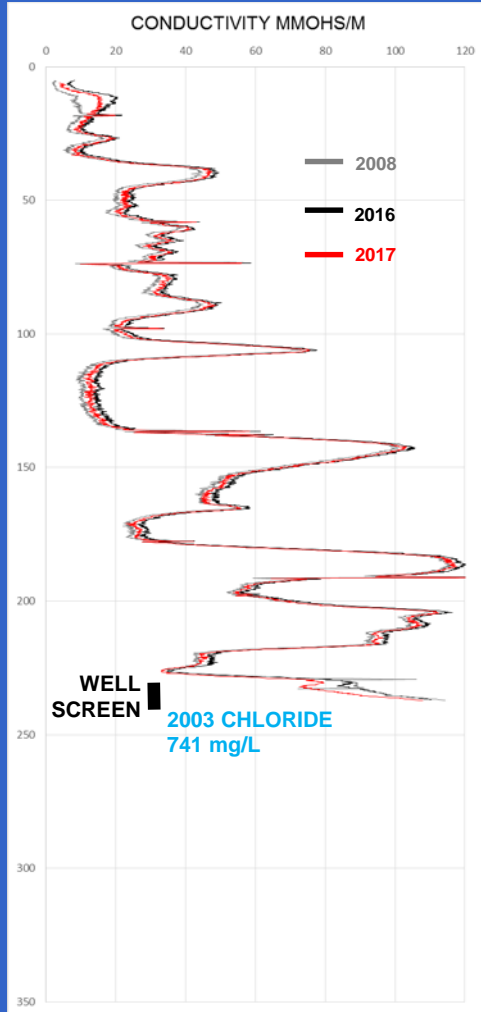


WATER LEVELS

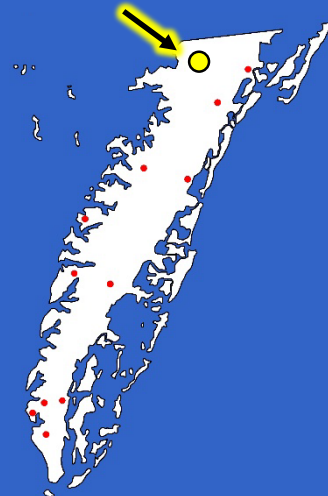
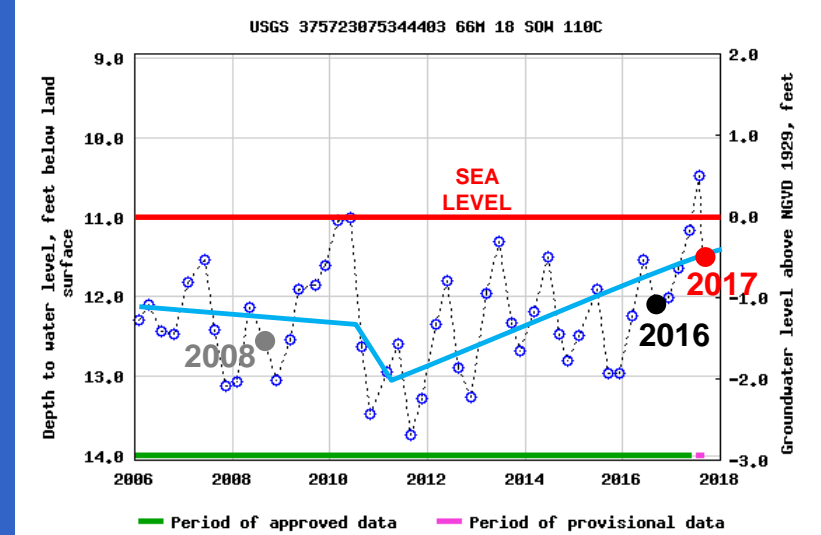
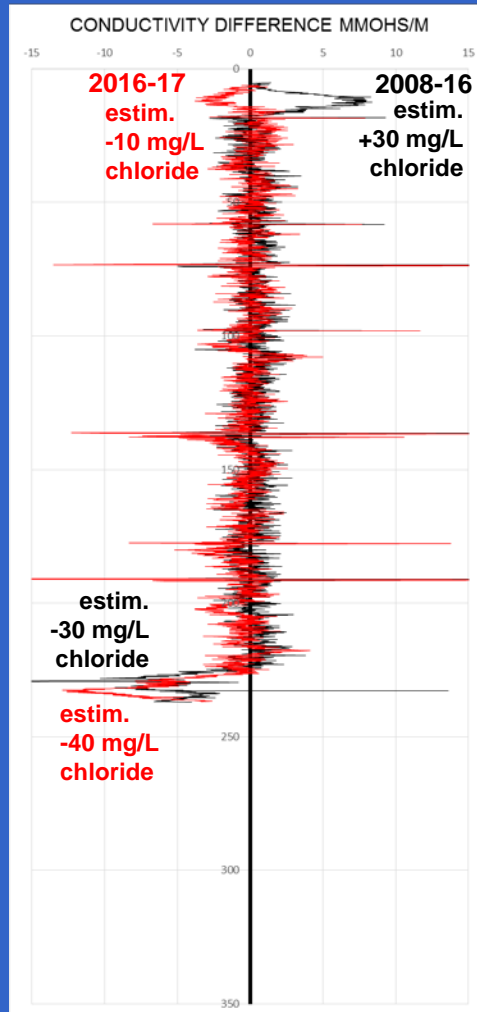


Well 66M 18 Withams

LOG



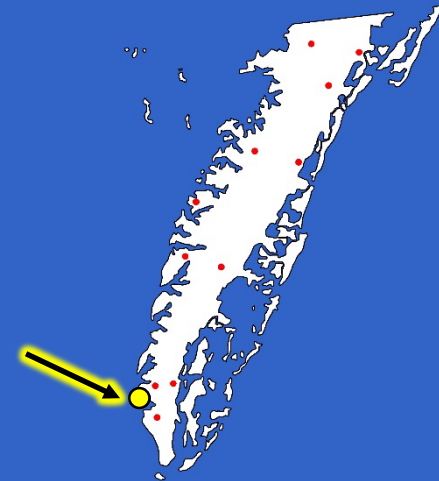
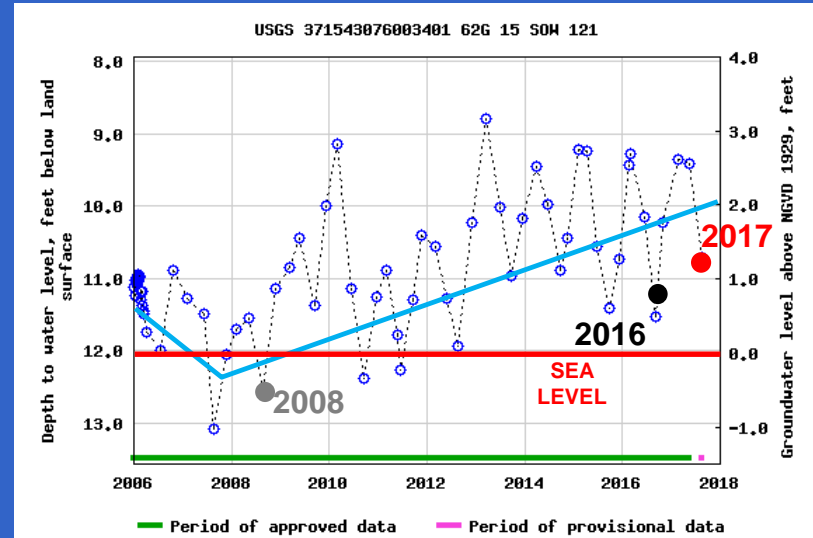
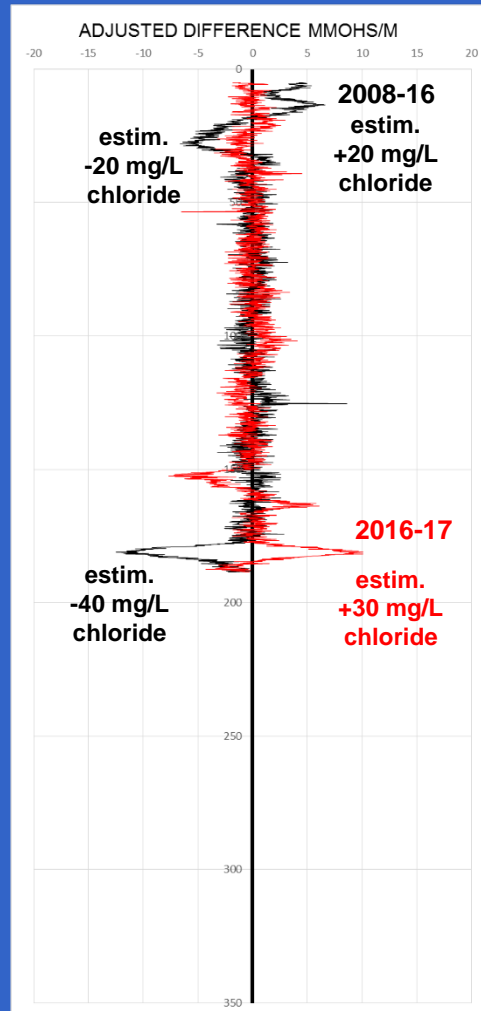
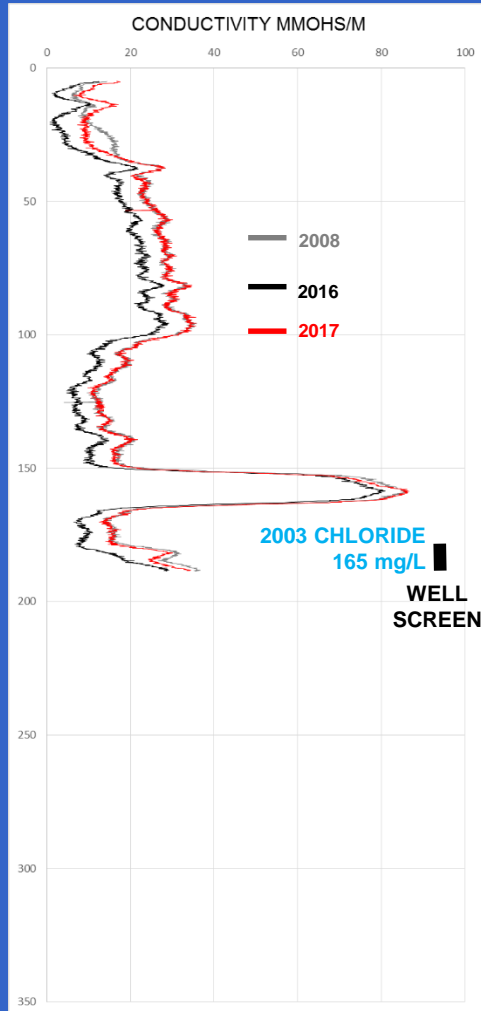
DIFFERENCE BETWEEN LOGS



Well 62G 15 Bay Creek Resort

LOG

DIFFERENCE BETWEEN LOGS

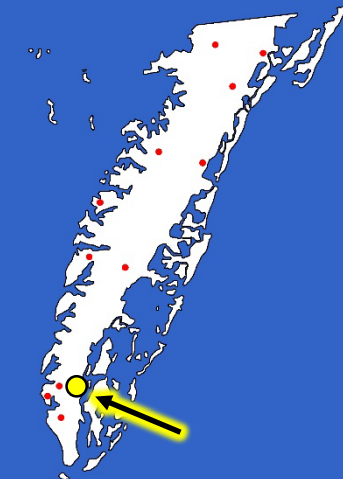
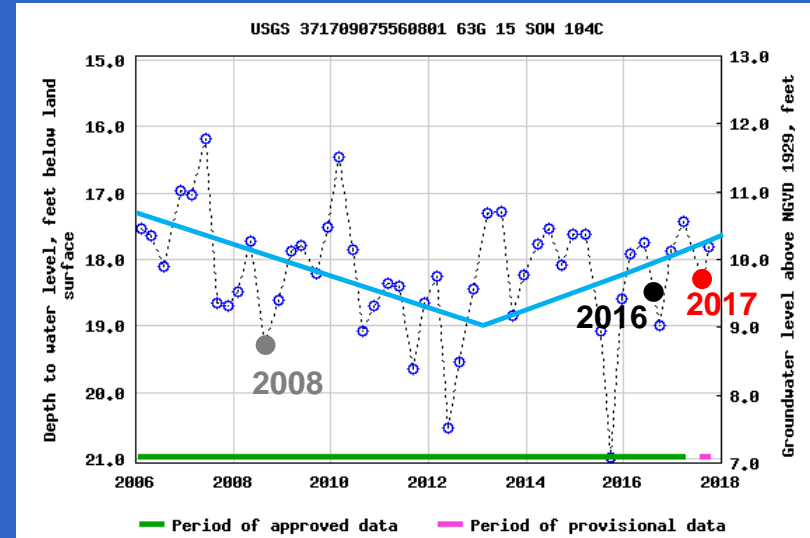
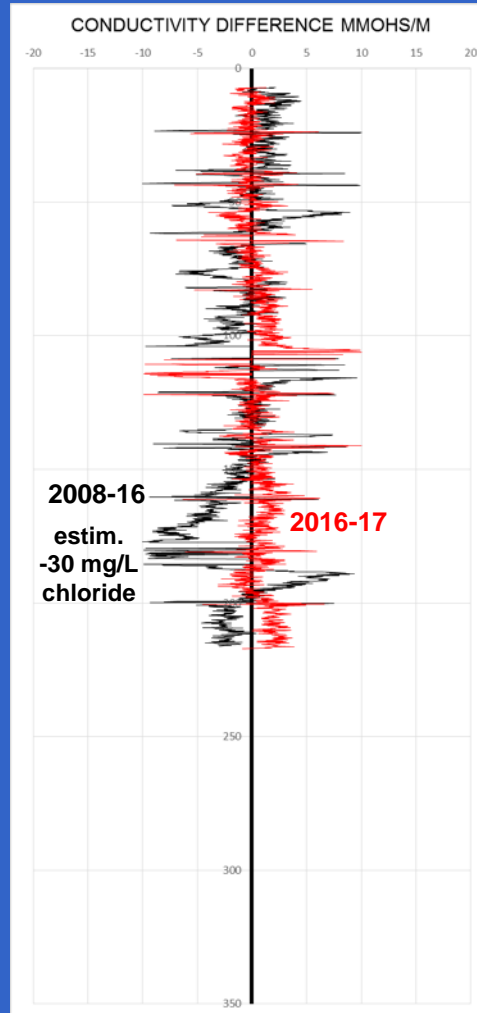
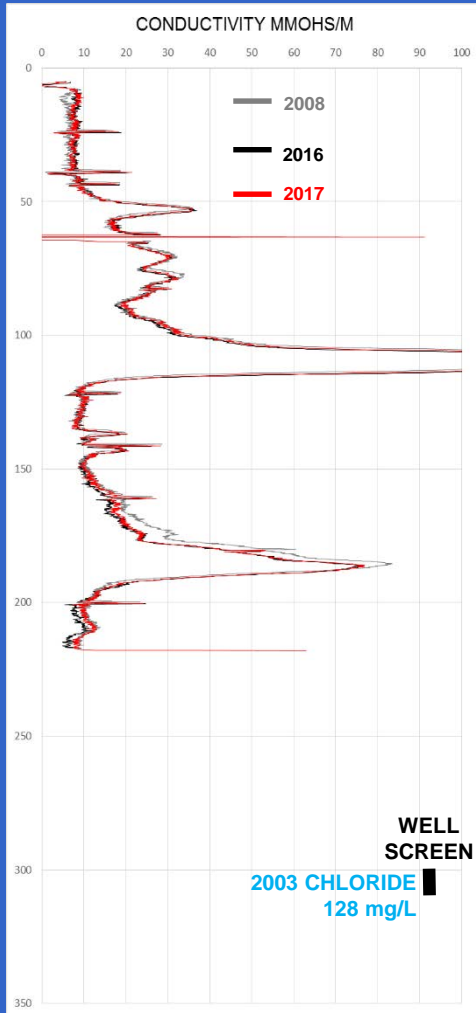


Well 63G 15 Oyster

LOG

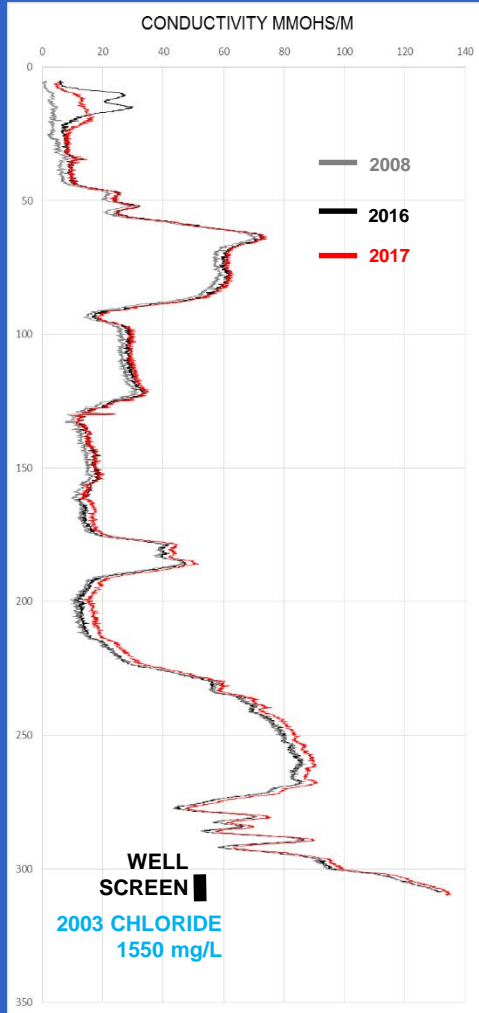
DIFFERENCE BETWEEN LOGS

WATER LEVELS

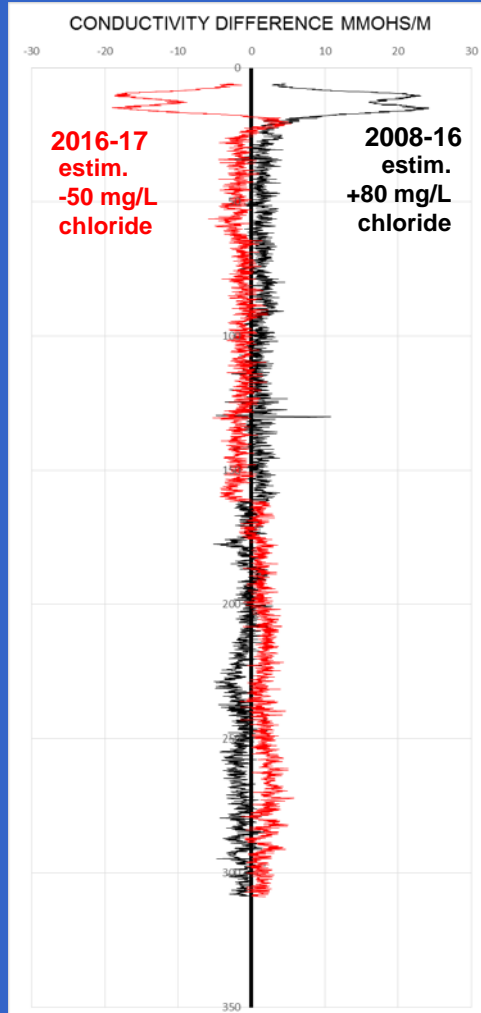


Well 64J 11 Willis Wharf

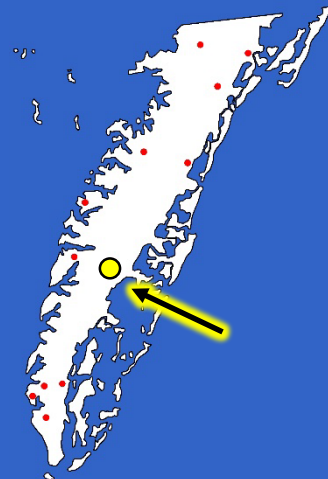
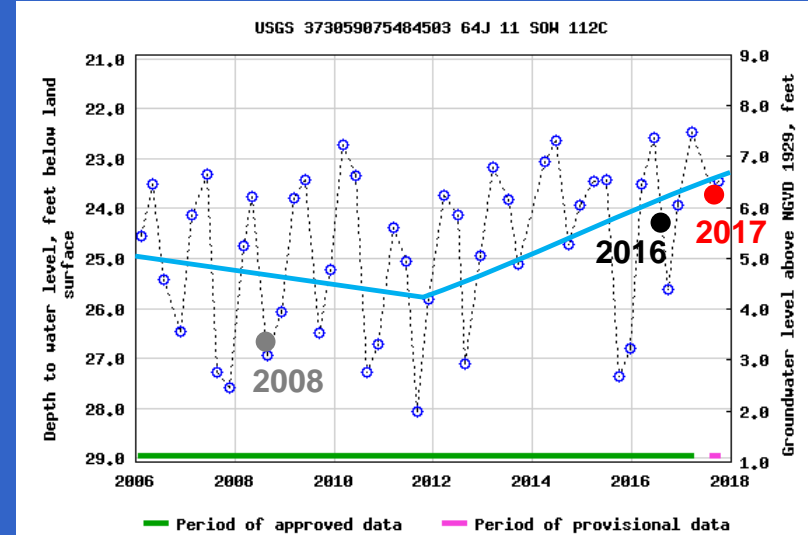
LOG



DIFFERENCE BETWEEN LOGS

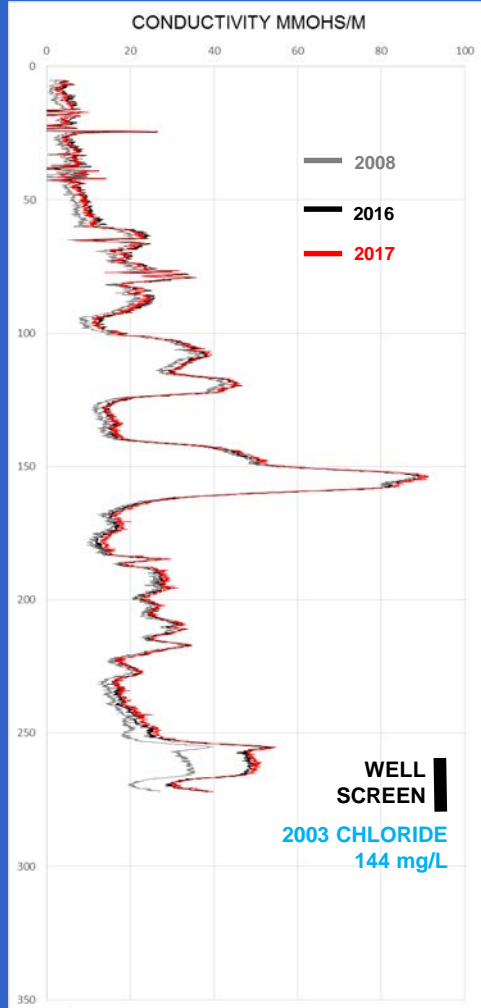


WATER LEVELS

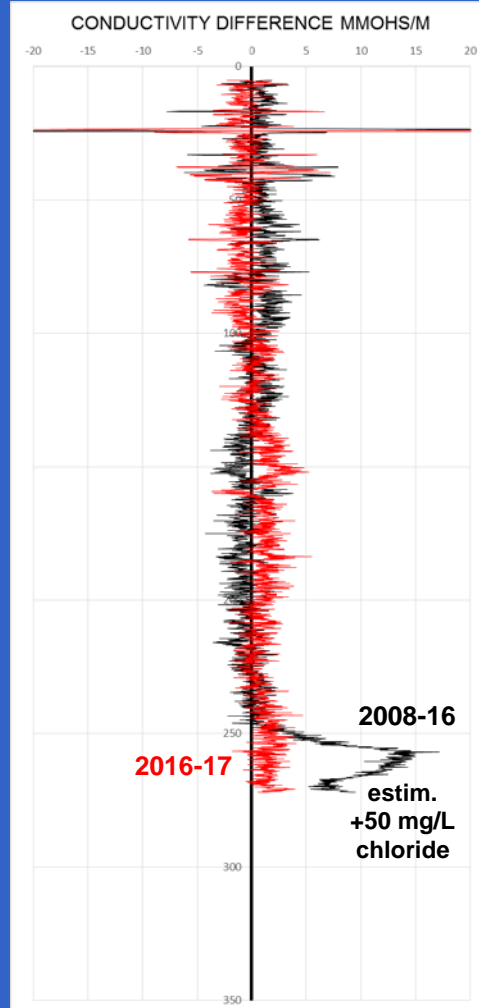


Well 67M 14 NASA WFF

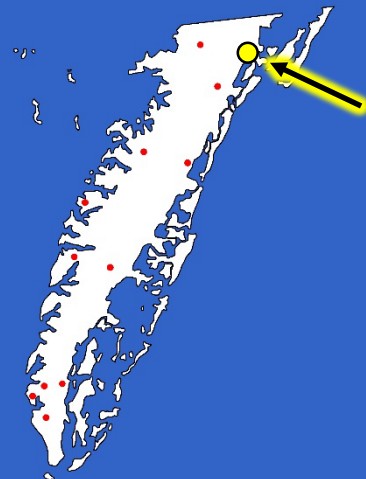
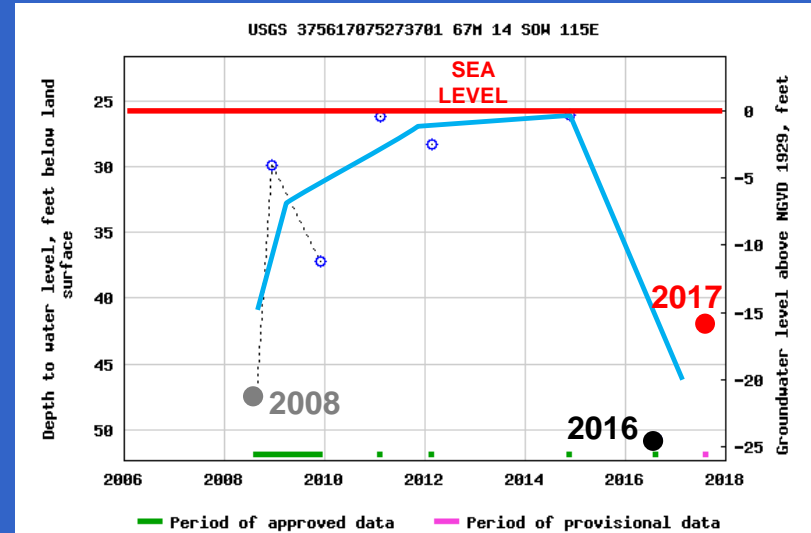
LOG



DIFFERENCE BETWEEN LOGS

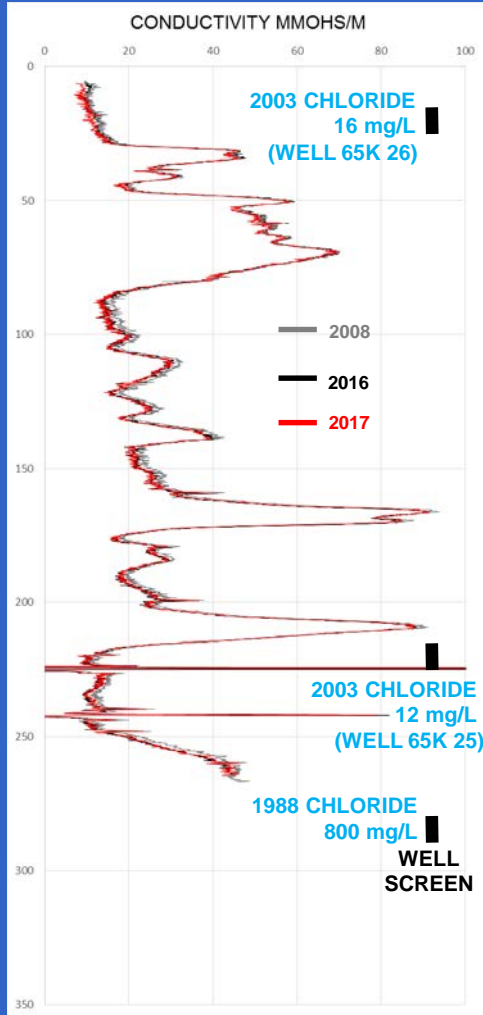


WATER LEVELS

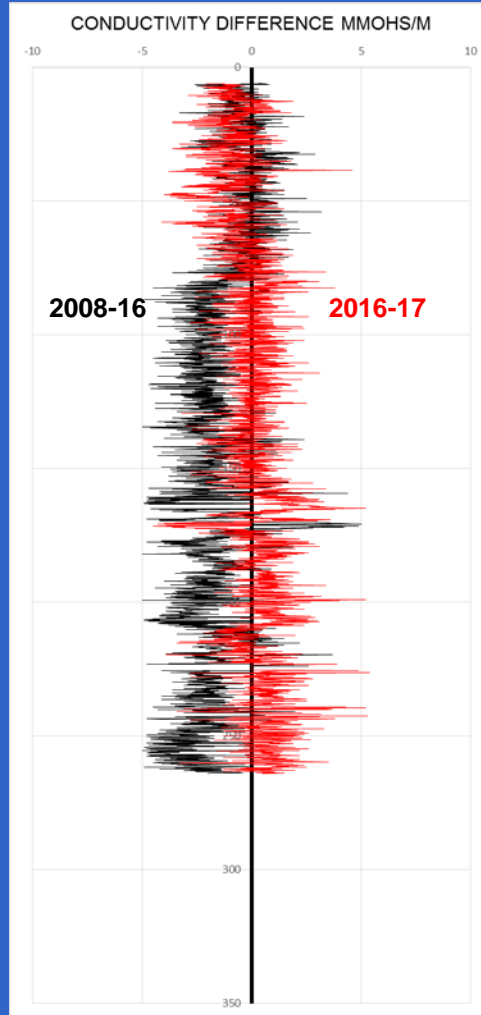


Well 65K 23 Bayside

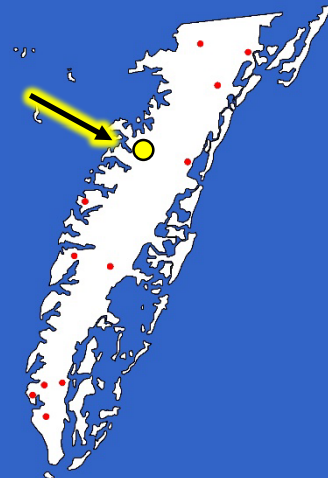
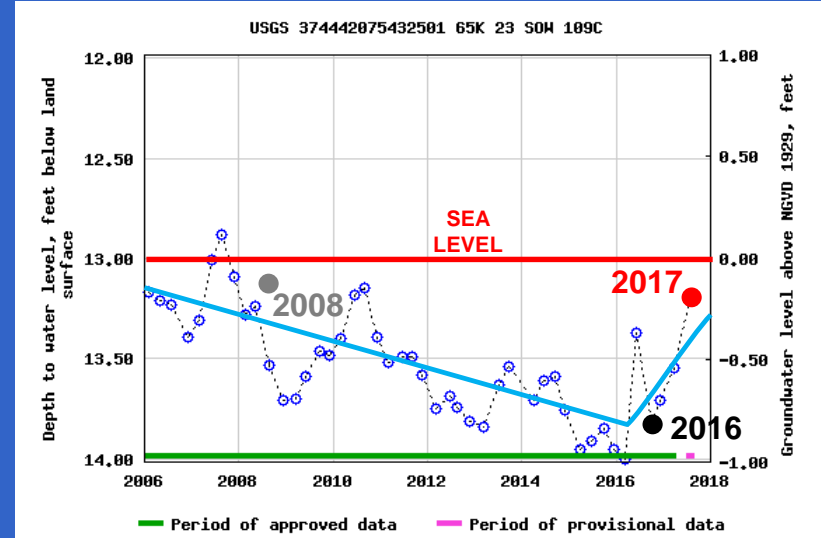
LOG



DIFFERENCE BETWEEN LOGS

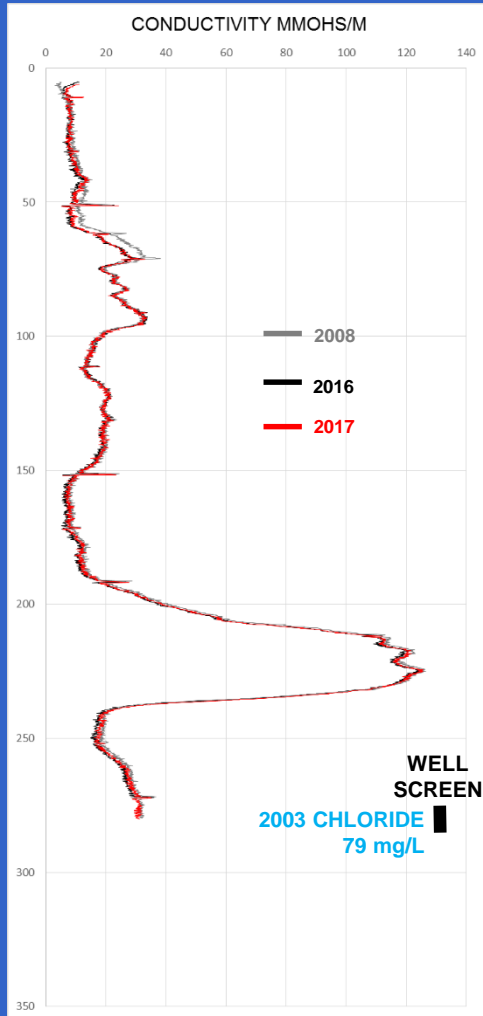


WATER LEVELS

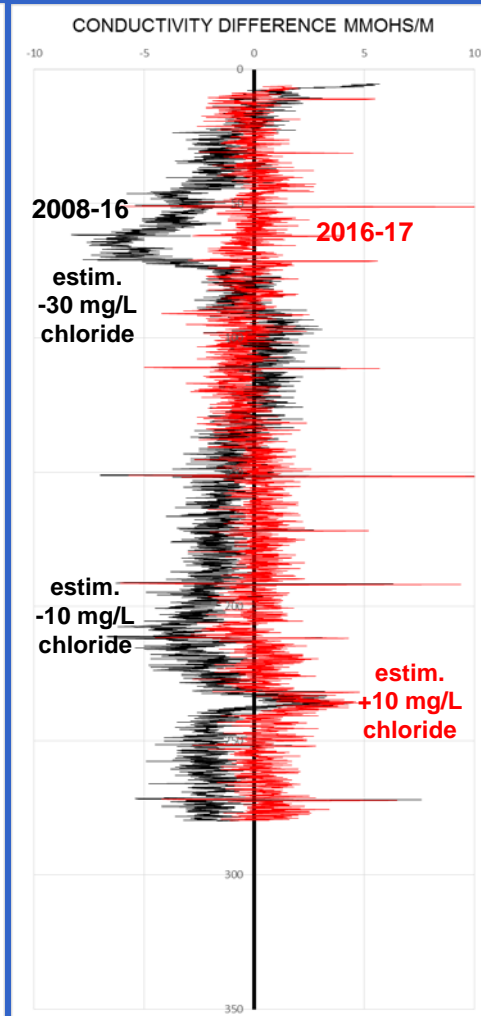


Well 63F 16 Cape Center

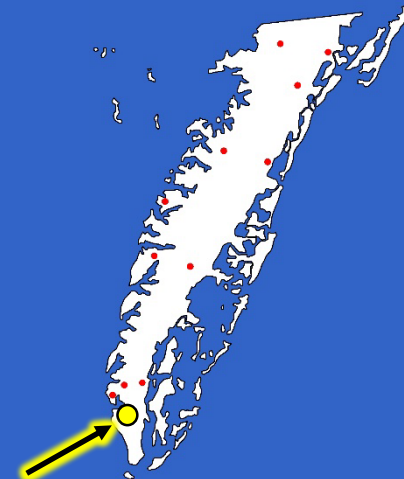
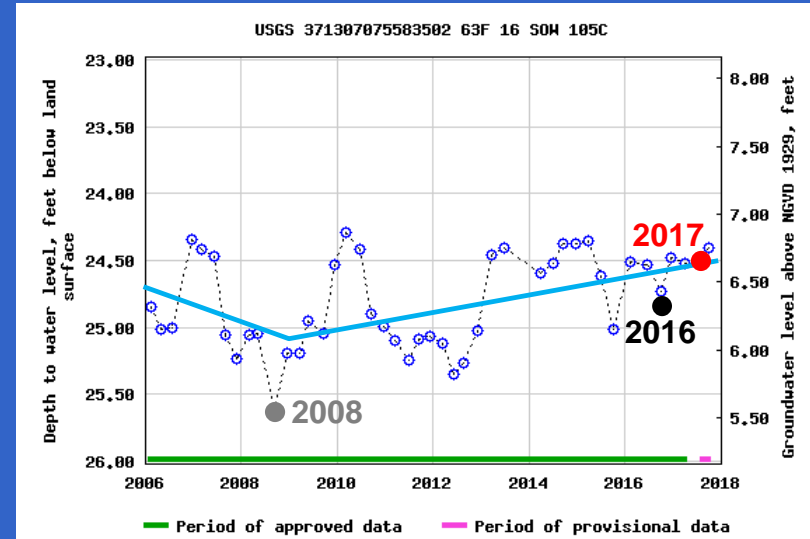
LOG



DIFFERENCE BETWEEN LOGS

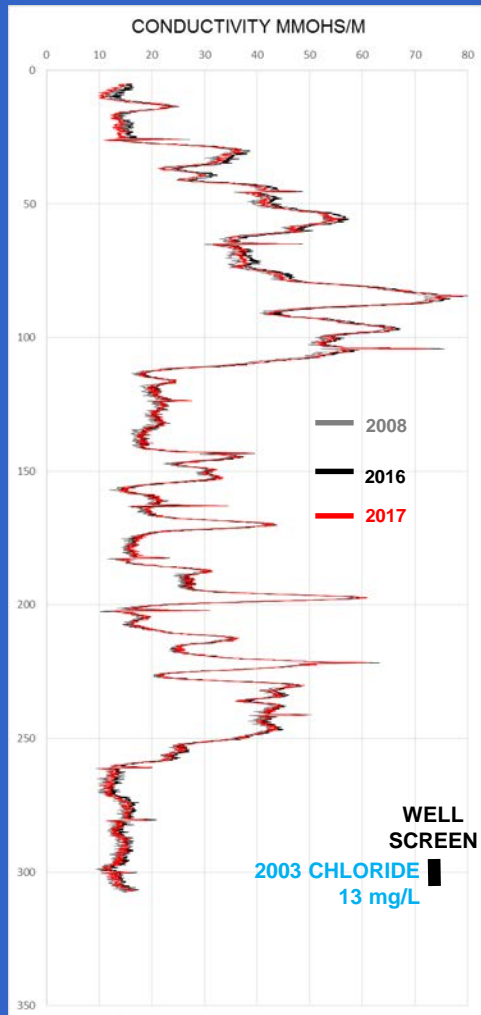


WATER LEVELS

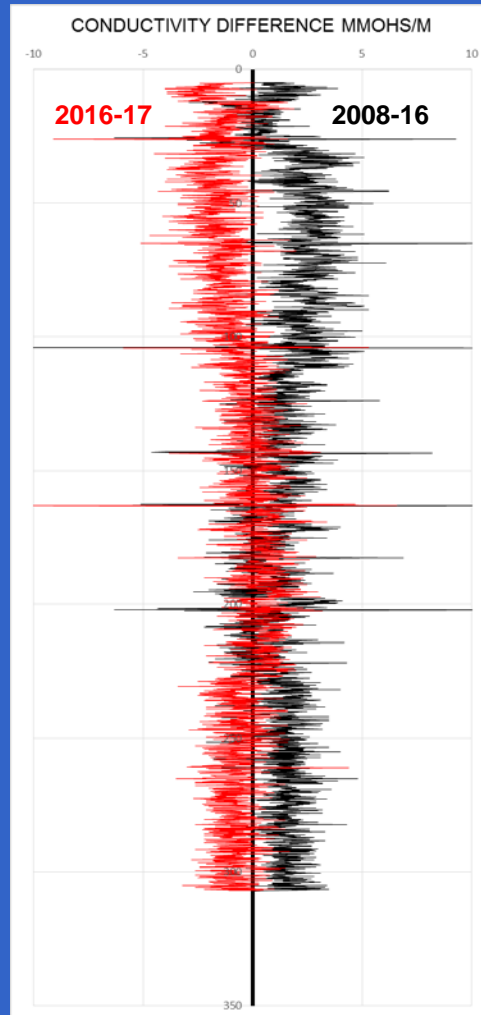


Well 66L 1 Chesser Road

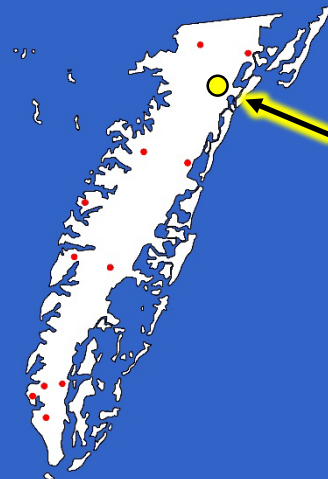
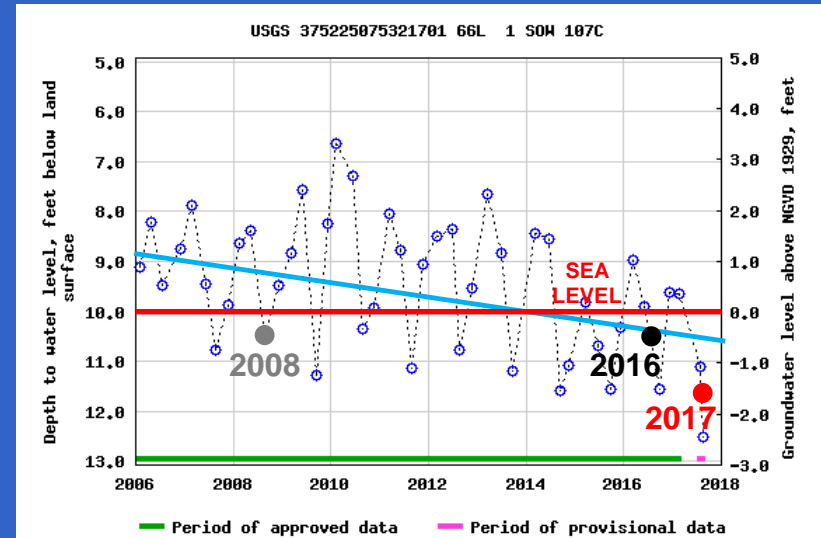
LOG



DIFFERENCE BETWEEN LOGS

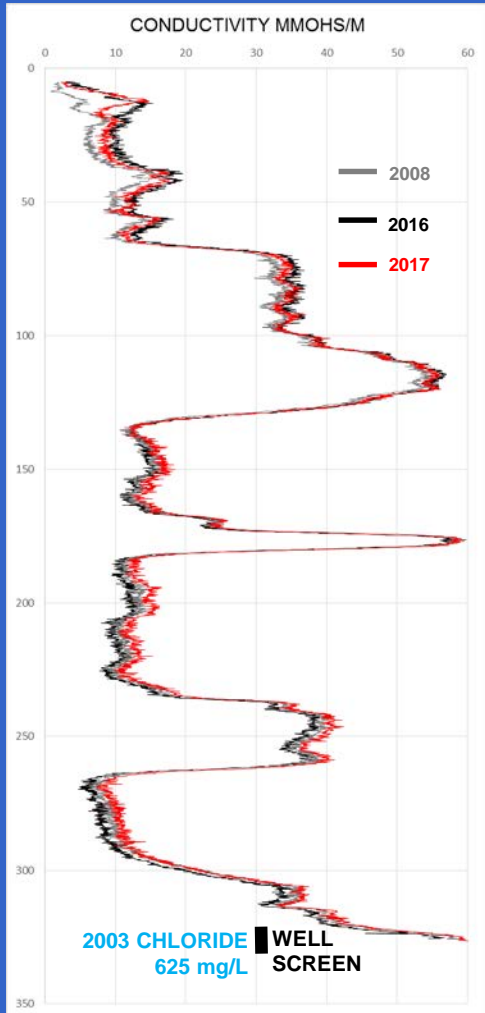


WATER LEVELS

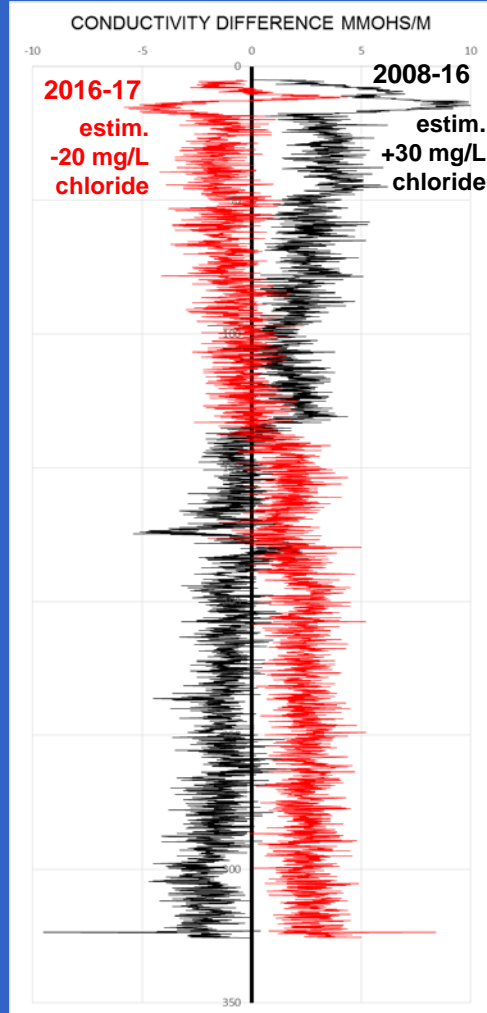


Well 63G 24 Cheriton

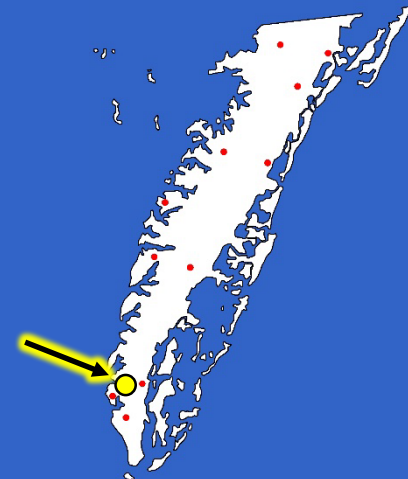
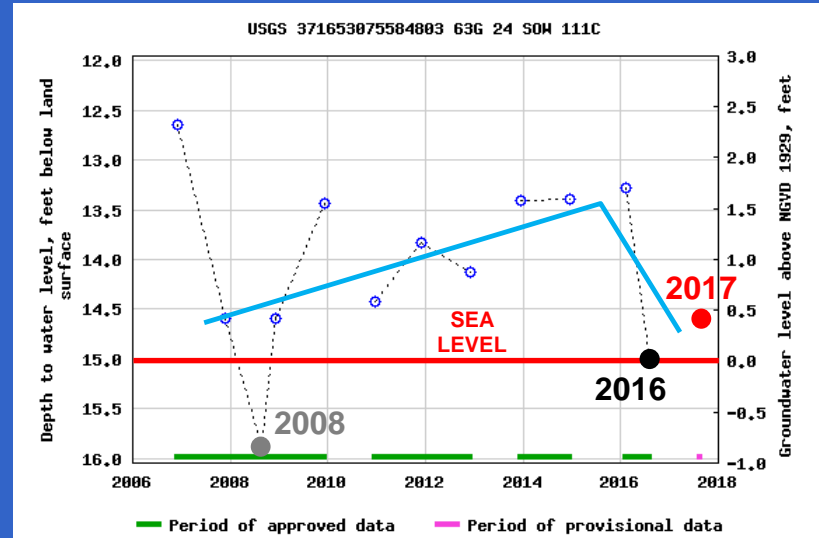
LOG



DIFFERENCE BETWEEN LOGS



WATER LEVELS

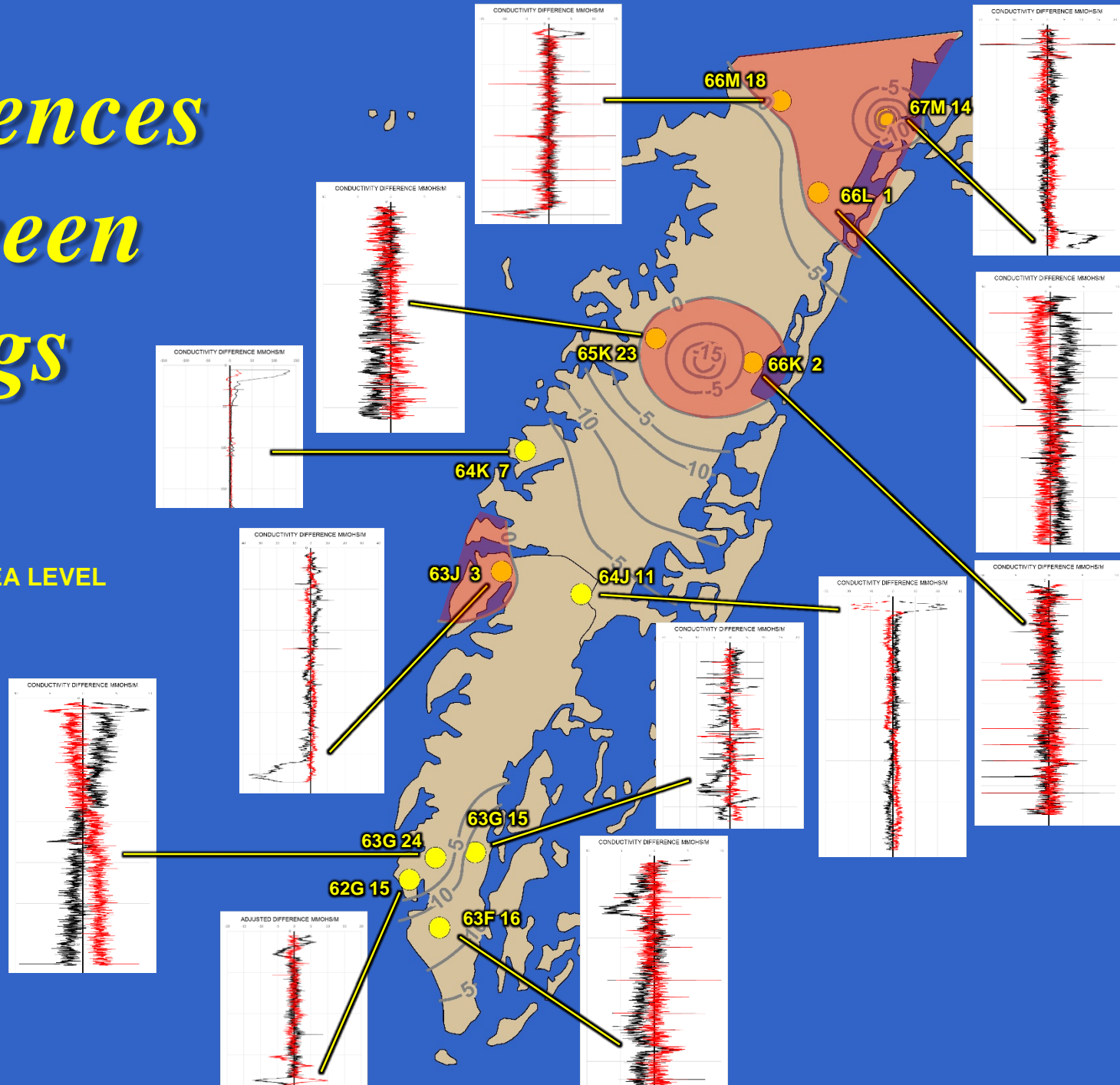


Differences Between Logs

— 2008-16

— 2016-17

BELOW SEA LEVEL



2017 Findings

1. analysis includes adjustment of baseline among logs run at different times
2. six wells showing small conductivity changes in unconfined aquifer
3. six wells showing small conductivity changes in confined aquifer
4. uncertain baseline in four wells
5. six wells in areas of potential inland intrusion