

SOURCES OF FRESH WATER IN THE COASTAL PLAIN, AND ASSOCIATED IMPACTS TO SOURCES

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HOW DO WE DEFINE FRESH WATER?

FRESH WATER

- TOTAL DISSOLVED SOLIDS (TDS) <500 mg/L (NC GW QUALITY STANDARDS)
- CHLORIDE CONCENTRATION <250 mg/L (NC GW QUALITY STANDARDS AND NATIONAL SECONDARY DW STANDARD)

BRACKISH WATER

- TDS >500 mg/L and <35,000 mg/L

SALT WATER

- TDS >35,000 mg/L

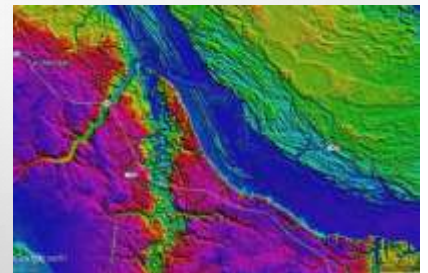


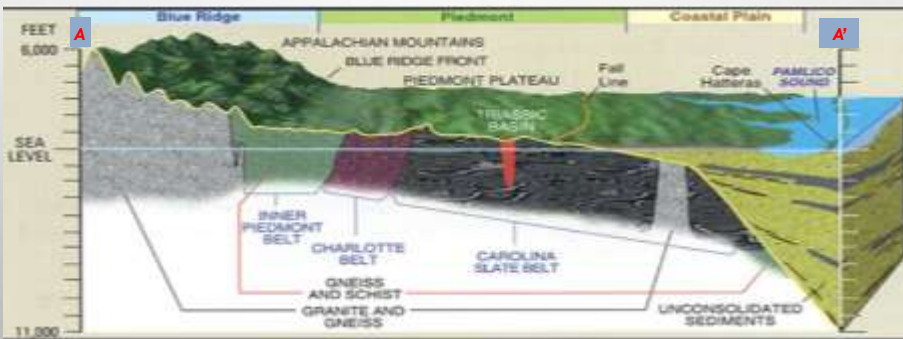
BEST USE OF FRESH WATER!

WHAT ARE THE FRESH-WATER SOURCES OF THE NORTH CAROLINA COASTAL PLAIN?



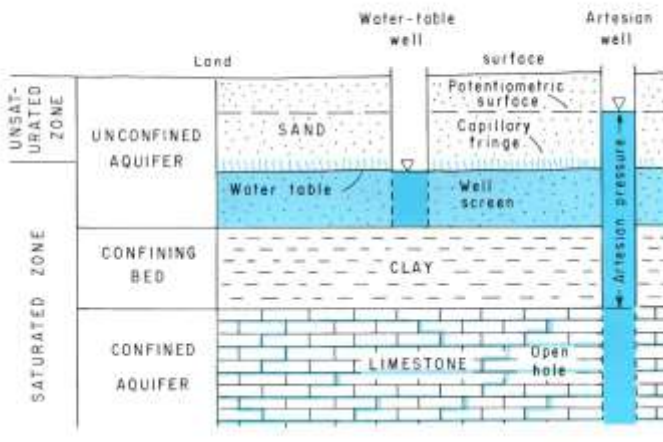
GROUNDWATER
SURFACE WATER
**ULTIMATELY SOURCED
FROM PRECIPITATION**



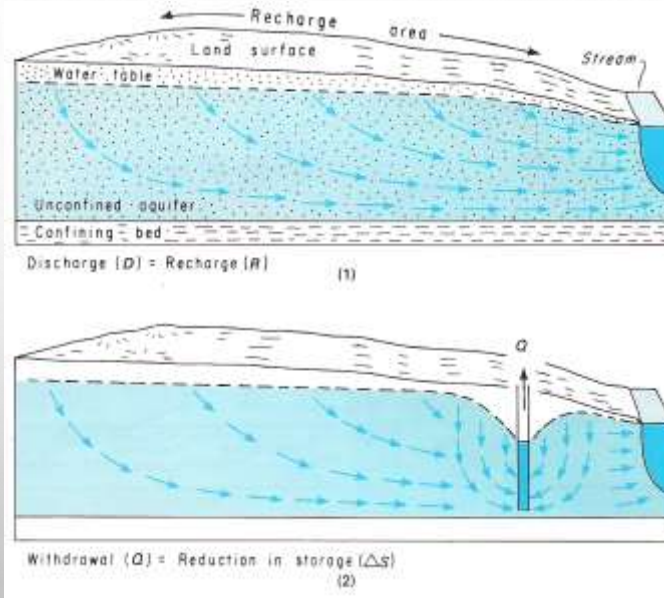


Source USGS <http://nc.water.usgs.gov/albe/maps/NCxsect.jpg>

AQUIFERS AND CONFINING BEDS

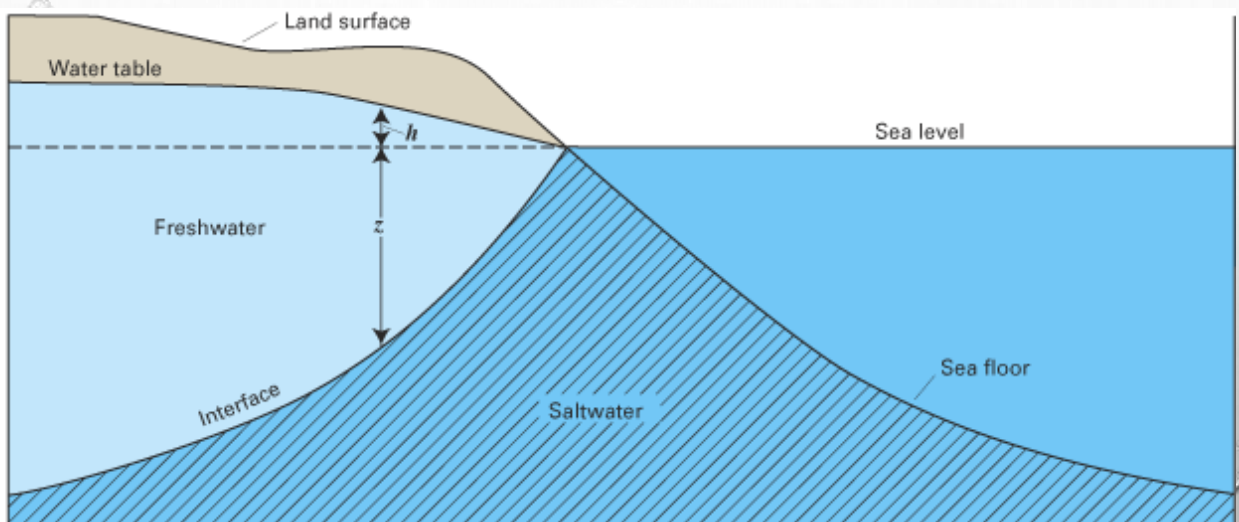


Source: Ralph Heath, 1983, "Basic Ground-Water Hydrology, USGS Water-Supply Paper 2220



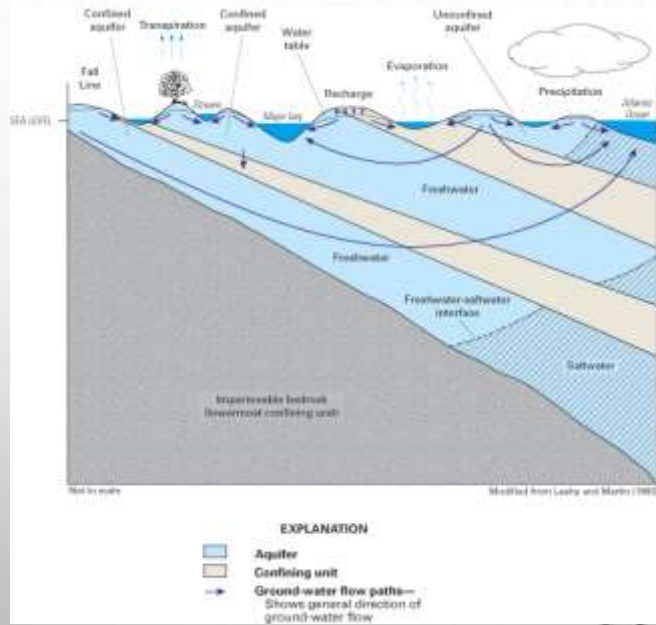
Source: Ralph Heath, 1983, "Basic Ground-Water Hydrology, USGS Water-Supply Paper 2220

Ghyben-Herzberg Principle



Source: Ralph Heath, 1983, "Basic Ground-Water Hydrology, USGS Water-Supply Paper 2220

Recharge and Discharge in Coastal Plain Aquifers



From Barlow, 2003

NC COASTAL PLAIN HYDROGEOLOGY

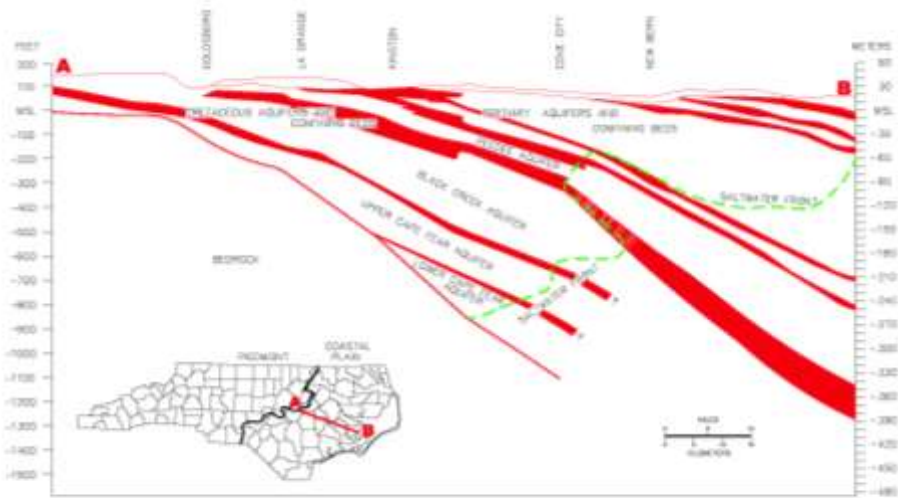
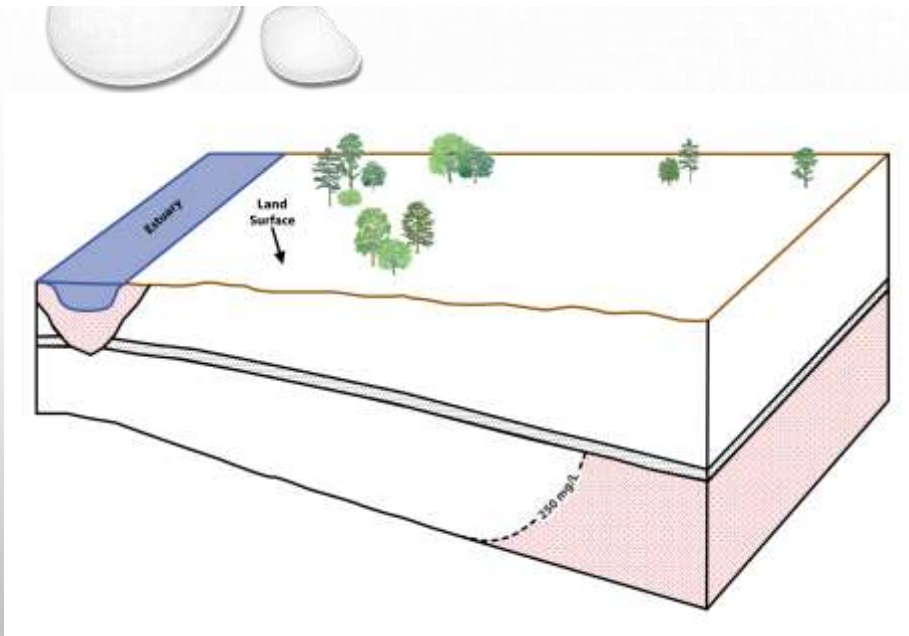
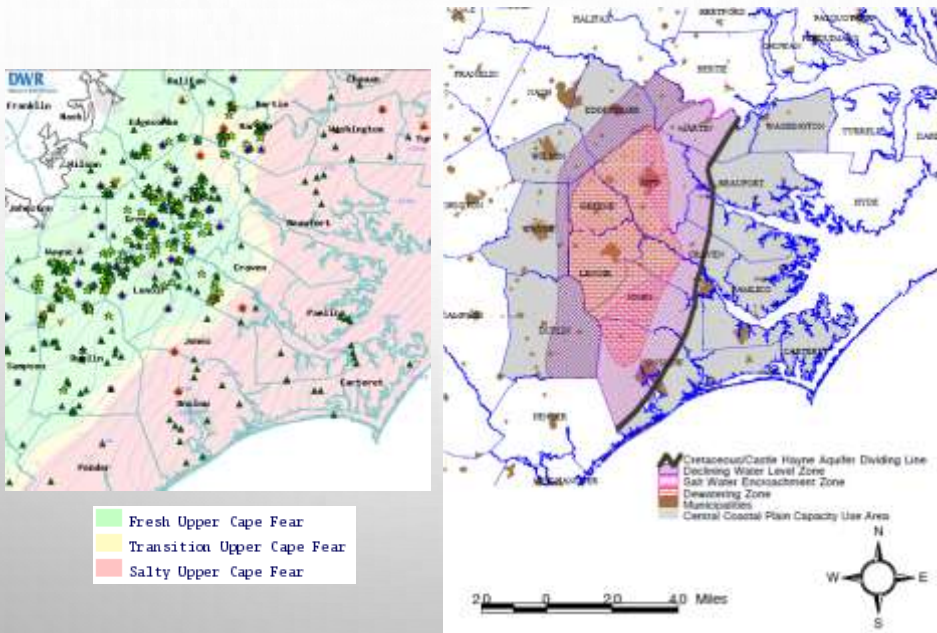
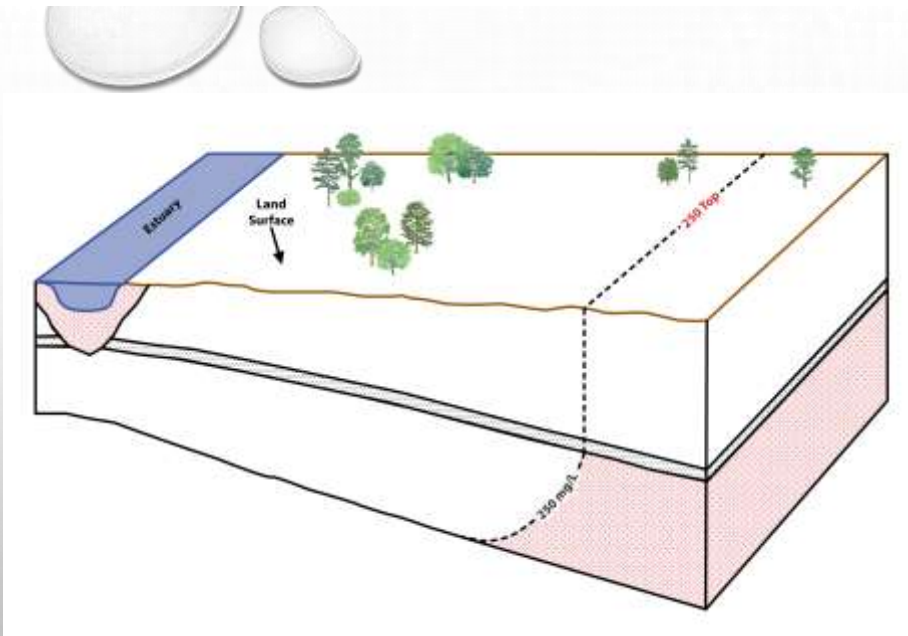
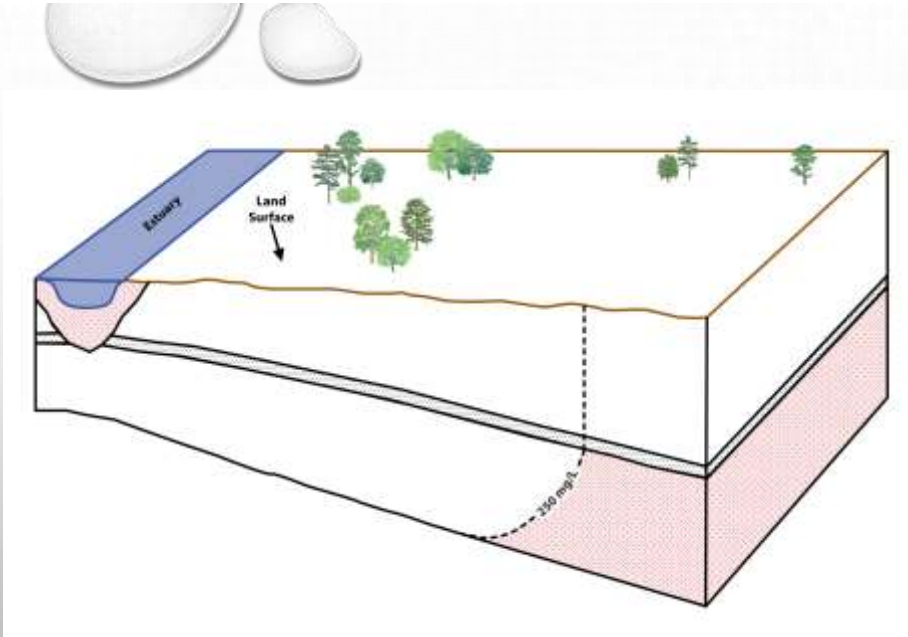
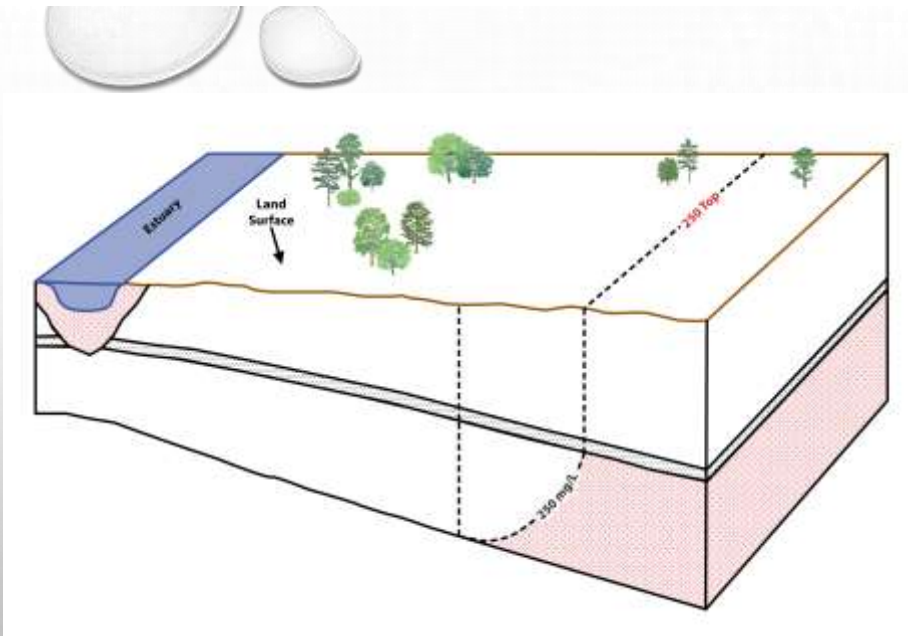
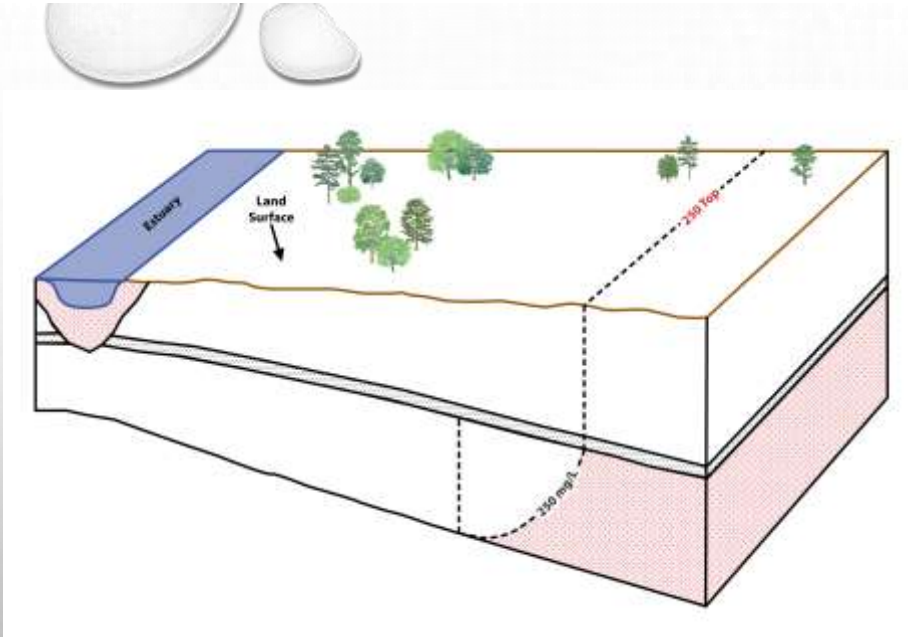


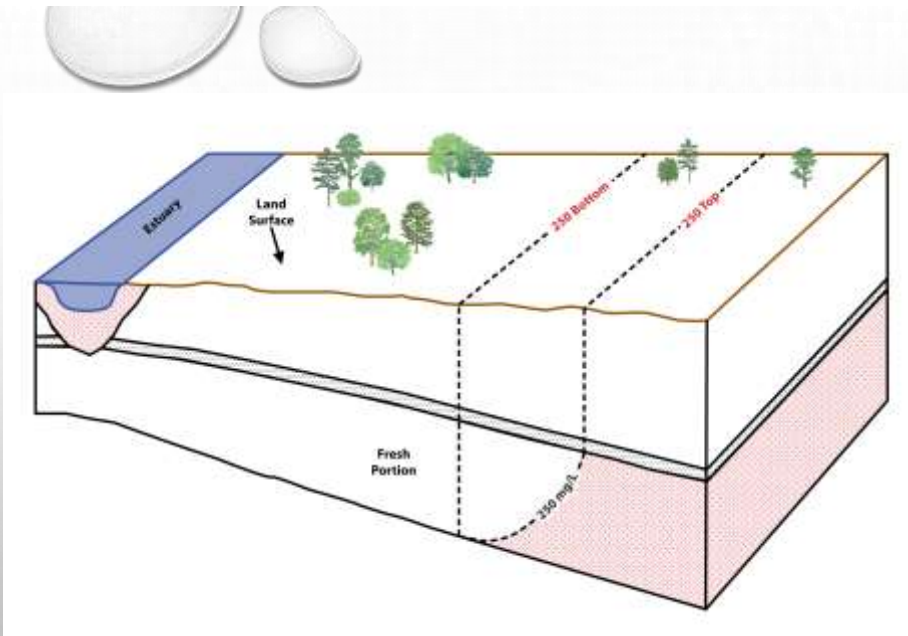
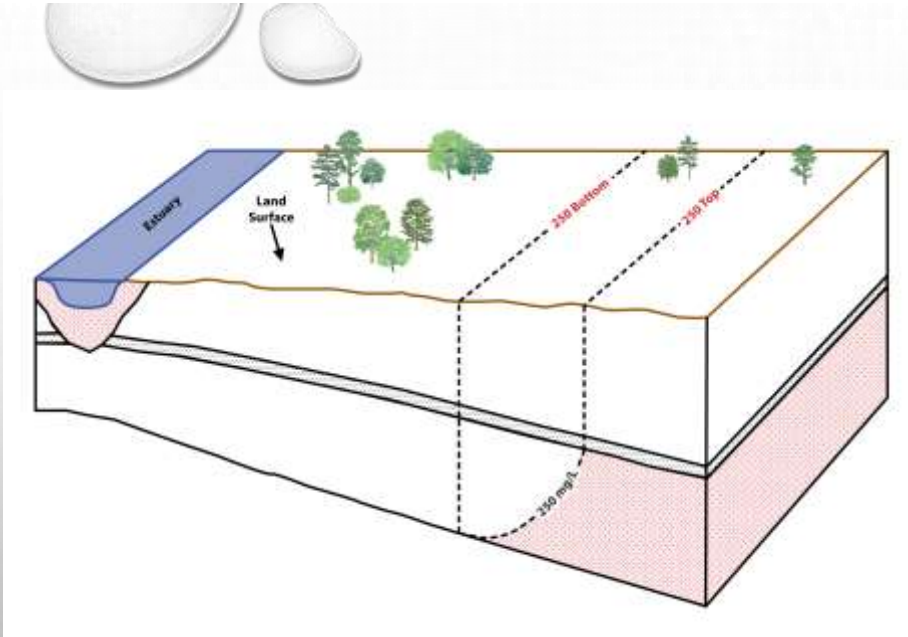
FIGURE 2. Hydrogeologic section through the central Coastal Plain showing the Cretaceous aquifers and confining beds and the position of the saltwater front. (Adapted from Winner and Coale, 1996, Plate 6)

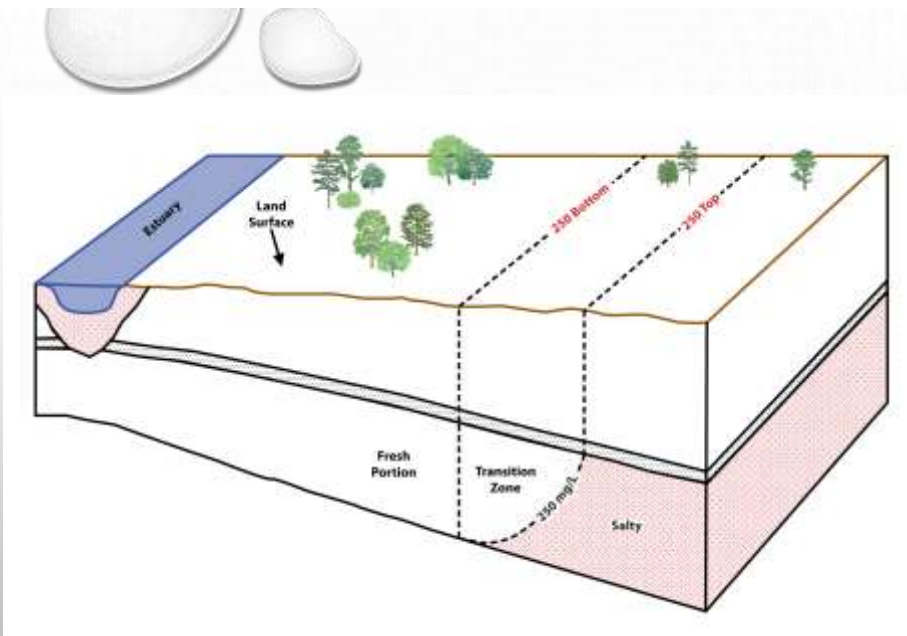
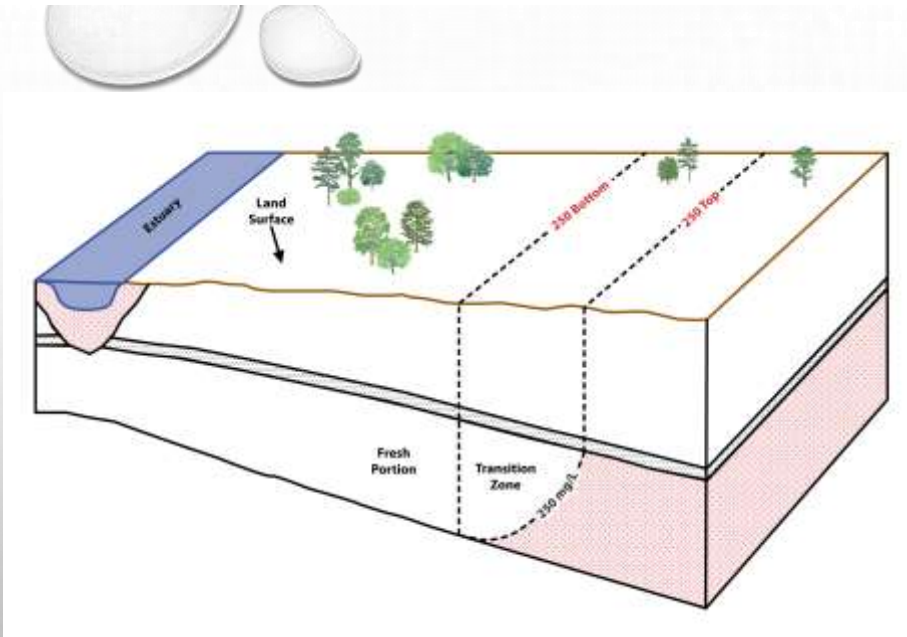
Central Coastal Plain Capacity Use Area Zones

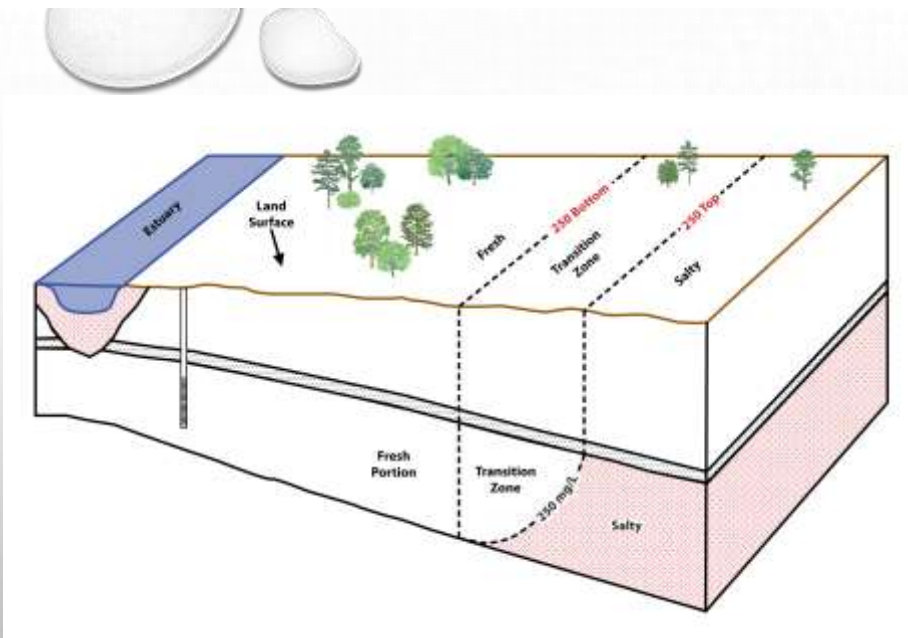
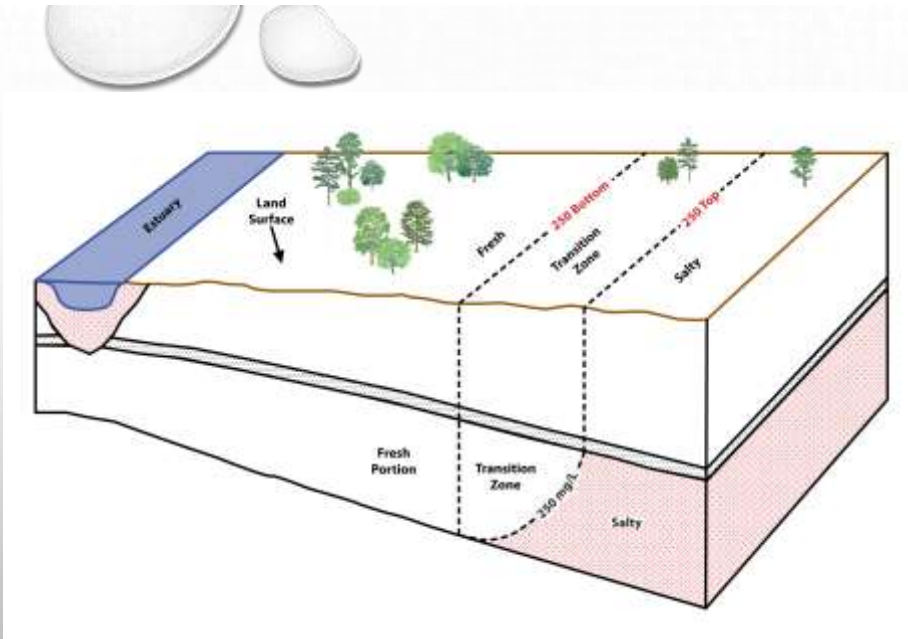


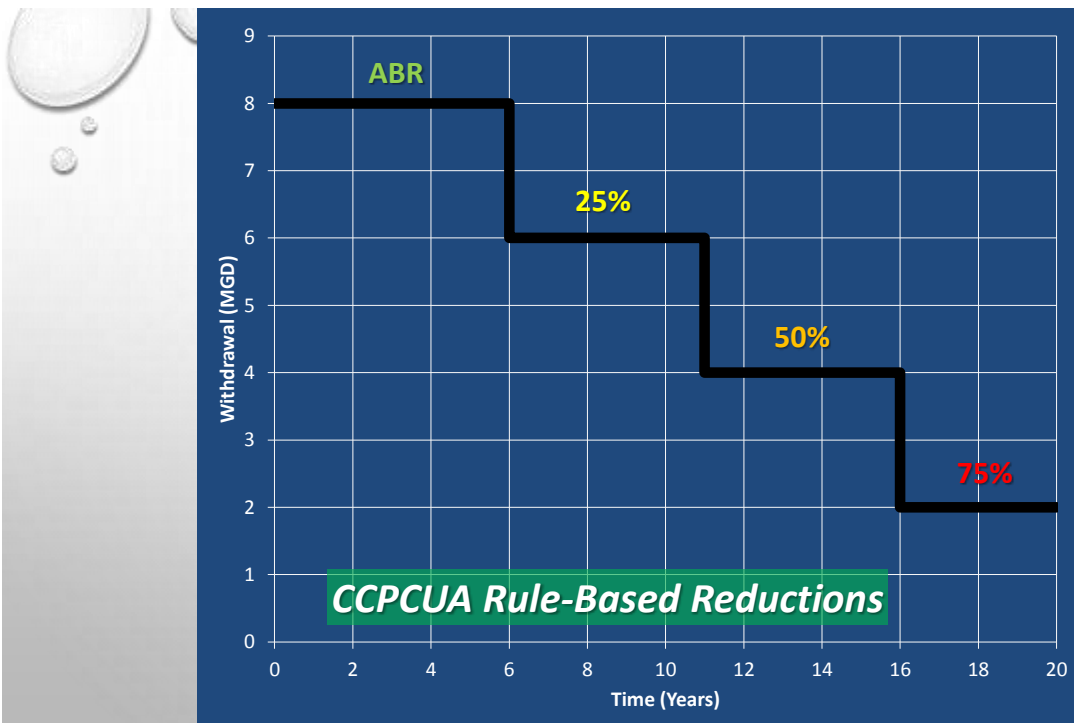
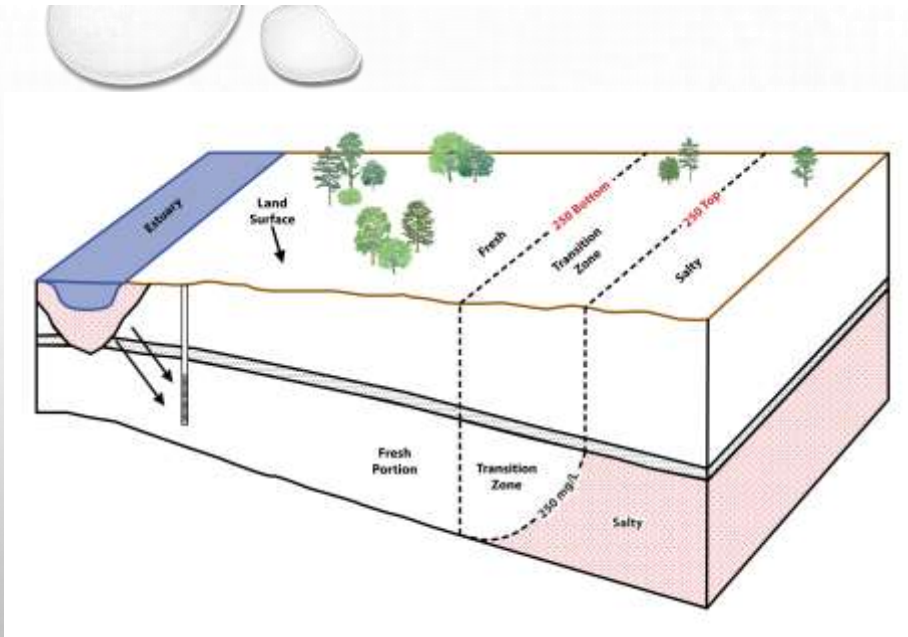


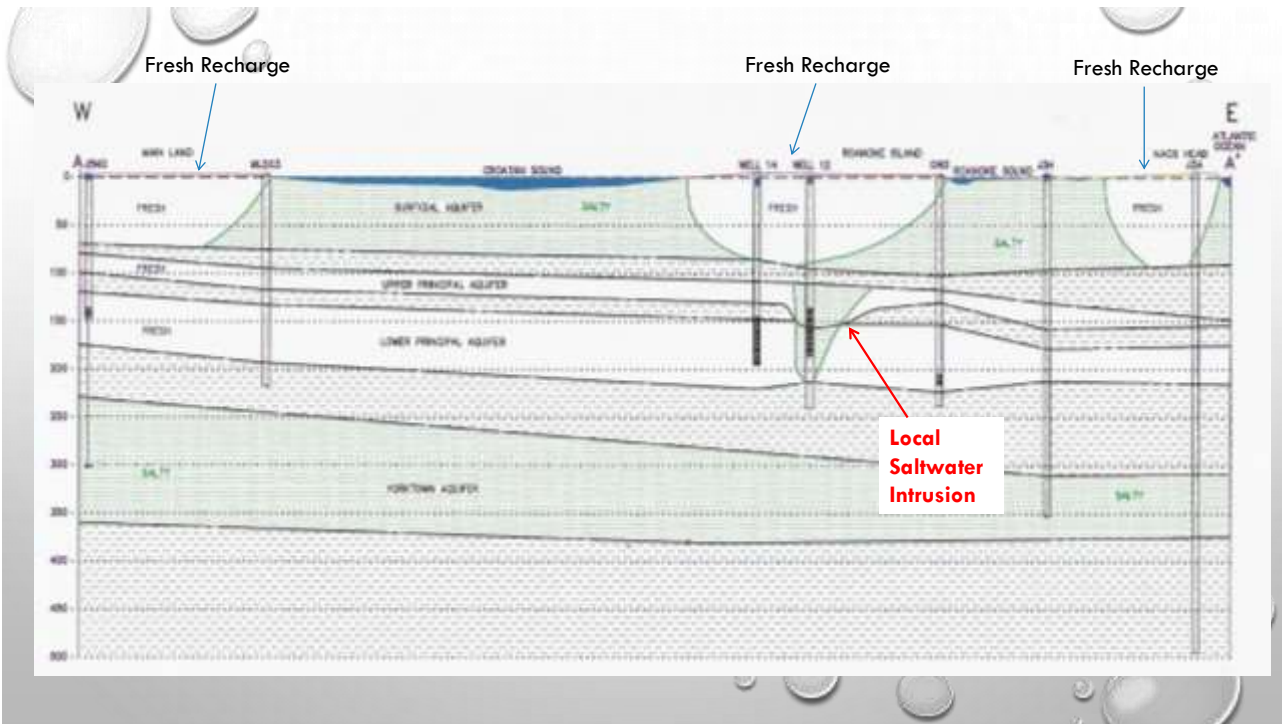












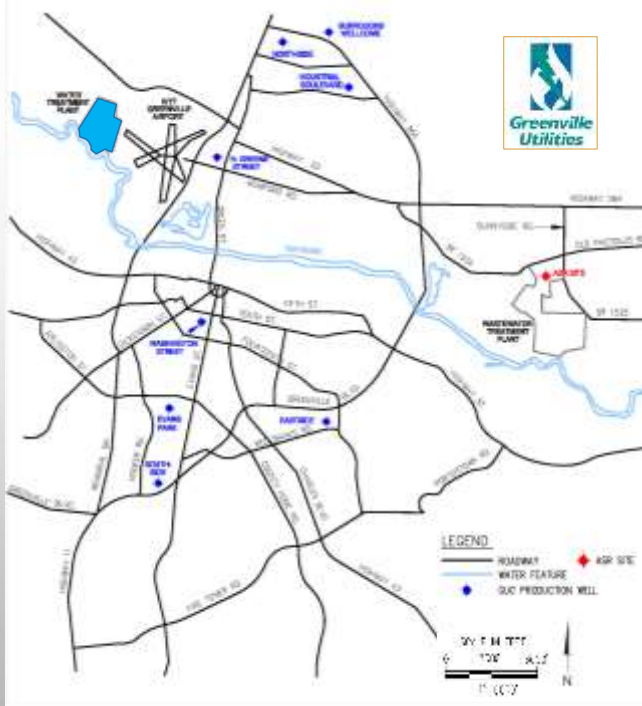
SURFACE WATER

- HAS BECOME INCREASINGLY RELIED UPON FOR DRINKING WATER IN THE NC COASTAL PLAIN
 - NRWASA
 - GUC
 - MARTIN COUNTY



SURFACE WATER CHALLENGES AND RISKS

- EXTENSIVE TREATMENT (FOR TURBIDITY, NUTRIENTS, BACTERIA, CHEMICALS, MANGANESE, ETC.)
- VARYING TEMPERATURE (CREATES CHALLENGES FOR CHEMICAL FEEDS)
- VARYING DISCHARGE VOLUMES (LIMITS AVAILABLE SUPPLY DURING DROUGHTS)
- IN COASTAL AREAS, MAY BE VULNERABLE TO SALTWATER INTRUSION
- MORE EXPENSIVE TO DEVELOP AND TREAT THAN GROUNDWATER
- OFTEN IS ABLE TO MEET LARGER WITHDRAWALS MORE EFFECTIVELY THAN GROUNDWATER SUPPLIES



**Location
of GUC's
surface water
treatment
plant,
groundwater
production
wells, and
ASR System
No. 1**





WHAT ARE SOME ALTERNATIVES FOR THE FUTURE OF FRESH WATER IN THE NC COASTAL PLAIN?

- EXPAND USAGE OF BRACKISH GROUNDWATER (WITH RO)
- ACTIVE QUARRIES AND RECLAIMED QUARRY LAKES
- AQUIFER STORAGE RECOVERY



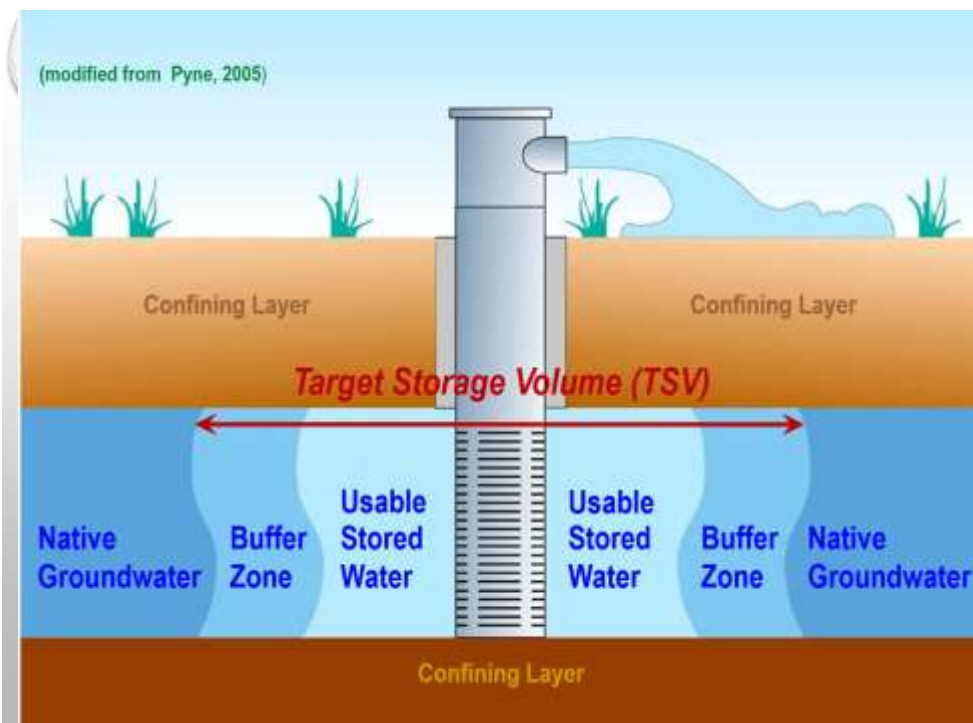
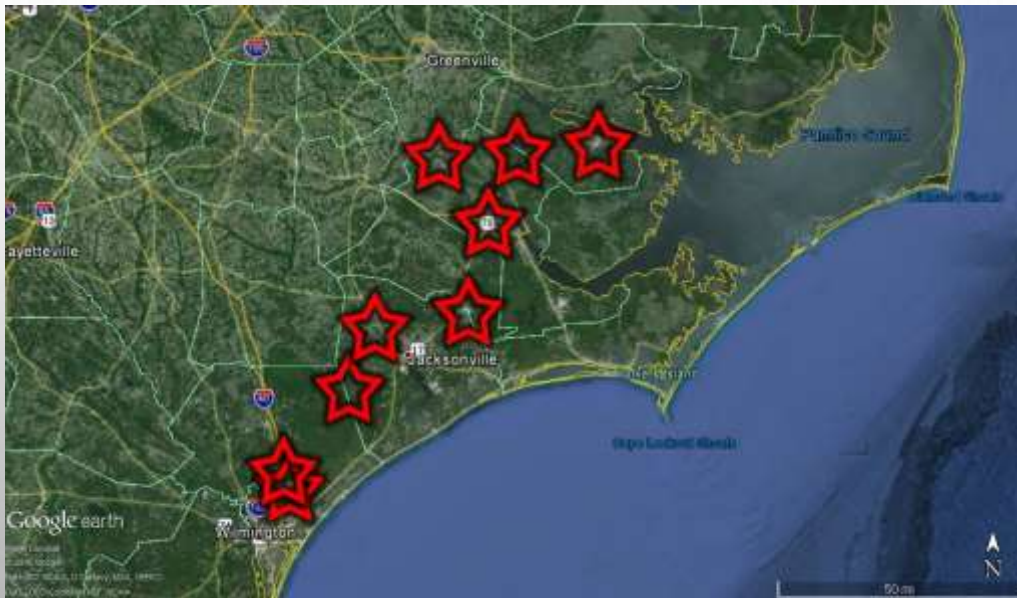
**Onslow
Quarry**



BELGRADE QUARRY



LARGE MINE OPERATIONS IN EASTERN NC



AQUIFER STORAGE RECOVERY

Innovative water management strategy to store pre-treated water underground and recover the water during times of need.

Questions?

