

MGS

Utilities Commission, New Smyrna Beach Hydrogeologic Evaluation of Potential Uses of the I-95 Property

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Potential Uses of I-95 Property

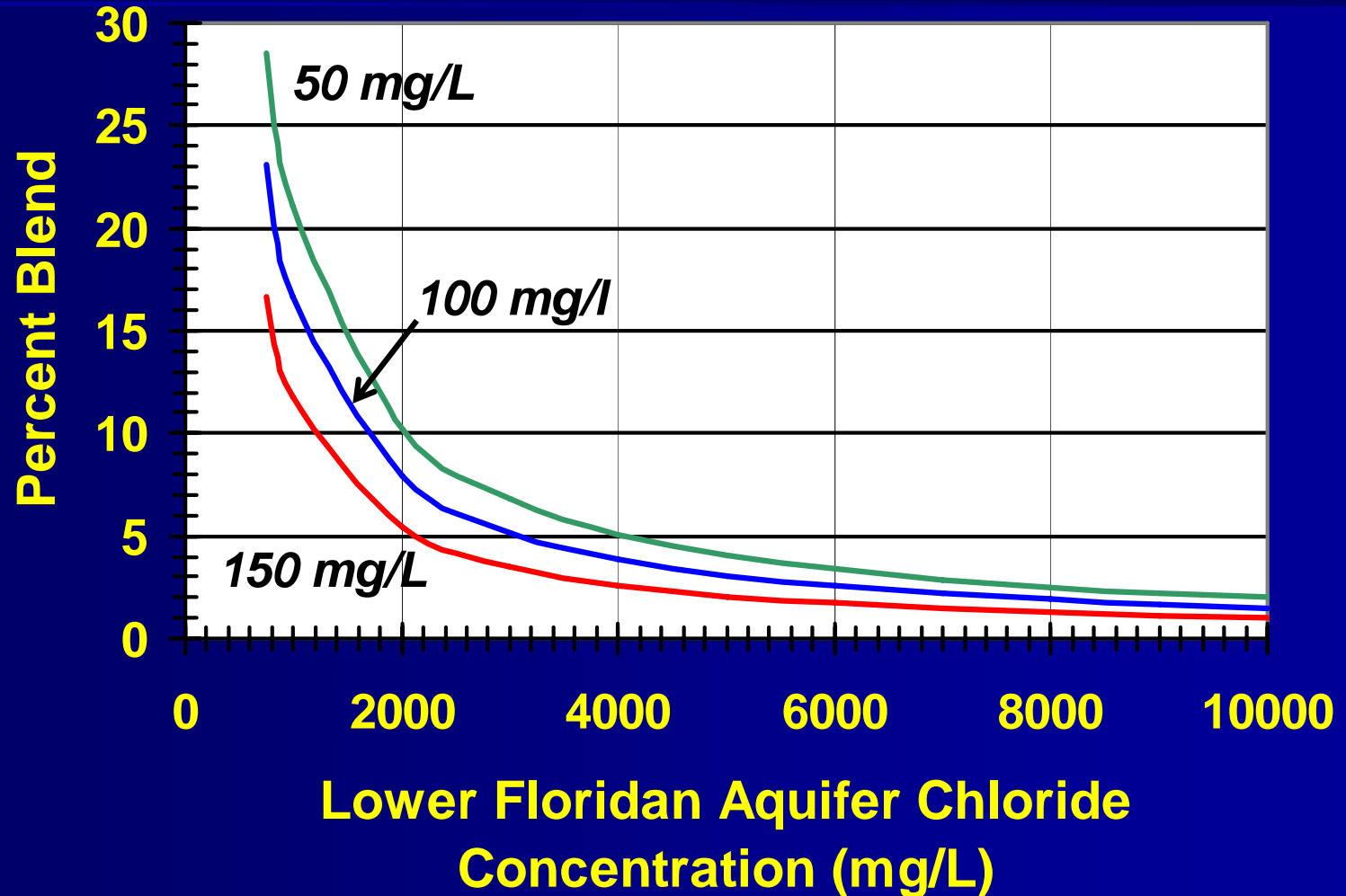
- Lower Floridan Aquifer blend water source.
- ASR storage zone (reclaimed water or raw groundwater).
- Brackish RO feedwater.
- Reclaimed water storage ponds.
- Supplemental water (horizontal wells).'



Blending with Lower Floridan Aquifer water

- Lower Floridan Aquifer water can be blended with either reclaimed water or raw groundwater to increase supply.
- Amount of blending (blend ratio) will depend largely upon the salinity of the Lower Floridan Aquifer water and the maximum acceptable salinity of the blend

Chloride blending curves for 250 mg/L blend



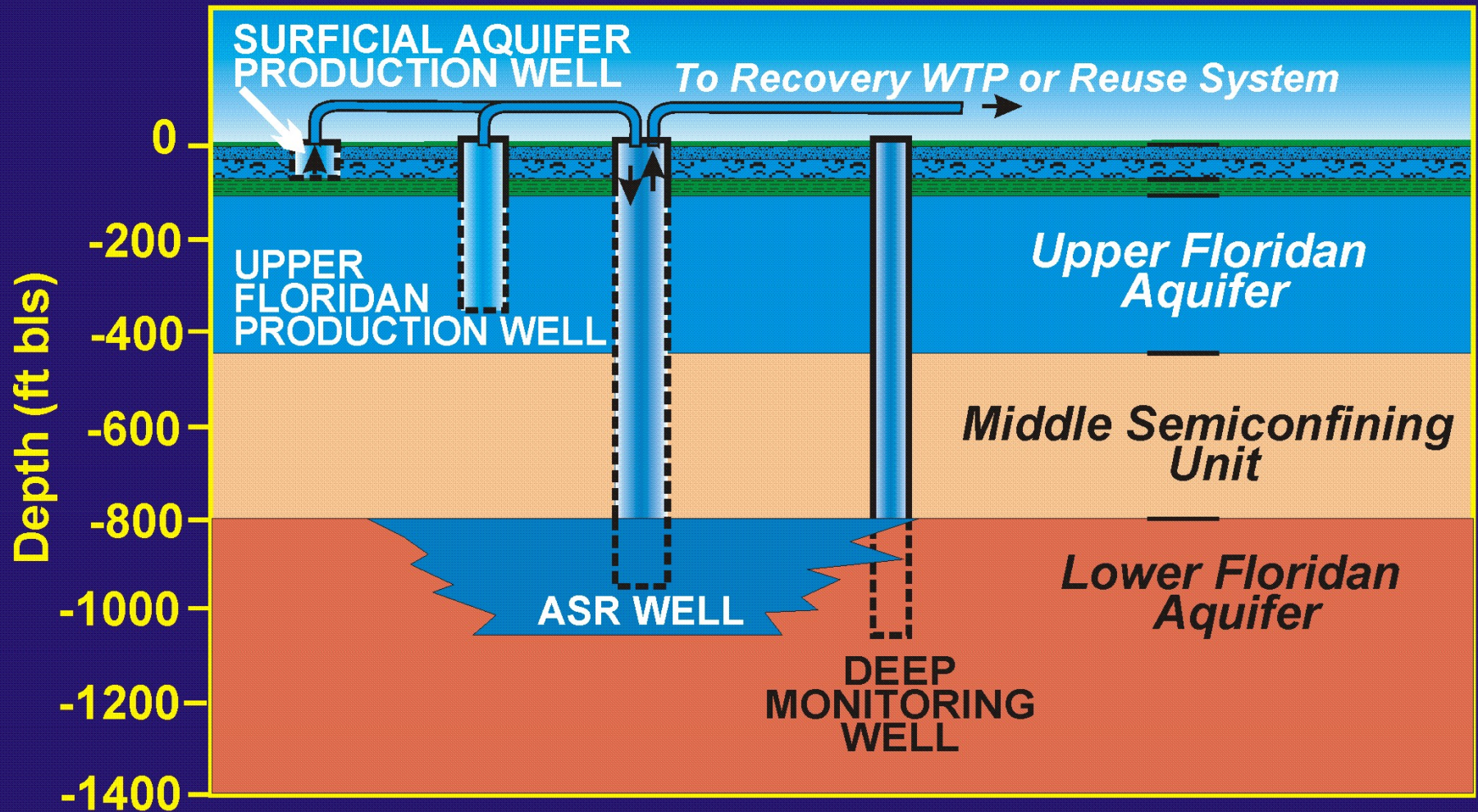
Salinity of the Lower Floridan Aquifer at the project site

- No well data from the project site vicinity.
- Extrapolated values from government agency reports are inconsistent.
- Data available from nearby TDEM surveys, but the reliability of data is questionable.
- Best estimate: Upper part contains mildly brackish water (500 to 2,500 mg/L chloride), increasing with depth to seawater values. 5,000 mg/L chloride concentration may occur from 950 to 1,200 feet below land surface.

Aquifer Storage and Recovery (ASR)

- Either reclaimed water or raw groundwater could be stored.
- Water will have to meet applicable groundwater standards (Florida drinking water standards).
- There are additional regulations and potential public opposition to reclaimed water ASR.
- Lower Floridan Aquifer appears to be a suitable storage zone. Recovery efficiency will depend in part upon its salinity.

Aquifer to Aquifer ASR



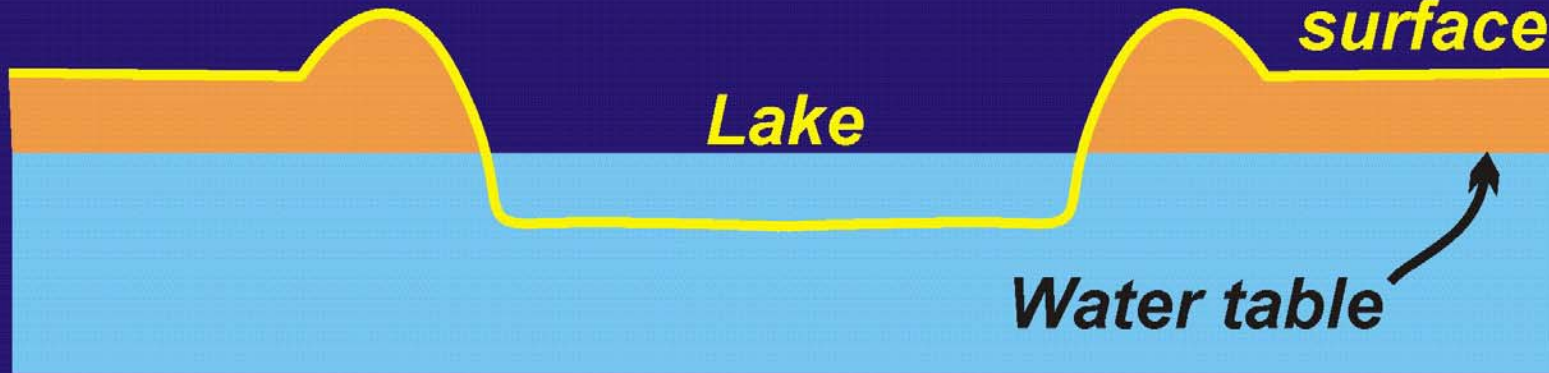
Lower Floridan Aquifer Brackish RO Feedwater Wells

- Brackish water wellfield completed in Lower Floridan Aquifer is feasible.
- Unknown questions are initial salinity of water and likely change in salinity over time as the wellfield is operated.
- Concentrate disposal will be a more difficult issue.

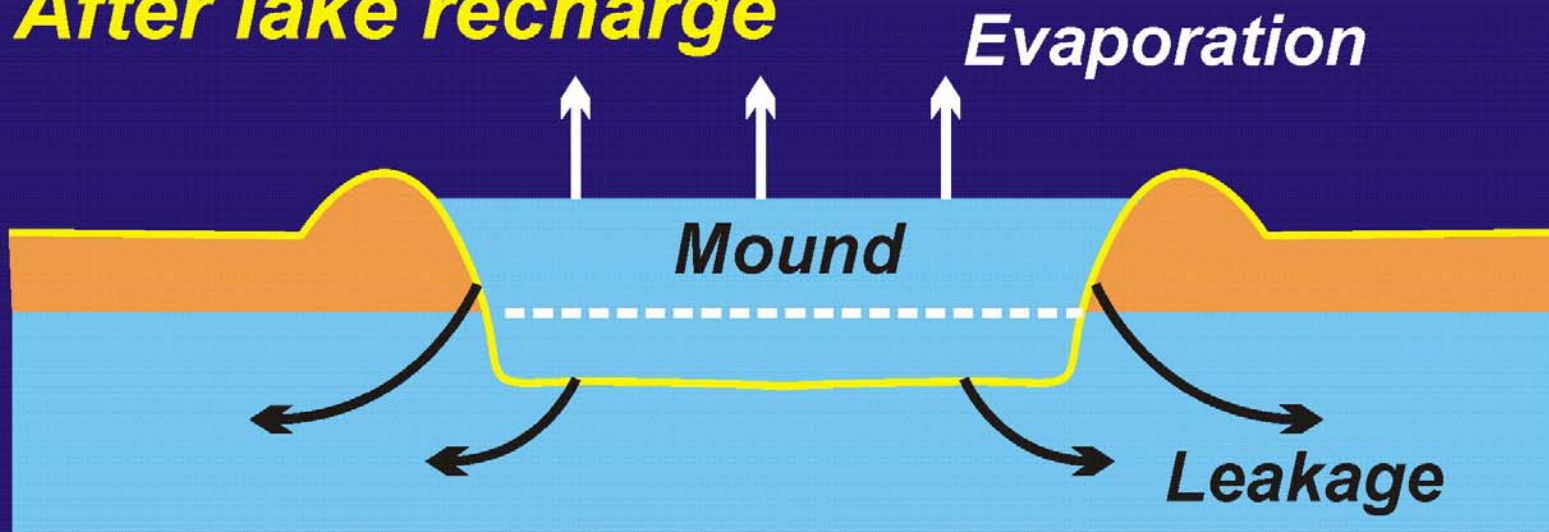
Reclaimed Water Storage in on-site lakes

- Water levels in lakes tend to reach equilibrium with the potentiometric surface of the Surficial Aquifer System (water table).
- In order to achieve net storage of water in a lake, the lake level must be increased above static level (a hydraulic mound created).
- Once recharge is terminated, water levels will quickly return to static levels.

Static conditions



After lake recharge



Mound above water table will quickly dissipate due to leakage and evaporation

Reclaimed Water Storage in on-site lakes (continued)

- Lakes are likely not a viable option for long term (wet season to dry season) storage of reclaimed water because of leakage and evaporation.
- Lakes may be suitable for short term storage of reclaimed water (equilization of daily or perhaps weekly supply and demand).

Horizontal Wells

- Horizontal wells (bank filtration) may be a less expensive option for extracting supplemental waters from on-site lakes than constructing an intake structure and filtration system.
- Efficacy of bank filtration system will be depend on site-specific aquifer hydraulics, which will control both well yields and effectiveness of filtration.
- Wetlands impacts will likely be a critical issue for permitting lake or Surficial Aquifer System withdrawals

Recommendations

- Further assessment of the feasibility and the design of all of the potential Lower Floridan Aquifer uses requires site specific information on its water quality and aquifer hydraulics. A Lower Floridan Aquifer test well program should therefore be implemented at the project site.
- A test well program should also be implemented for the Surficial Aquifer System if either the lake storage or horizontal wells (bank filtration) options will be pursued.