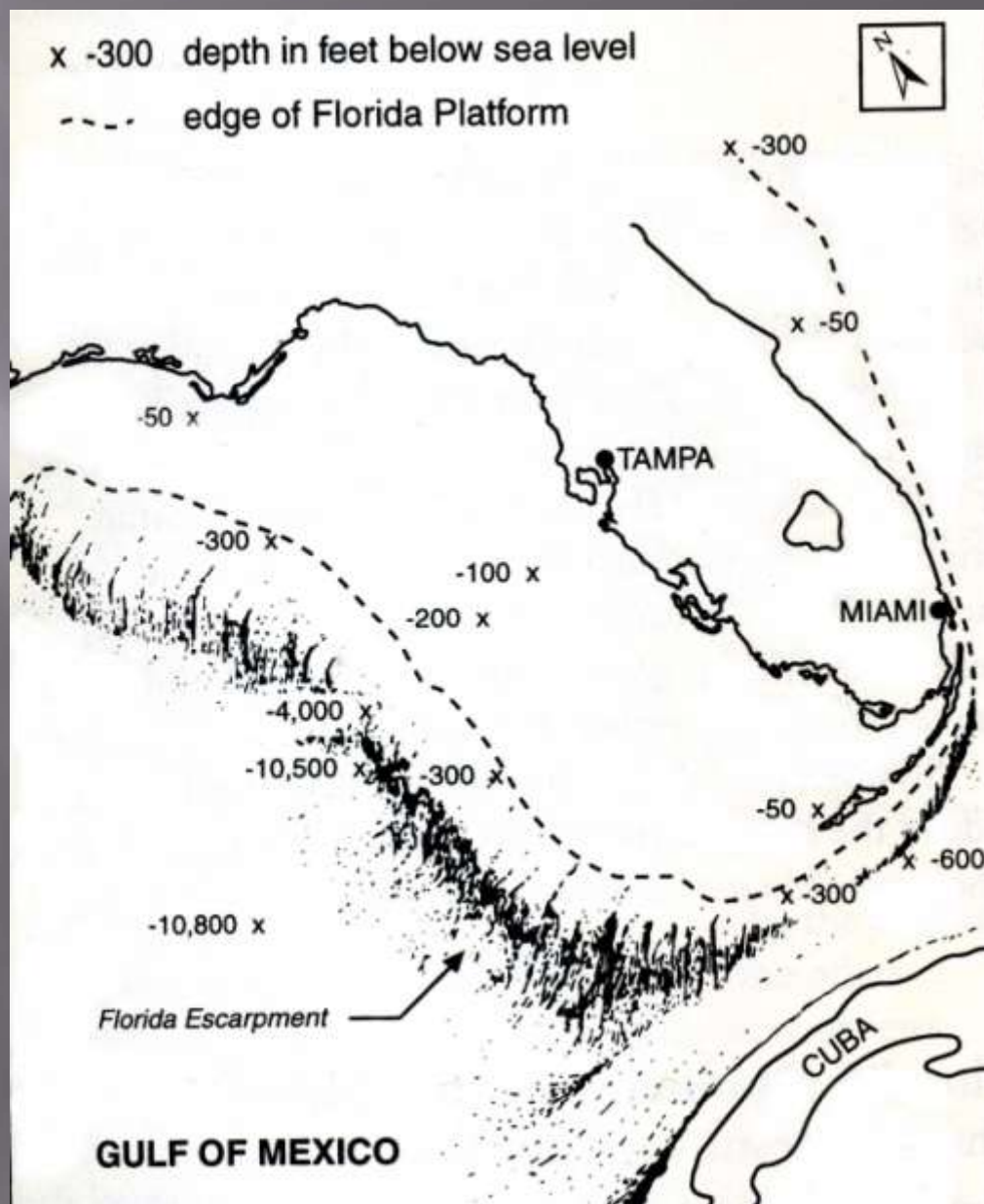


Hydrogeology of Florida: Implications for Water Resource Protection

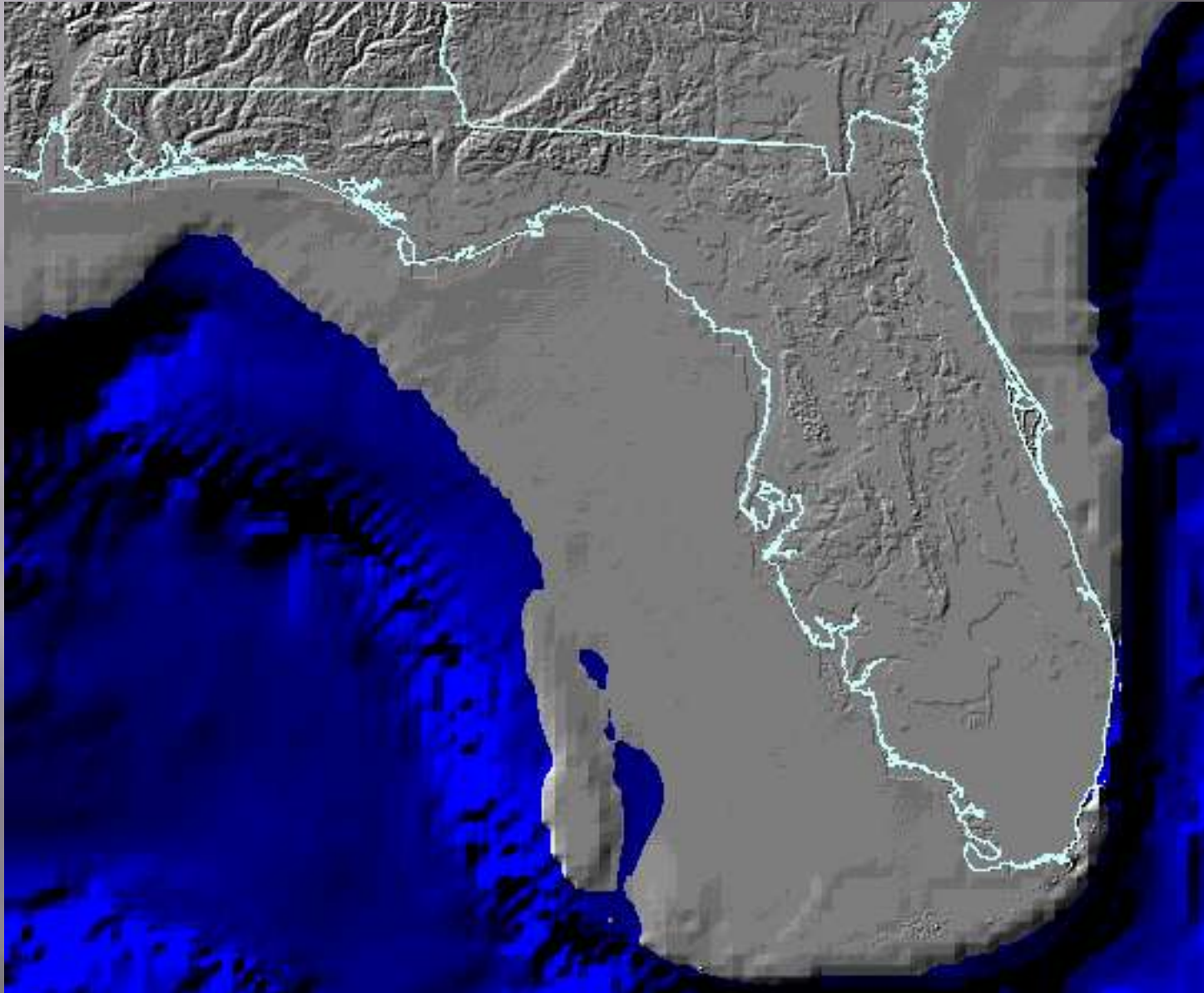
Harley Means, P.G.
FDEP,
Florida Geological Survey



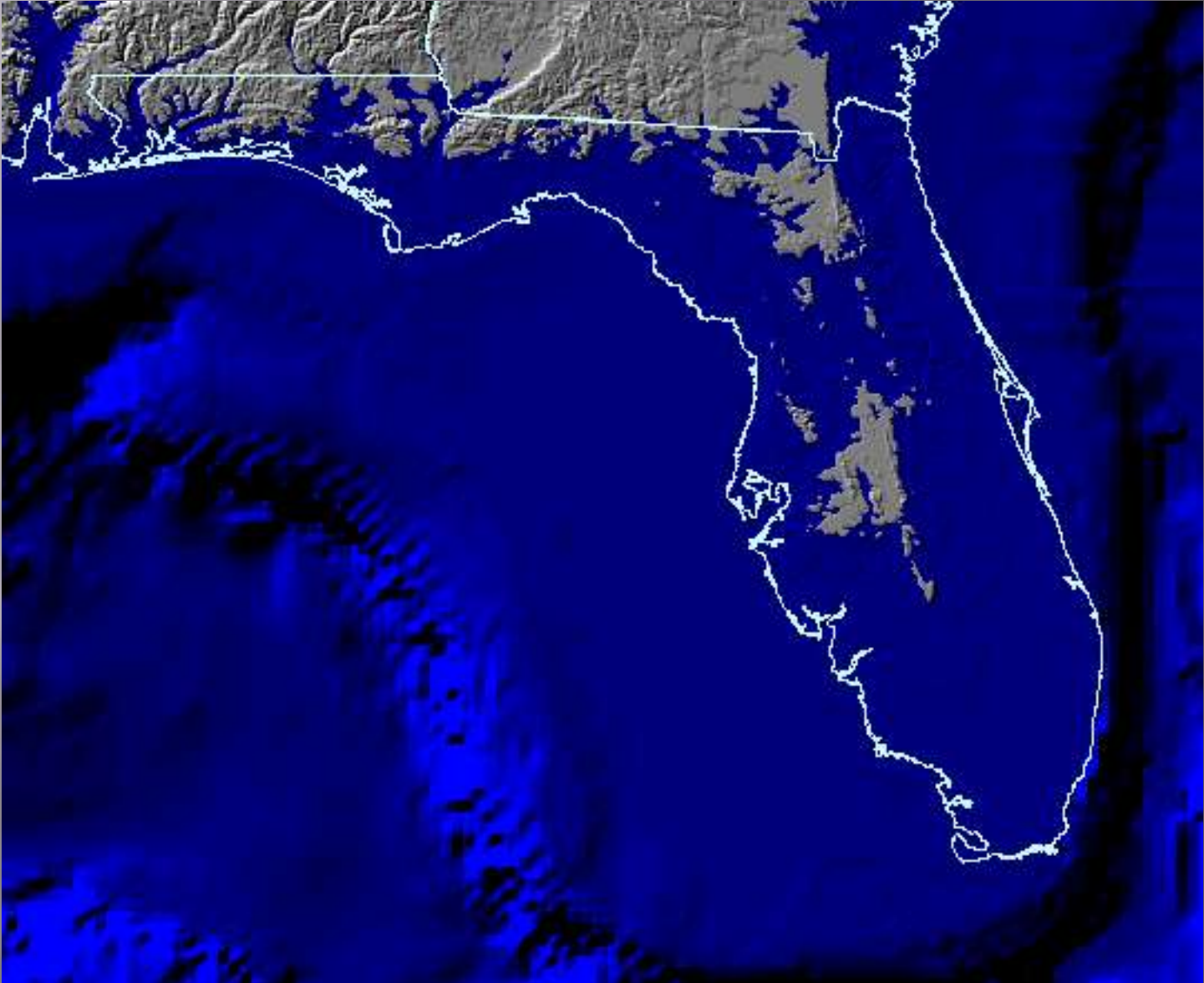
- The Florida Platform.
- Approximately half of the platform is currently underwater.
- Much more of the platform has been exposed in the past during glacial events.



Florida Platform ~ 18,000 years ago



Maximum flooding of the Platform



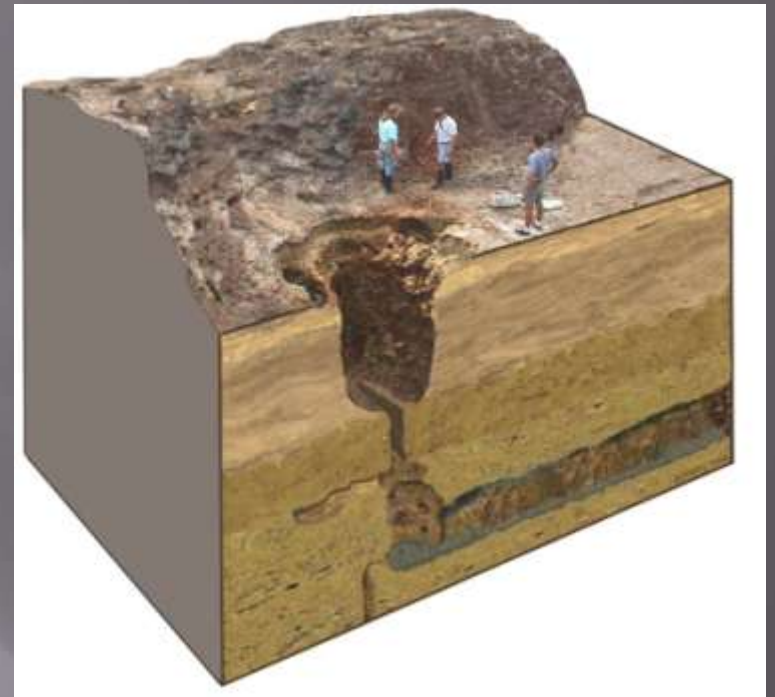


Limestone & Dolostone

- ❑ Florida is underlain by vast thicknesses of limestone and dolostone.
- ❑ Primarily composed of the remains of marine organisms.
- ❑ Calcite (CaCO_3) is the mineral that limestone is comprised of.
- ❑ Dolostone (Ca,MgCO_3) has magnesium in it.
- ❑ The Floridan aquifer system is comprised of limestone and dolostone.

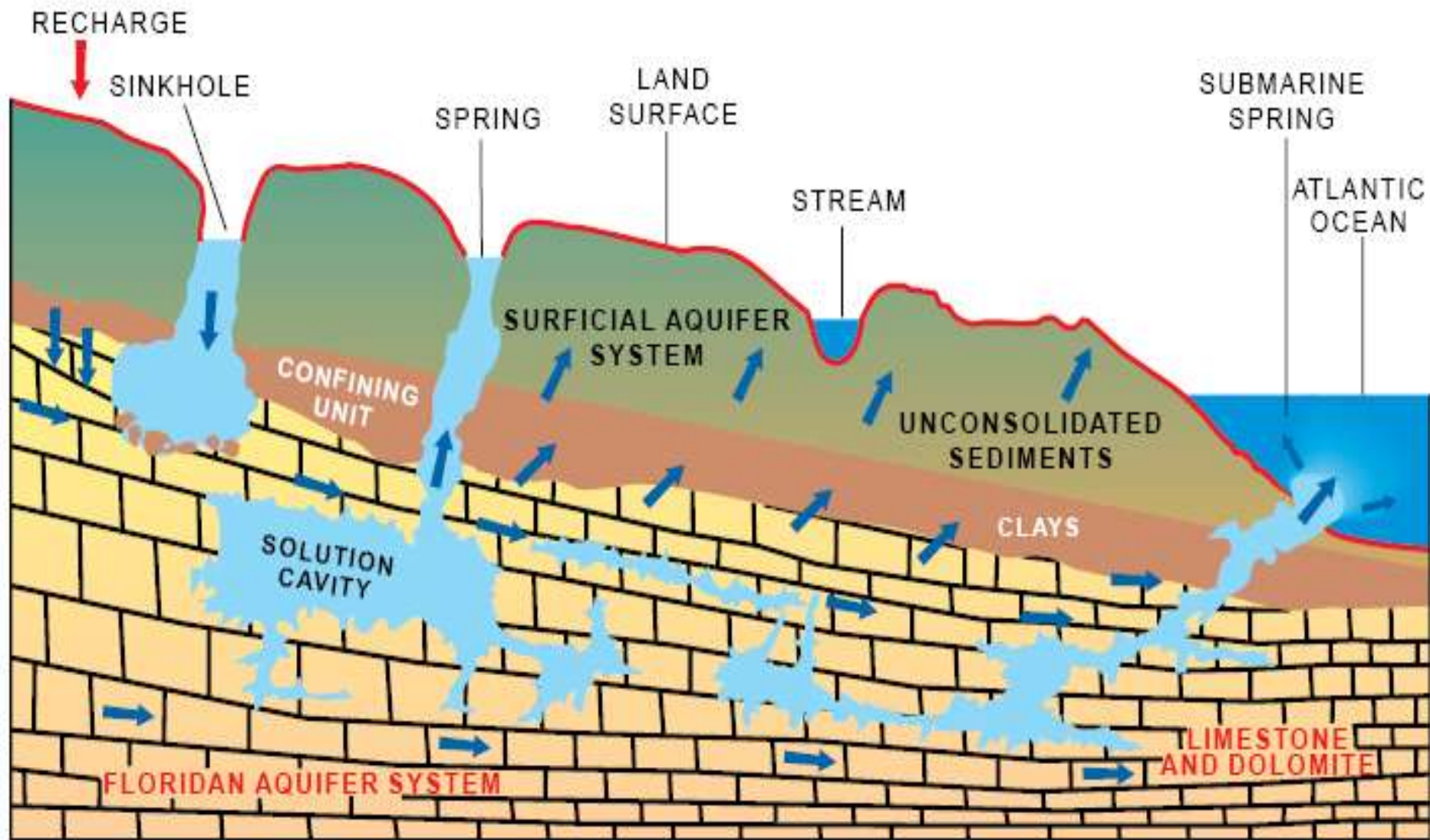
Definition:

- ▣ **Karst** – a type of topography that is formed on limestone, gypsum and other rocks by dissolution, and that is characterized by sinkholes, caves and underground drainage (Bates and Jackson, 1987)



- ❑ As rainwater falls through the atmosphere it picks up carbon dioxide and becomes slightly acidic.
- ❑ The slightly acidic rainwater becomes more acidic as it moves through soil.
- ❑ Limestone, which underlies all of Florida, is dissolved by the acidic water. This creates pore space including cavities, caves and conduits.





EXPLANATION

➔ DIRECTION OF GROUND-WATER FLOW



Figure 2. Generalized cross section showing the geohydrology and springs of Florida.

FLORIDA KARST FEATURES

Unknown number of
sinkholes and swallets

Numerous caves – air
and aqueous.

Over 700 known springs

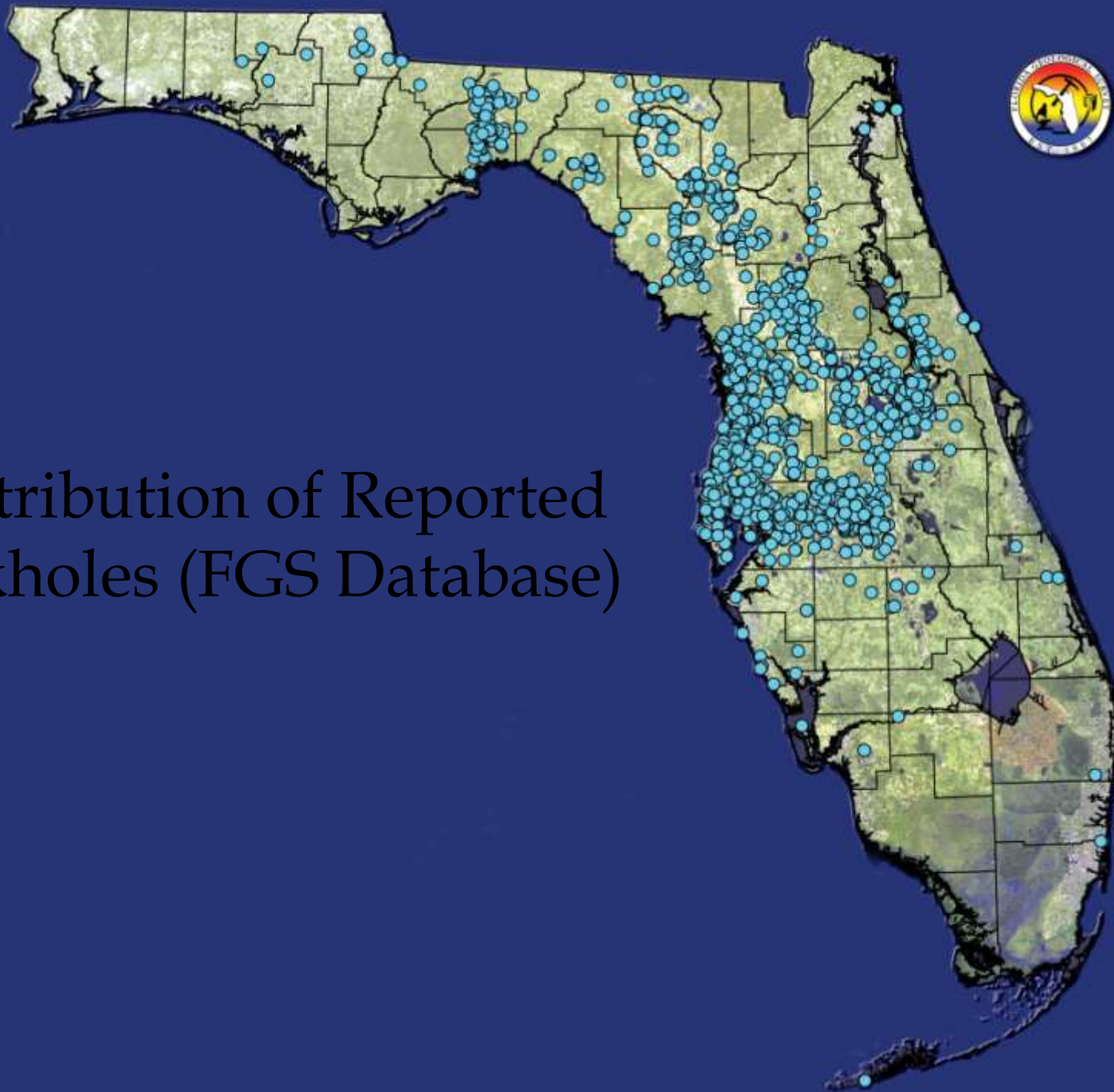
32 first magnitude
springs (100cfs or more),
more than any other state

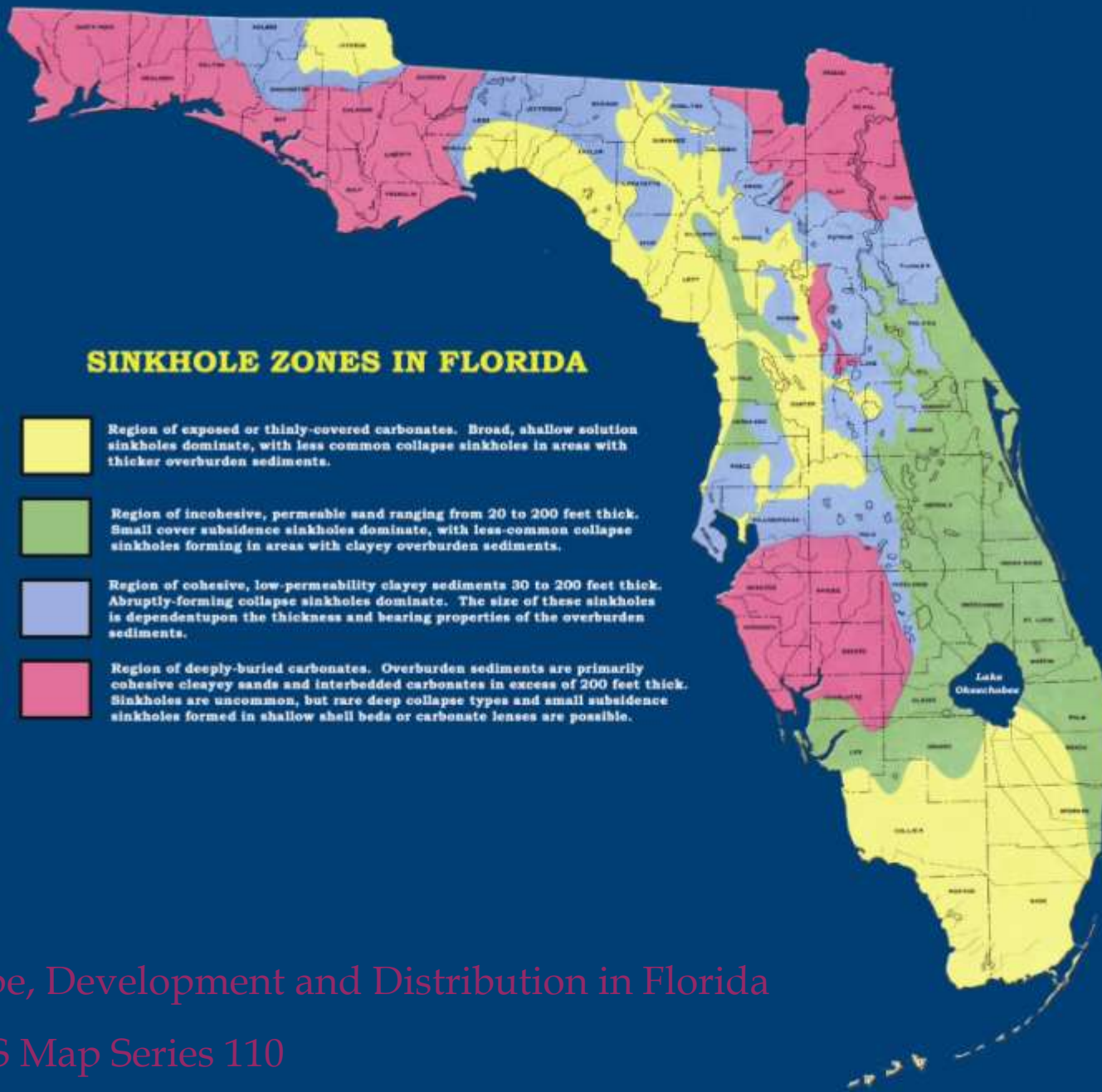
Unknown number of
undocumented springs

Offshore springs



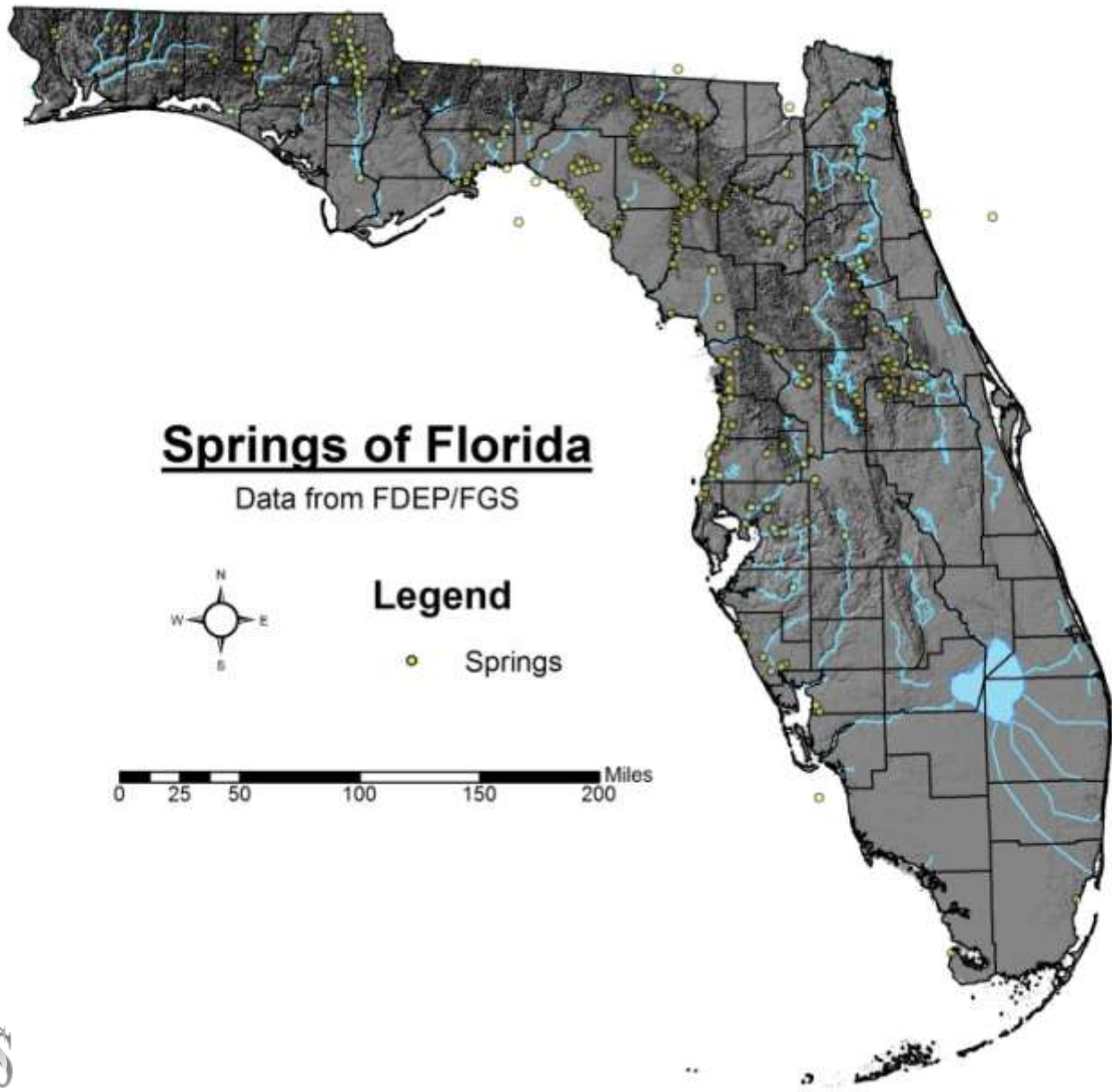
Distribution of Reported Sinkholes (FGS Database)





Type, Development and Distribution in Florida

FGS Map Series 110



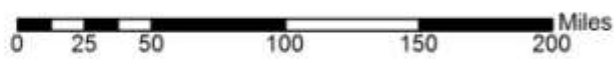
Springs of Florida

Data from FDEP/FGS



Legend

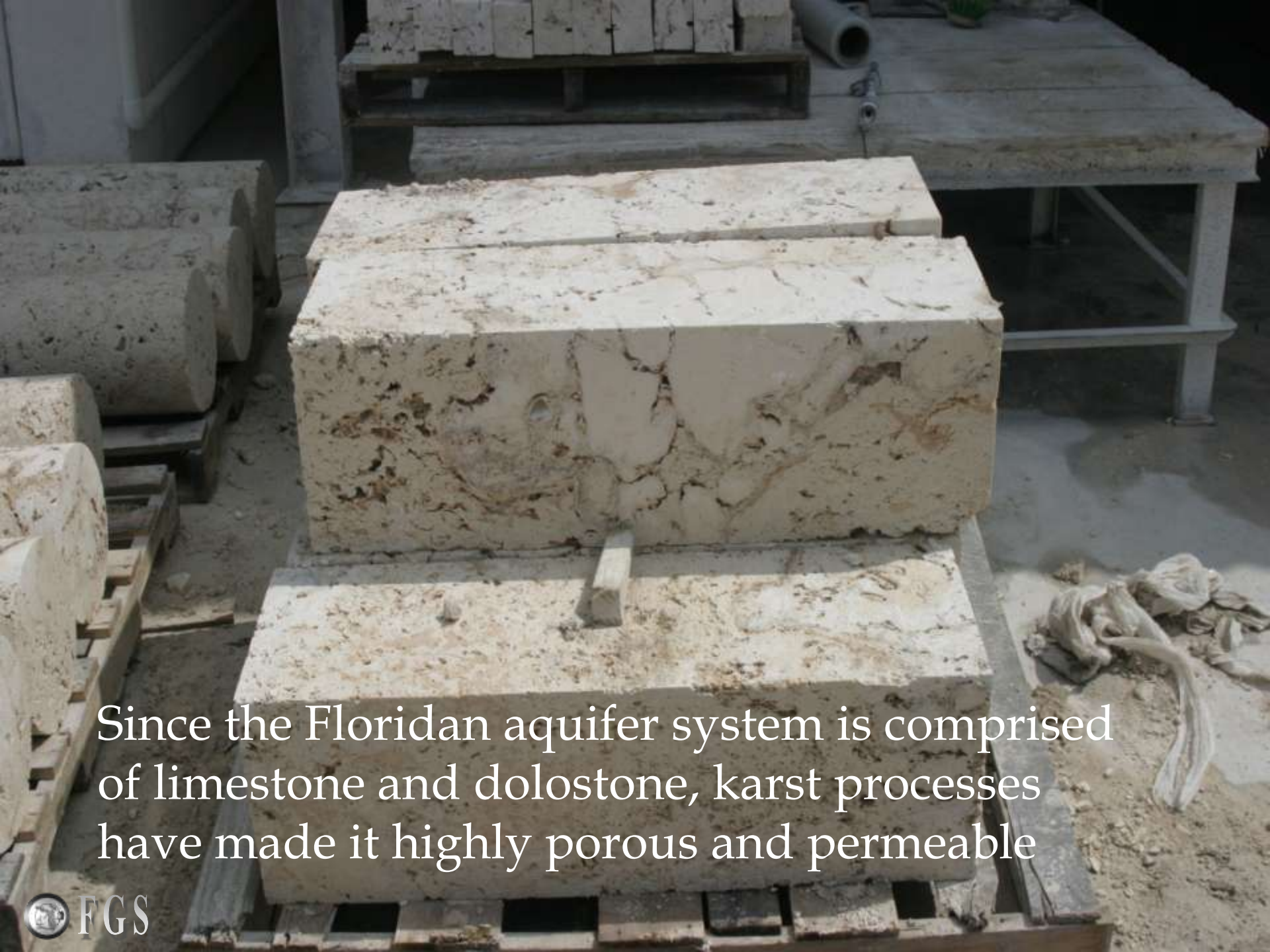
● Springs



Florida's Aquifer Systems

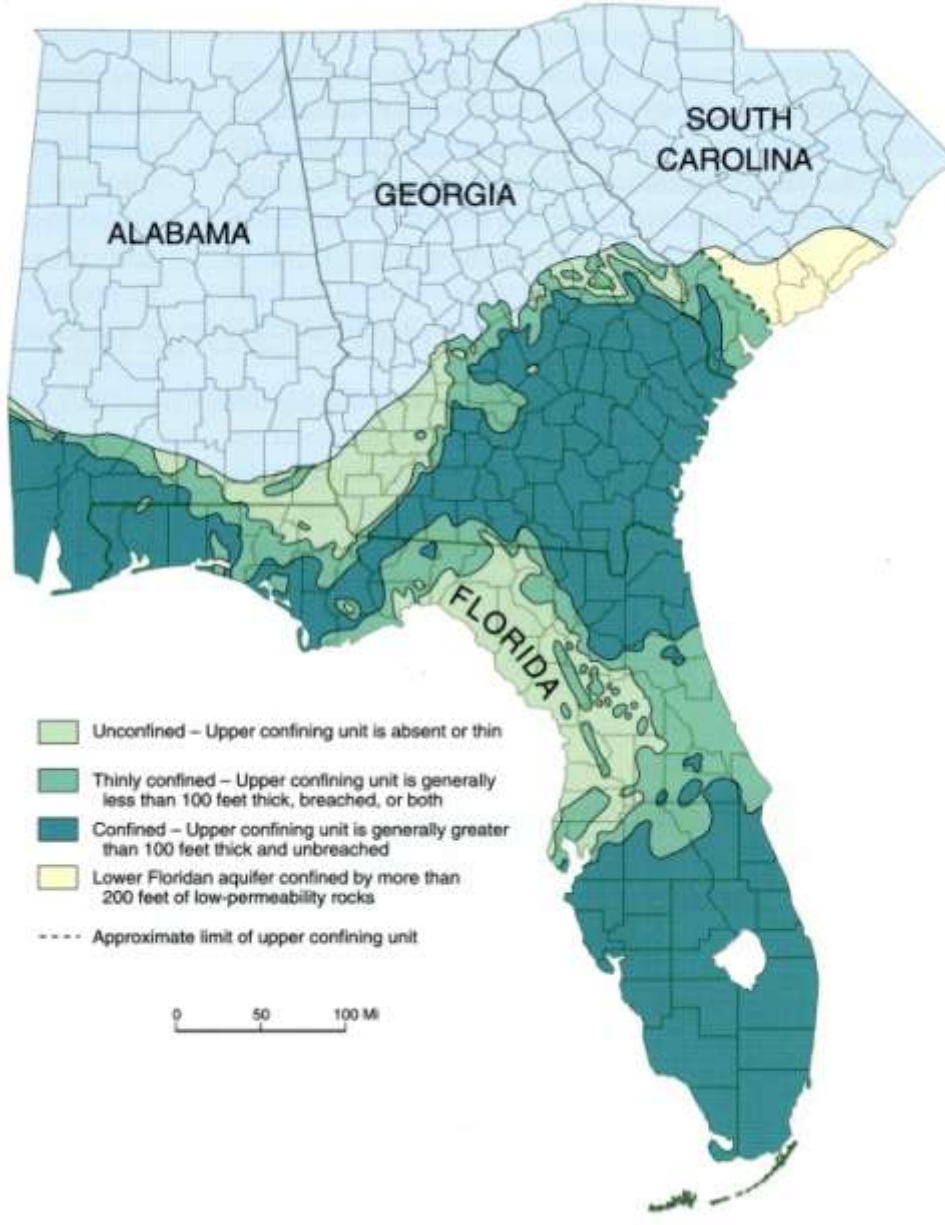
- surficial aquifer system
- intermediate aquifer system and confining unit
- Floridan aquifer system- primary for drinking water and main source for most of Florida's major springs.



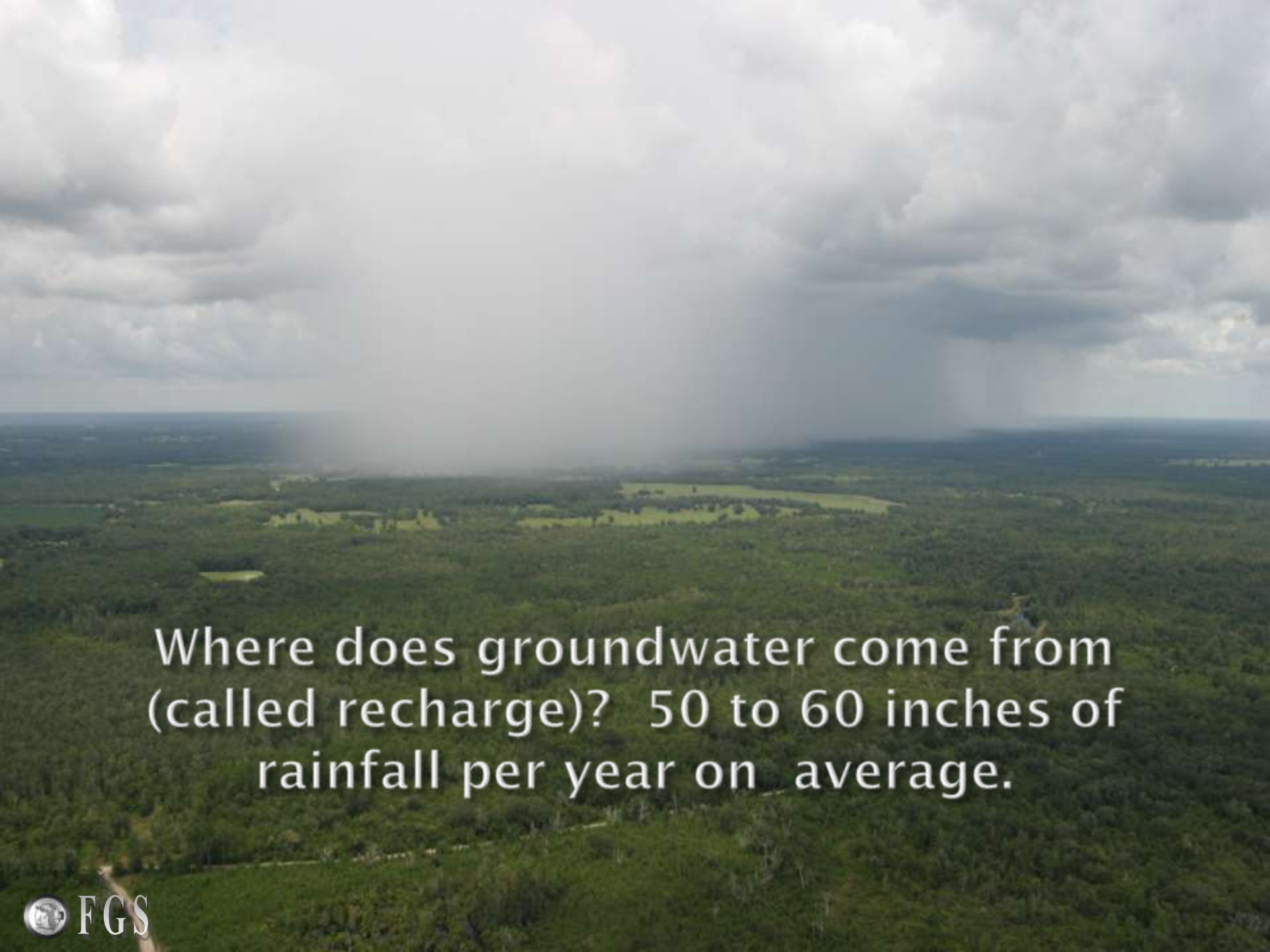


Since the Floridan aquifer system is comprised of limestone and dolostone, karst processes have made it highly porous and permeable

Confinement of the Floridan Aquifer System

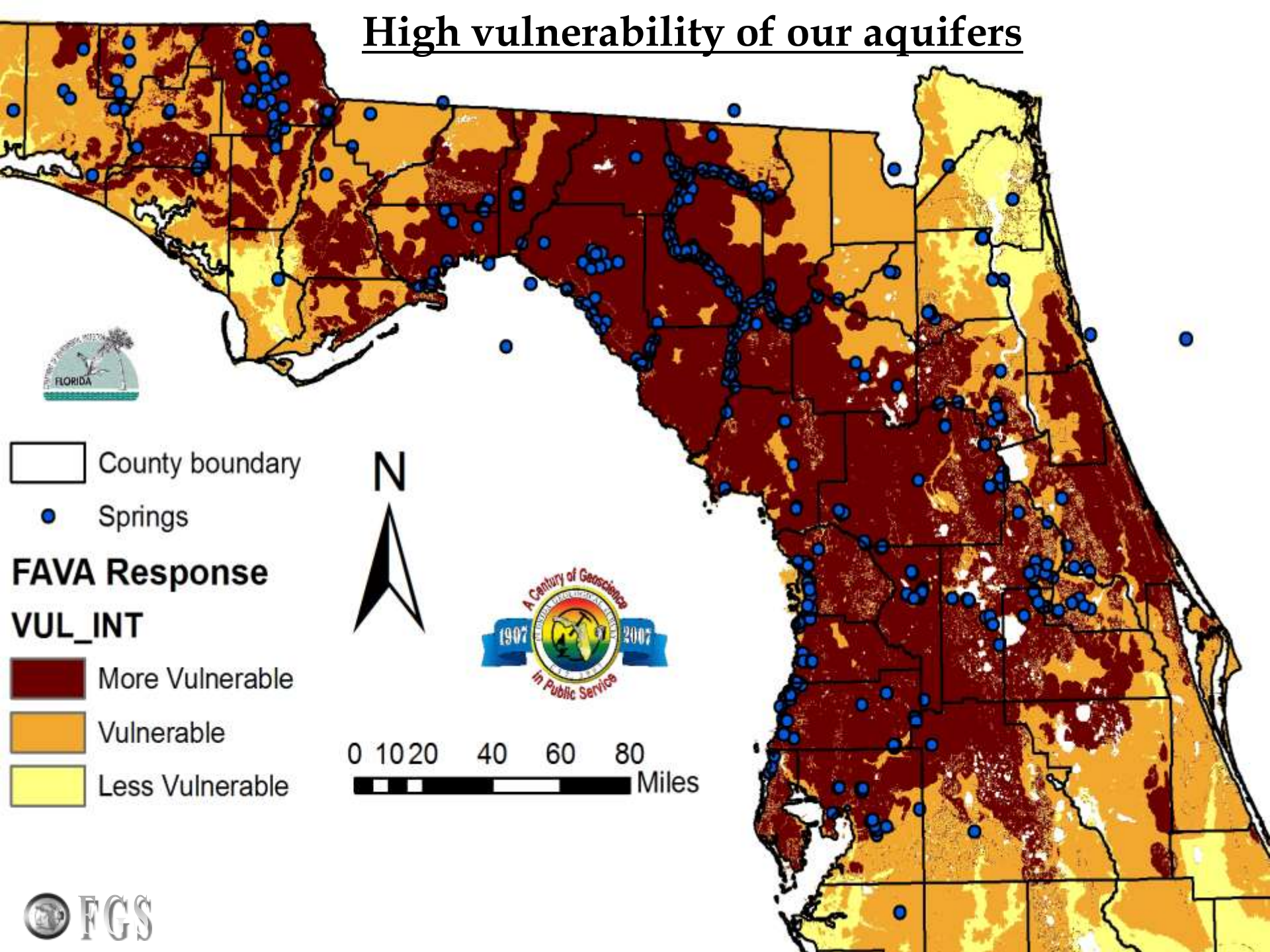


- ▣ Where the aquifer system is confined, some protection of the groundwater from surface activities occurs.
- ▣ Confinement = clay and less permeable geological materials.

An aerial photograph of a vast, green forested landscape. In the upper right, a large, dark, stormy cloud is visible, with a vertical column of rain falling from it onto the forest below. The horizon is flat and distant. The overall scene is dramatic and atmospheric.

Where does groundwater come from (called recharge)? 50 to 60 inches of rainfall per year on average.

High vulnerability of our aquifers

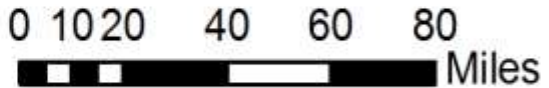


- County boundary
- Springs

FAVA Response

VUL_INT

- More Vulnerable
- Vulnerable
- Less Vulnerable



Because of Florida's karst:

- ▣ We have one of the most prolific aquifer systems in the world.
- ▣ We have a large concentration of springs, sinkholes and caves (karst features).
- ▣ We get rapid recharge of rain water which replenishes the system.
- ▣ We have an aquifer system that is highly vulnerable to contamination.

Questions??

