



Groundwater Resources & Pollution

Wednesday, October 26th, 2005

Resource

- **A supply of material that we draw upon when needed**

Natural Resource

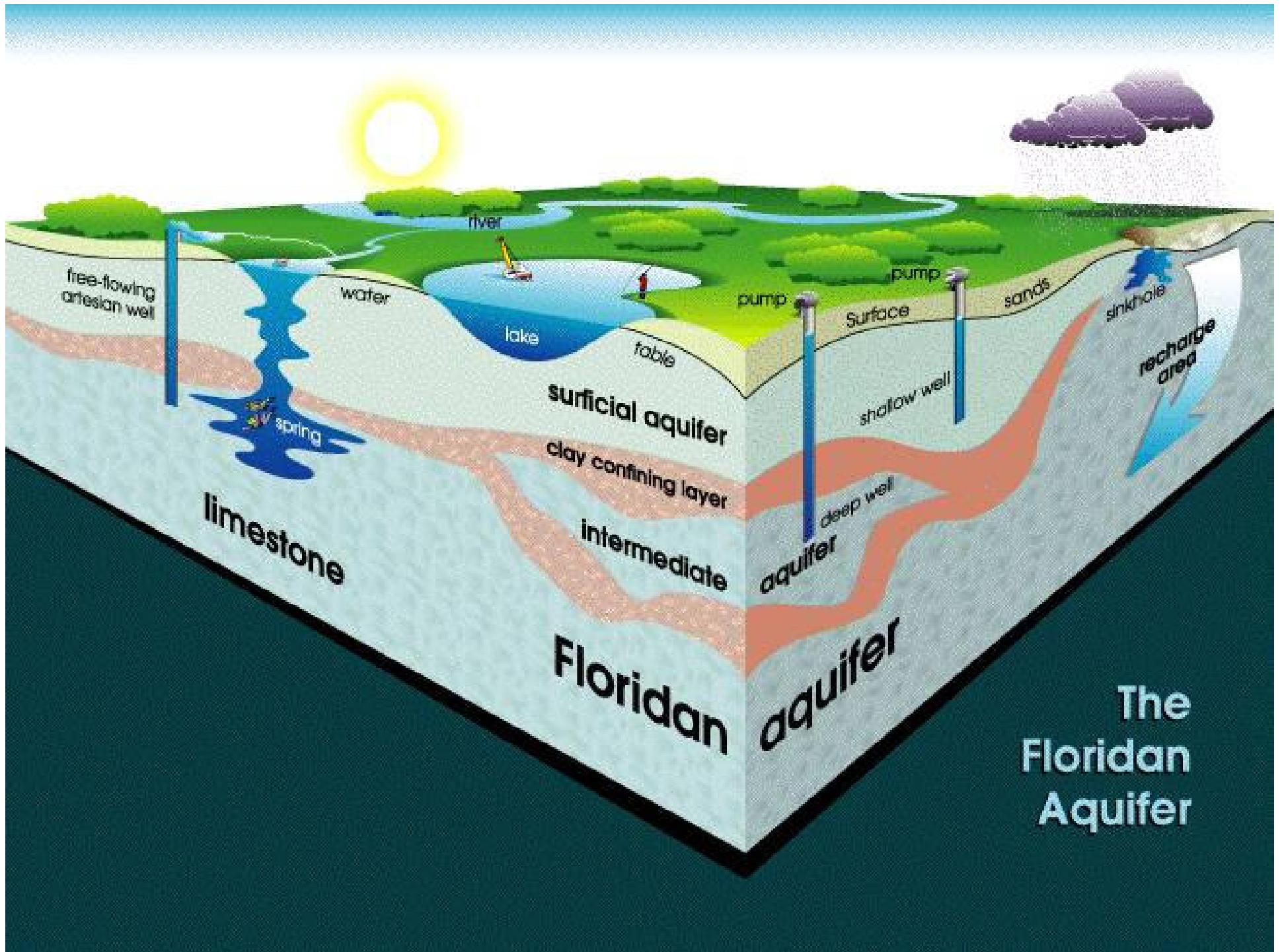
- **Anything found in a nature that is valuable to humans for survival**
- **land, soil, air, water, minerals, trees & plants**

Where is all the Water on Earth?

- **97% of all water is in the oceans**
 - **This is marine (salt) water**
- **69% of all fresh water is frozen**
 - **Glaciers, ice caps, permafrost**
- **30% of fresh water is in the ground**
- **Less than 1% is in rivers and lakes**

Groundwater Resources

- **96% of usable fresh water is under ground**
- **Florida has a very large supply of fresh water under the ground**



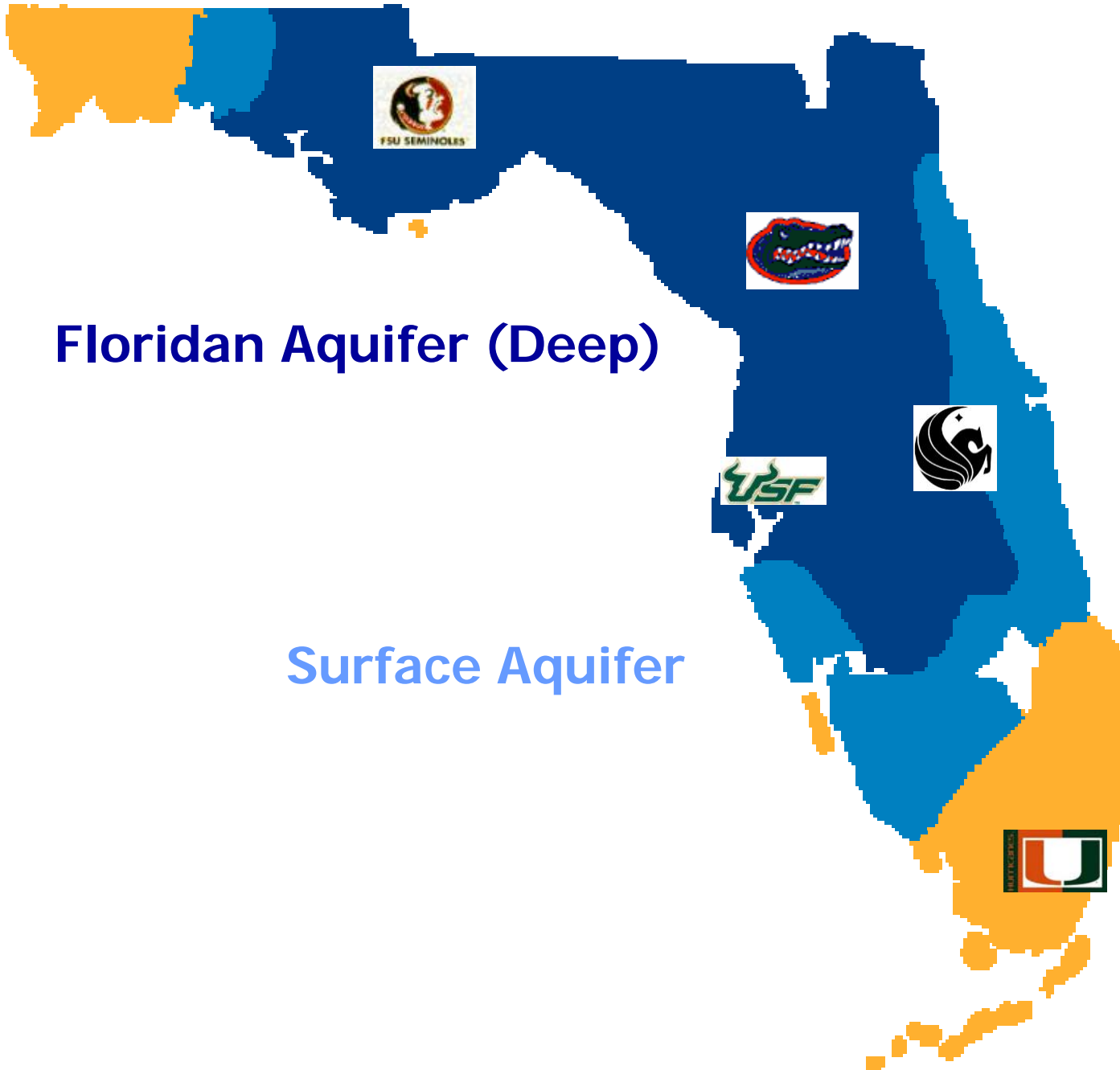
The Floridan Aquifer

Aquifer

- **Sand, gravel, or rock capable of storing water below the surface of the land**

Water Table

- **The level below which soil and rock are saturated with water**

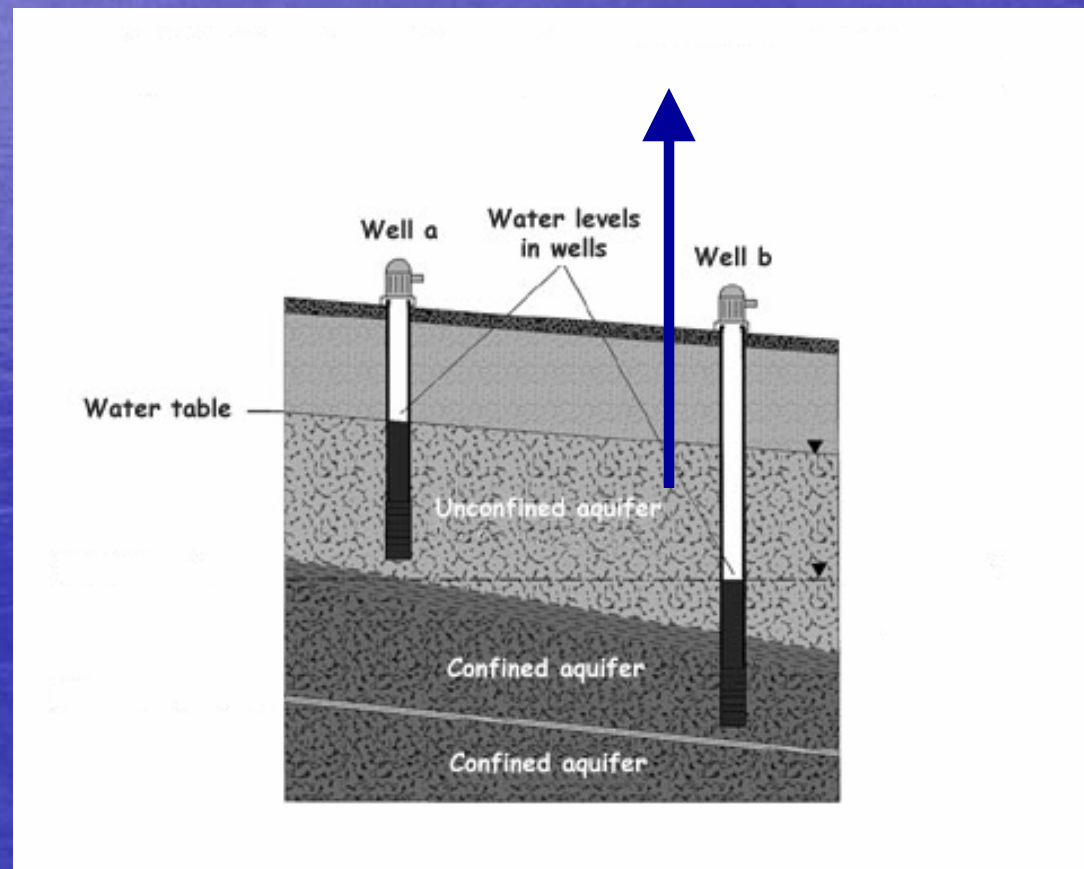


Floridan Aquifer (Deep)

Surface Aquifer

Well Pumping

- We can pump out groundwater with a well



Well Pumping

- Most home wells are in the surface aquifer
- Municipal wells are deep in the **Floridan Aquifer** - **GRU's well field on 53rd Ave**



Human Impacts to Water Resources

- **Lakes, Streams and Rivers easily affected by human activity**
- **Rain washes everything downhill**
 - **pesticides, soil erosion, fertilizers, industrial waste, animal waste, sewage wastewater, pavement oil & gas spills**

POINT SOURCE

Direct discharge into water

Sewage
Treatment
Plants

Dumping
Toxins

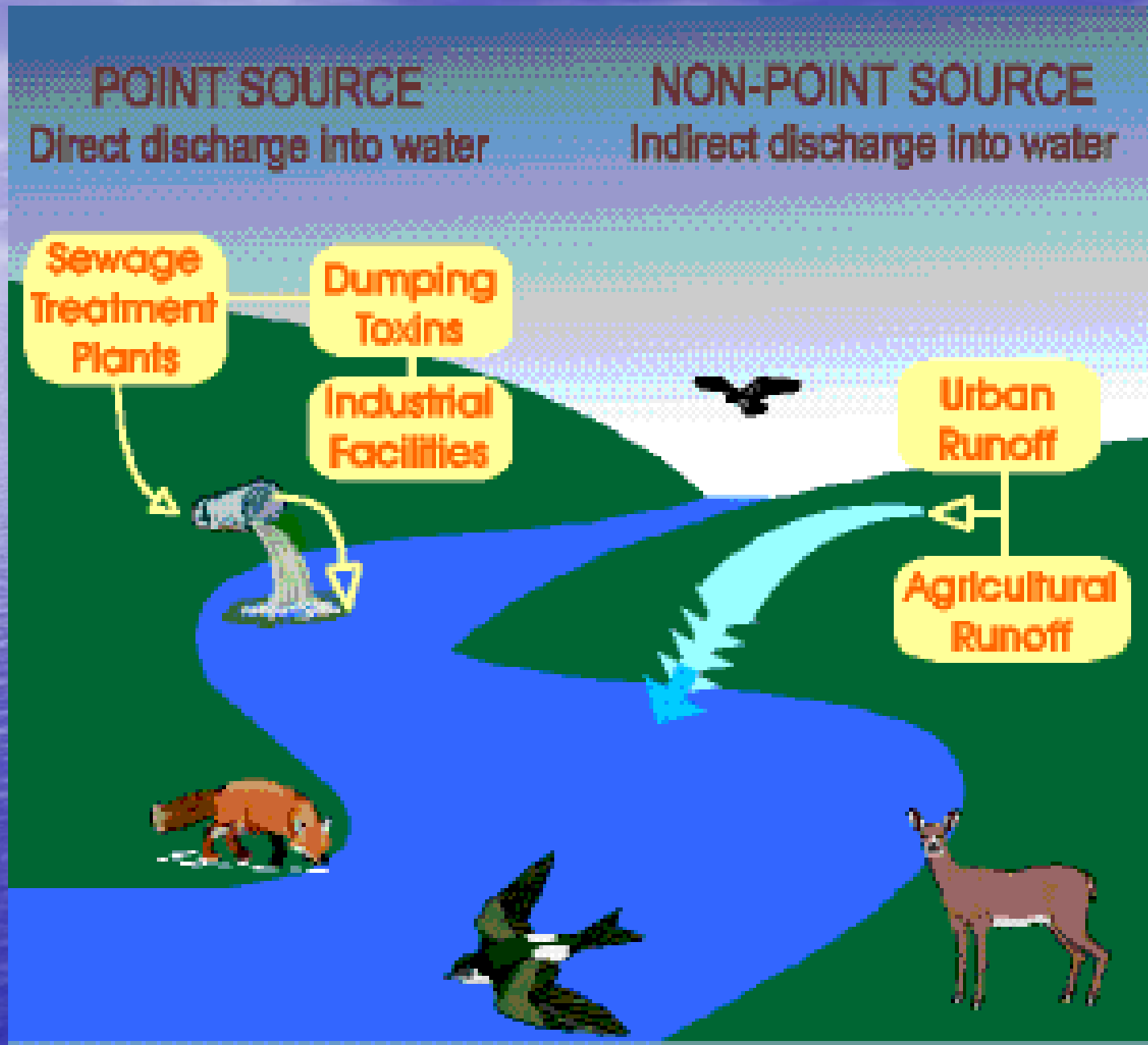
Industrial
Facilities

NON-POINT SOURCE

Indirect discharge into water

Urban
Runoff

Agricultural
Runoff

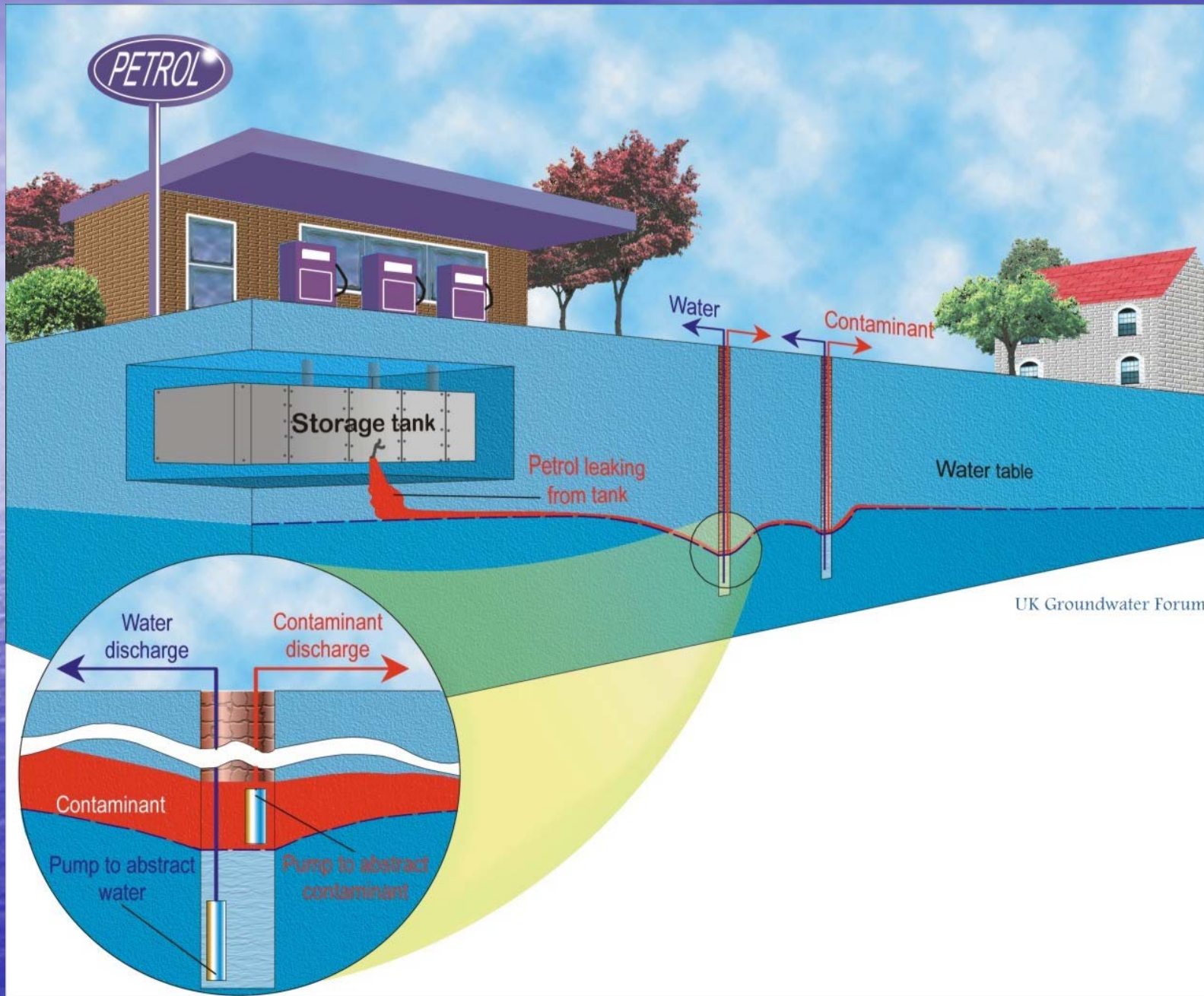


Environmental Health

- **Human activity affects surface water**
 - **This impacts ecosystems – plants and wildlife**
 - **And human surface water sources**
- **Gas stations, Military bases, Industrial Wastes, & Dry cleaners can affect groundwater**
 - **This impacts human water sources**

What happens when a gas station tank leaks?

- **Gasoline is lighter than water so it floats on the water table**
 - **Underground gas station tanks can leak**
 - **Over 310 petroleum spills in Alachua County, FL**
 - **Over 100 have been cleaned up**



UK Groundwater Forum

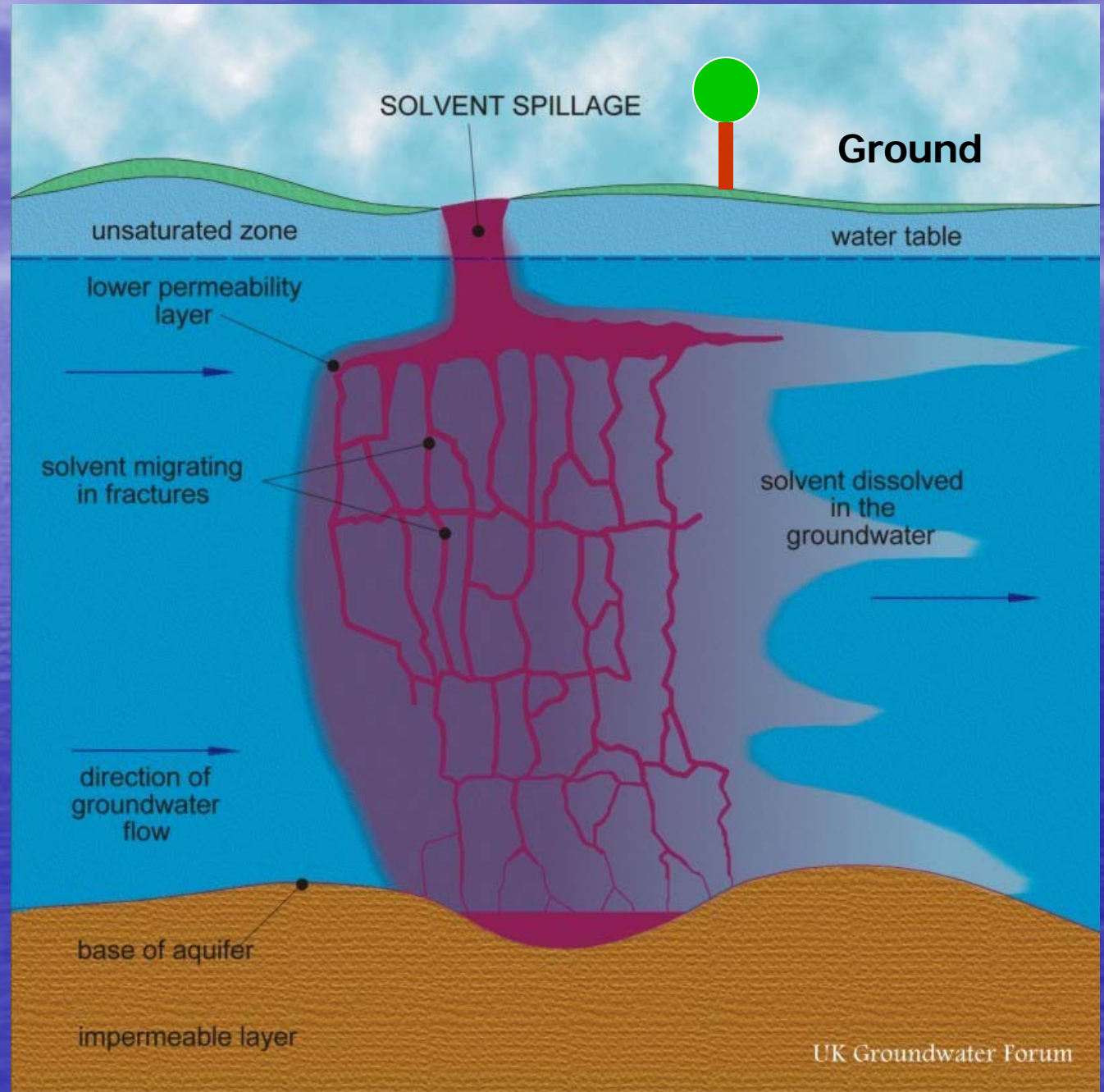
Environmental Effects of Gas Spills

- Many gasoline components are toxic
 - Benzene, toluene (BTEX)
- Slowly dissolve into the groundwater
 - Contaminating well water
- Can resurface in rivers, lakes, and streams
 - Toxic to plants and animals

What happens when Industrial Solvents are spilled?

- **Industrial Solvents are heavy and sink deep into the aquifer**
 - **Dry cleaners, industrial degreasers, military base degreasers**
 - **Over 1400 drycleaners in FL have reported spills**

Dry Cleaner Spills



Environmental Effects of Industrial Spills

- **Many industrial solvents are toxic**
- **Others cause cancer**
 - **Get into our well water**
 - **Cancer clusters, leukemia**

Let's do an Experiment

- **Get in groups of 2-3**
- **Fill 2 small cups with salad oil or molasses, mass the cups**
- **Fill 2 plastic cups $\frac{1}{2}$ full with water**
- **Try to predict the addition of oil and molasses to the water cups**
- **Add the salad oil and molasses to the water cup**

Results Questions

- How did your prediction compare to your results?
- Which one represents gasoline spill?
- Which one represents industrial solvent spill?
- **Bonus: Which do think is easier to clean up?**

Local Groundwater Pollution

- **Beezer/Cabot Koppers site**
 - **NW 23rd Ave and Main St**
 - **Treated wood – telephone pole coating**
 - **Opened chemical ponds into Hogtown Creek in 1967**
 - **Chemicals have seeped into the groundwater**
 - **The pollution is being drawn to GRU's wells**
 - **1984 added to EPA SUPERFUND site list**
 - **Who do you think will be affected ?**