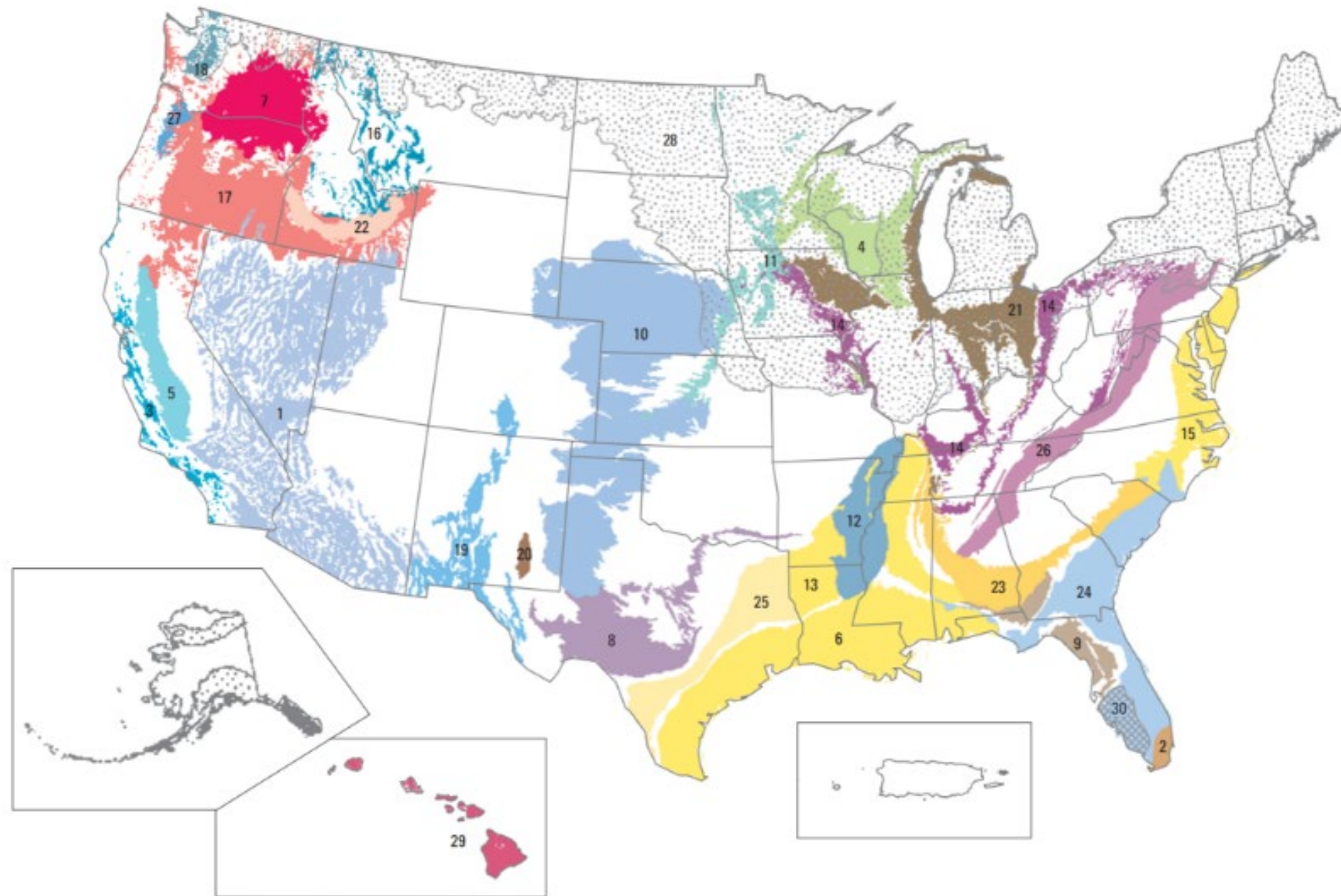


GROUNDWATER & ARIZONA: Pre Lesson 1

Unearthing Groundwater:

Groundwater Use in the U.S.

- The National Ground Water Association has determined that 38% of the U.S. population, depends on groundwater for its drinking water supply.



EXPLANATION
Thirty of the principal aquifers

GROUNDWATER & ARIZONA: Pre Lesson 1

ARIZONA'S WATER SUPPLY

36%

COLORADO RIVER

18%

IN-STATE RIVERS

5%

RECLAIMED WATER

41%

GROUNDWATER

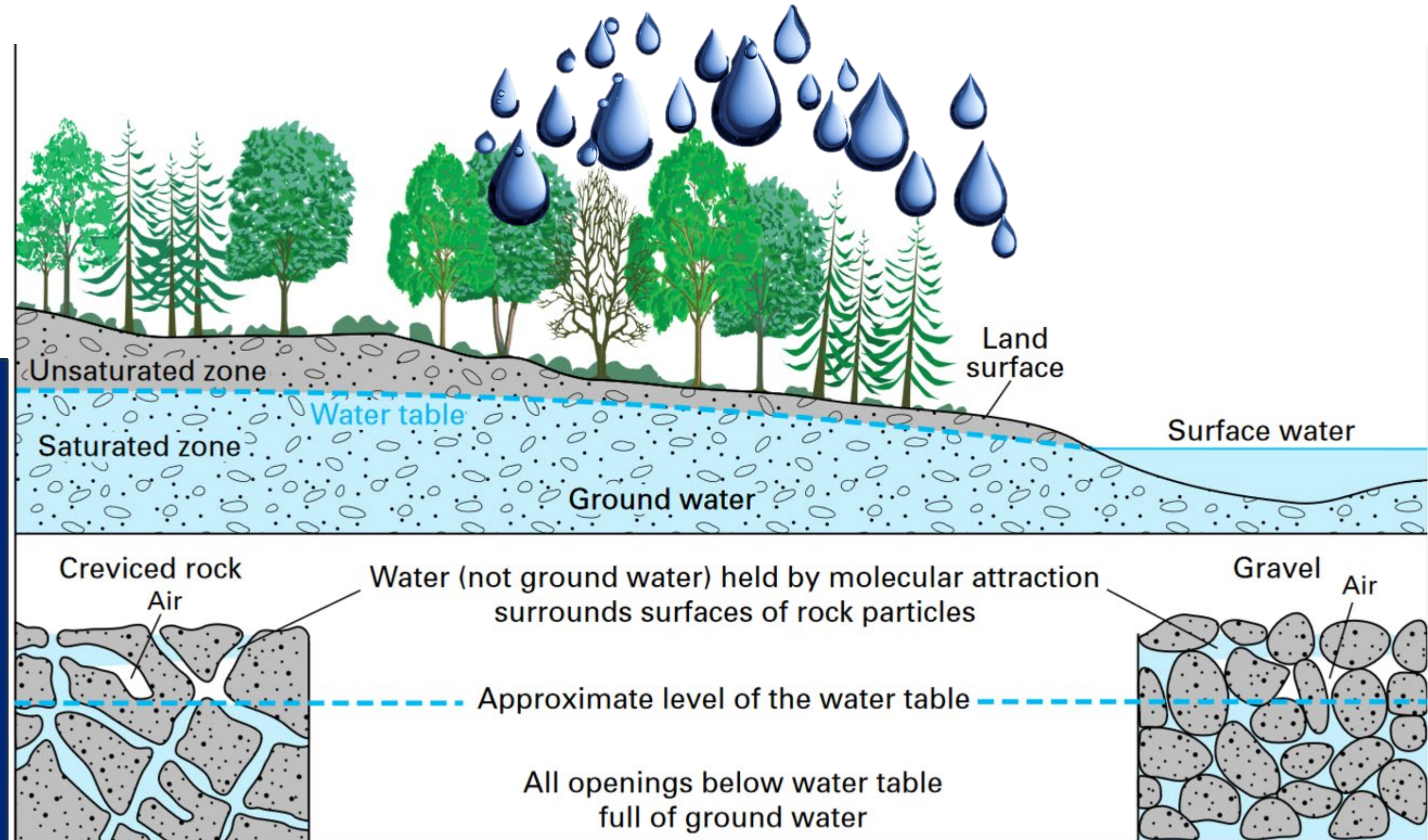
SOURCE: ADWR, 2020

How
important is
groundwater
to Arizona?

Let's Review!

Pore Spaces

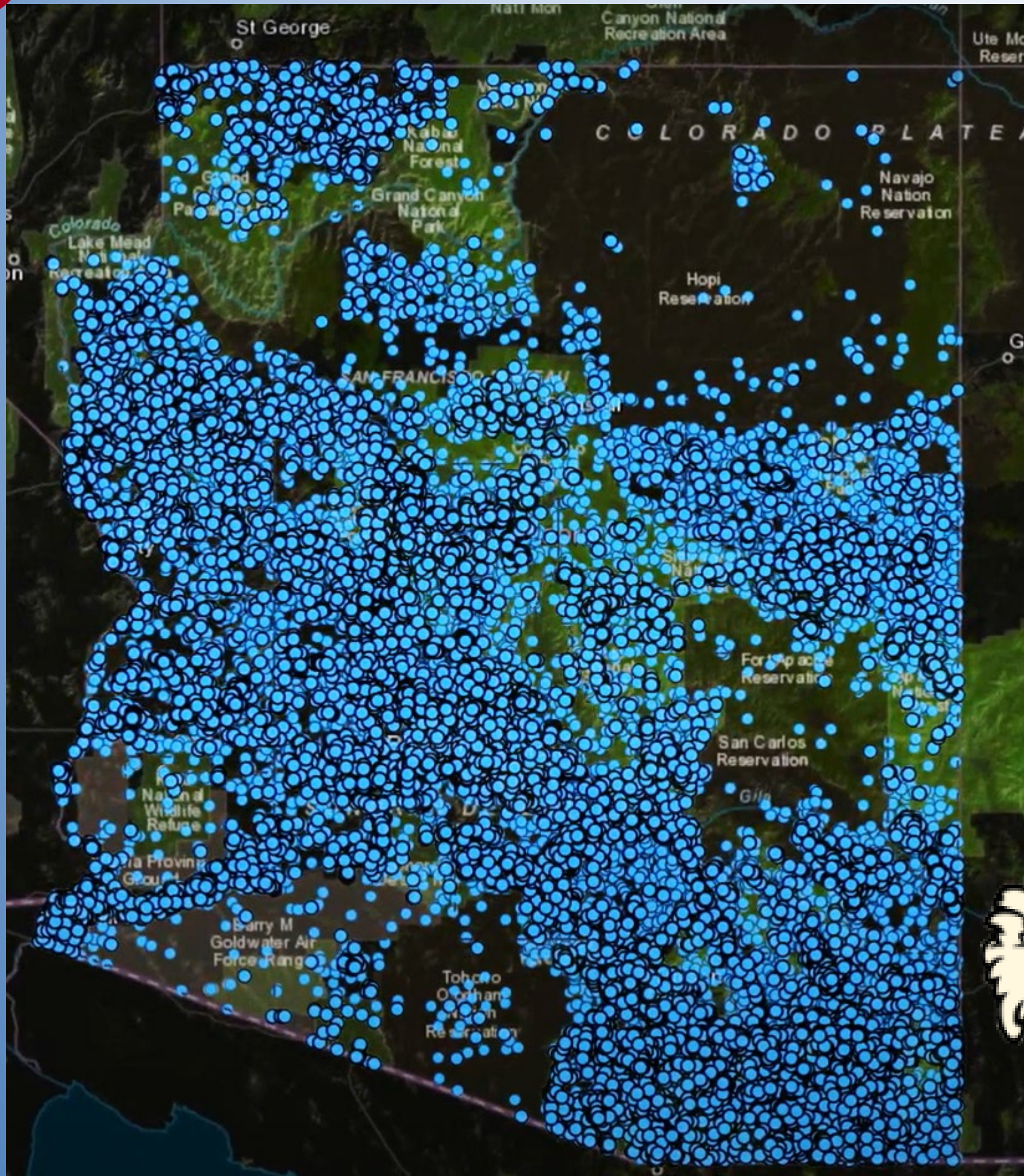
Groundwater moves between the spaces and pores and is pulled down due to gravity. The bigger the spaces between the materials, the faster or easier the water can move around it.



Aquifer:

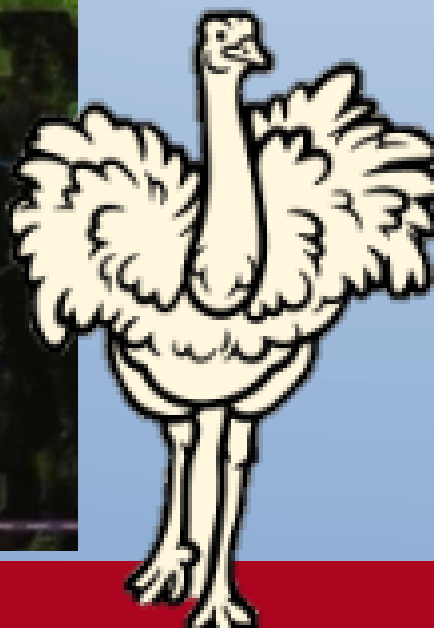
An area where significant groundwater is present. Groundwater flows between layers of earth materials.

GROUNDWATER & ARIZONA: Pre Lesson 1



Well, well, well, what do we have here?

- How do we access and use groundwater?
- Both individual landowners and city municipalities drill wells to access groundwater.



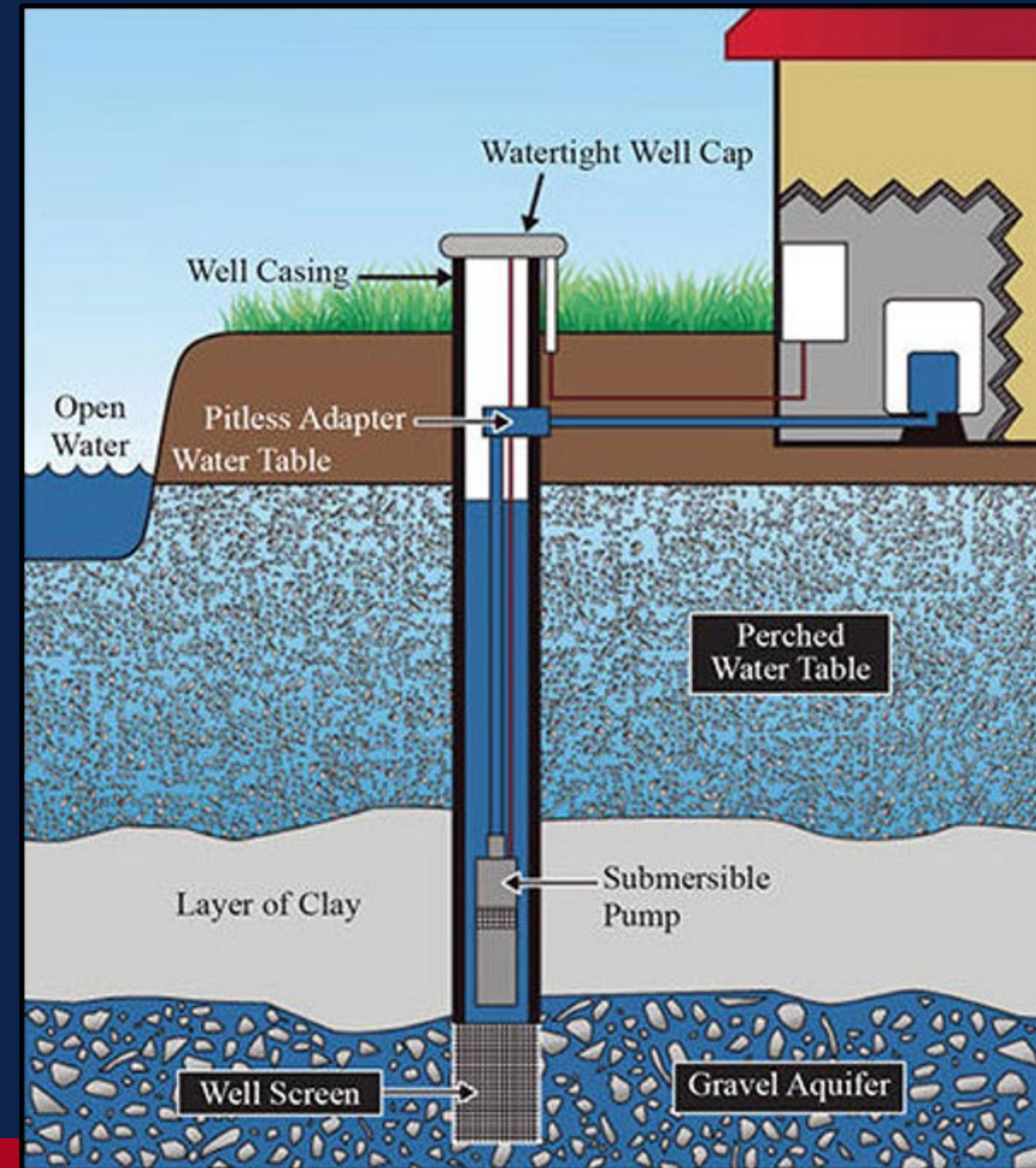
GROUNDWATER & ARIZONA: Pre Lesson 1

How do we pump it up and why?

- We use it for drinking water, agriculture, and for pretty much everything else.
- Do different places have different amounts of groundwater? Do you think it is evenly distributed under Arizona?

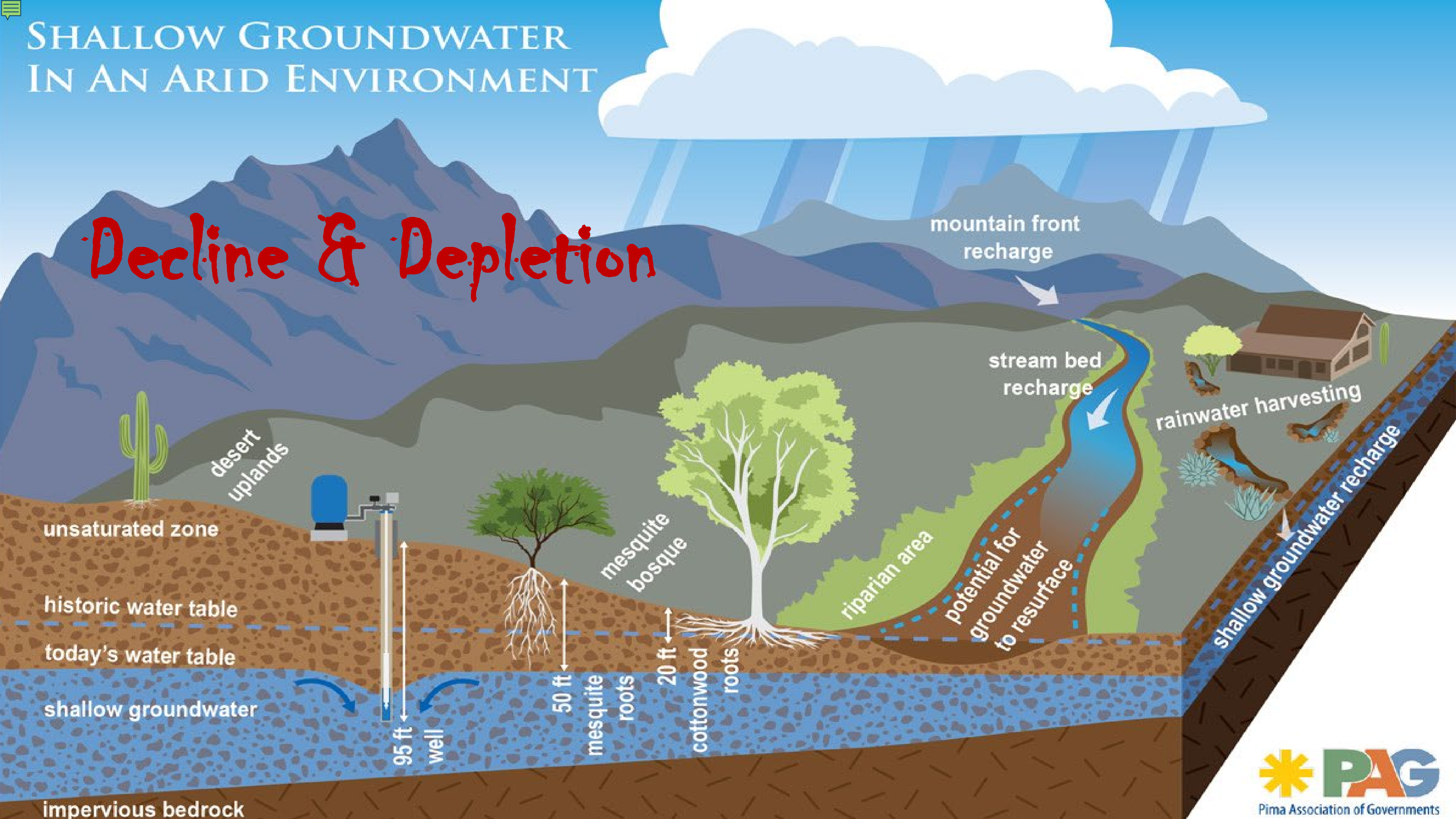


SOURCE: ADWR, 2020



SHALLOW GROUNDWATER IN AN ARID ENVIRONMENT

Decline & Depletion





Sink Holes, Fissures & Land Subsidence, Oh My!



GROUNDWATER & ARIZONA: Pre Lesson 1



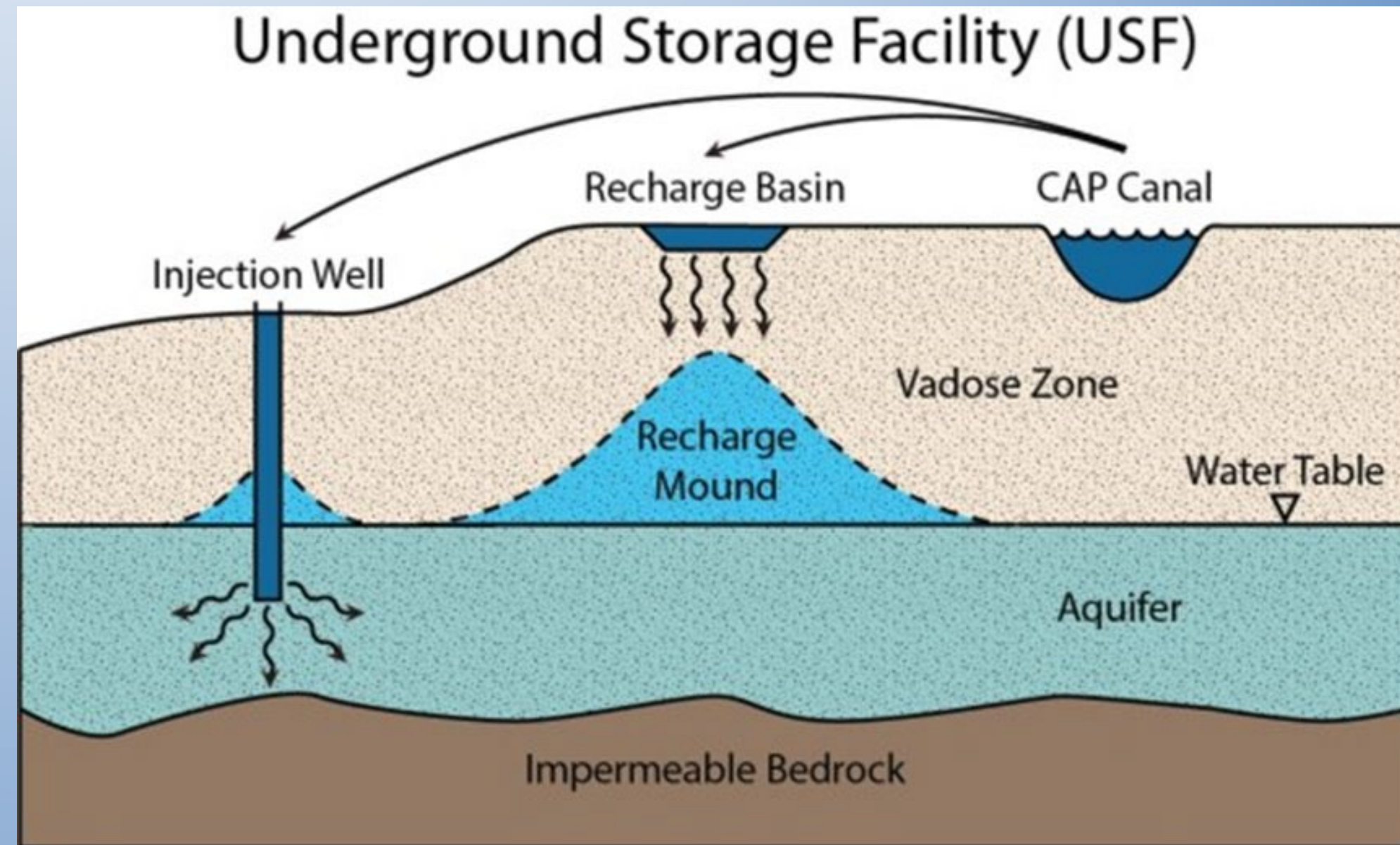
1980 Arizona Groundwater Management Act

- Active Management Area and Irrigation Non-Expansion Area designations
- Groundwater pumping limitations
- Recharge

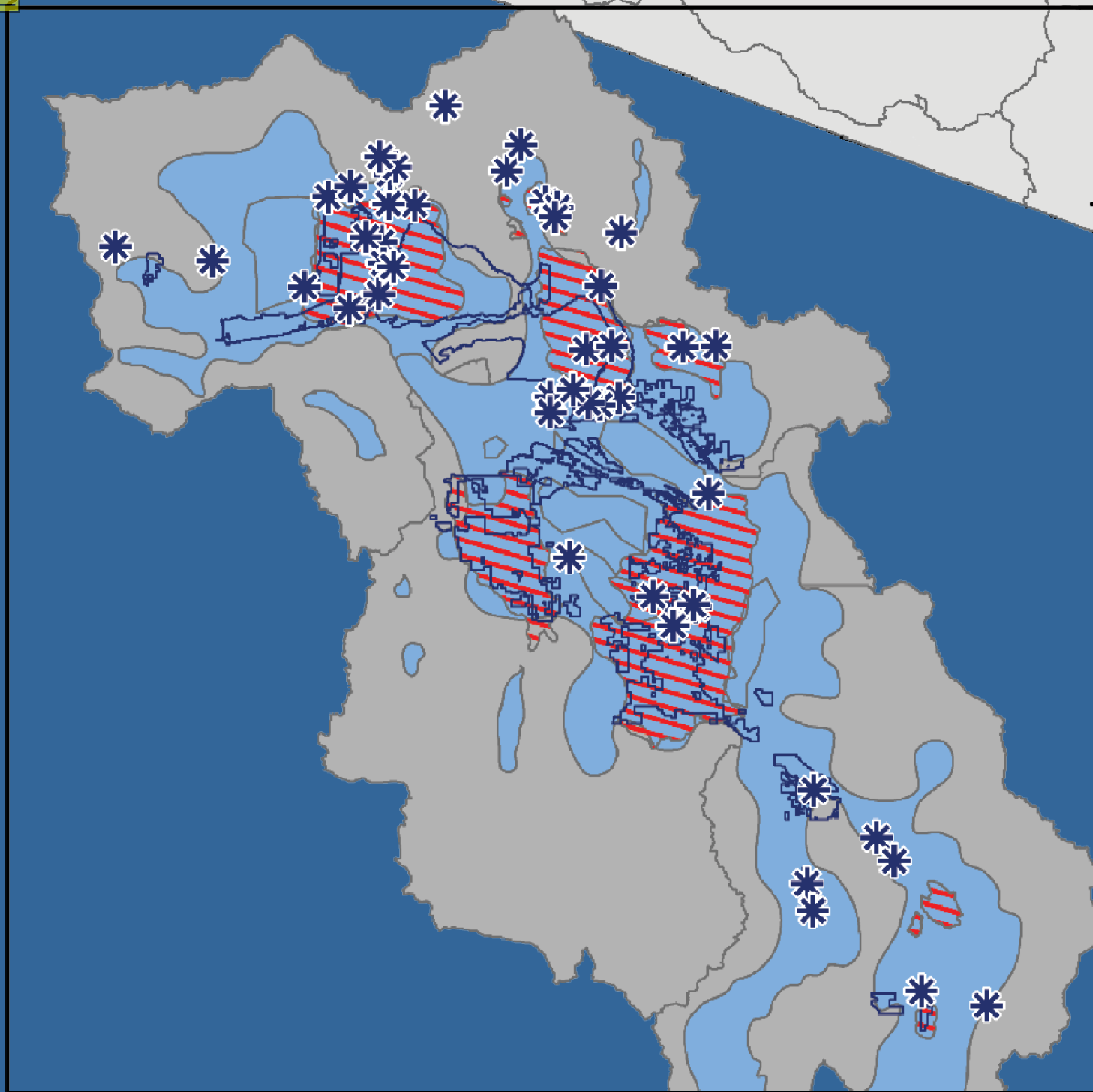


GROUNDWATER & ARIZONA: Pre Lesson 1

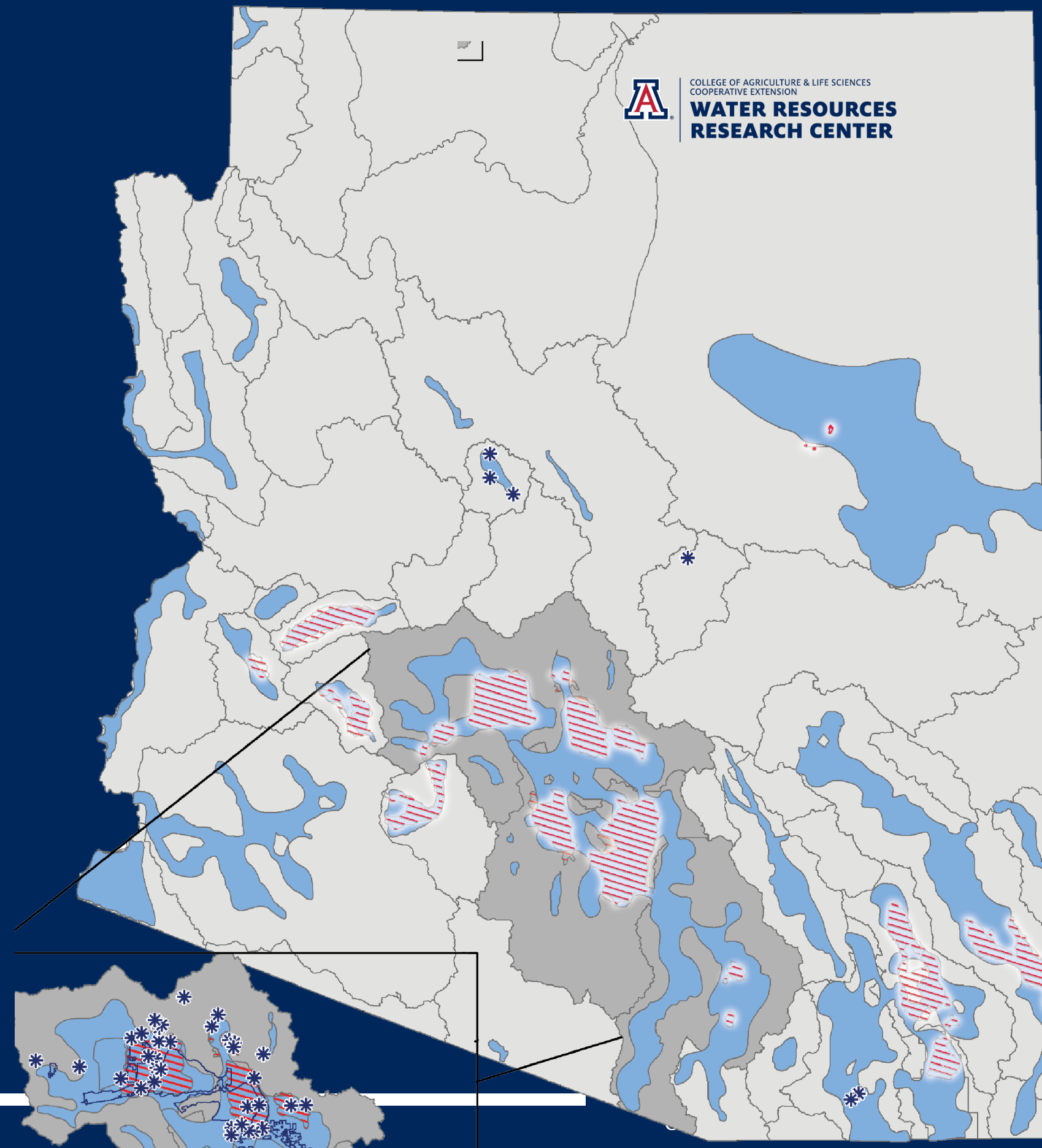
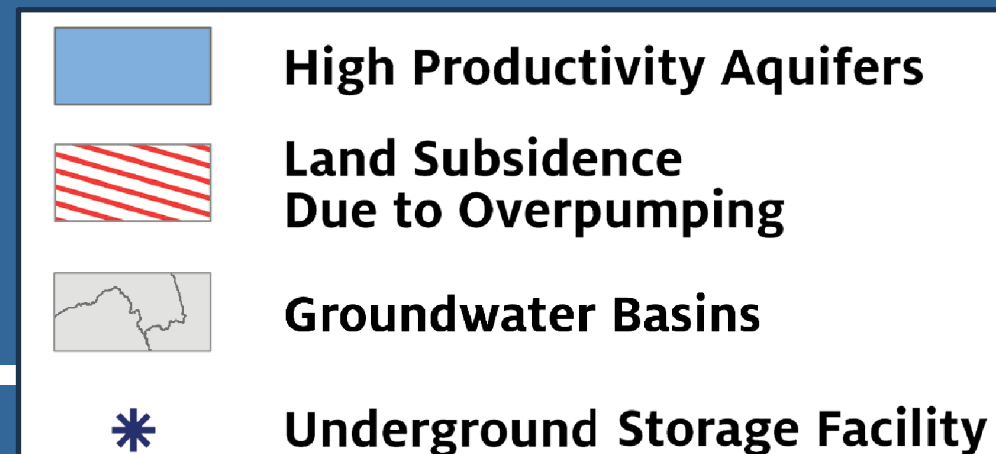
Recharging the Aquifer



SUBSIDENCE AND STORAGE



Source: ADWR 2014



GROUNDWATER & ARIZONA: Pre Lesson 1



- Watch Series of Arizona Groundwater Videos – an APW & ADWR joint project.



THE UNIVERSITY
OF ARIZONA

Groundwater & Sustainability : Lesson 1



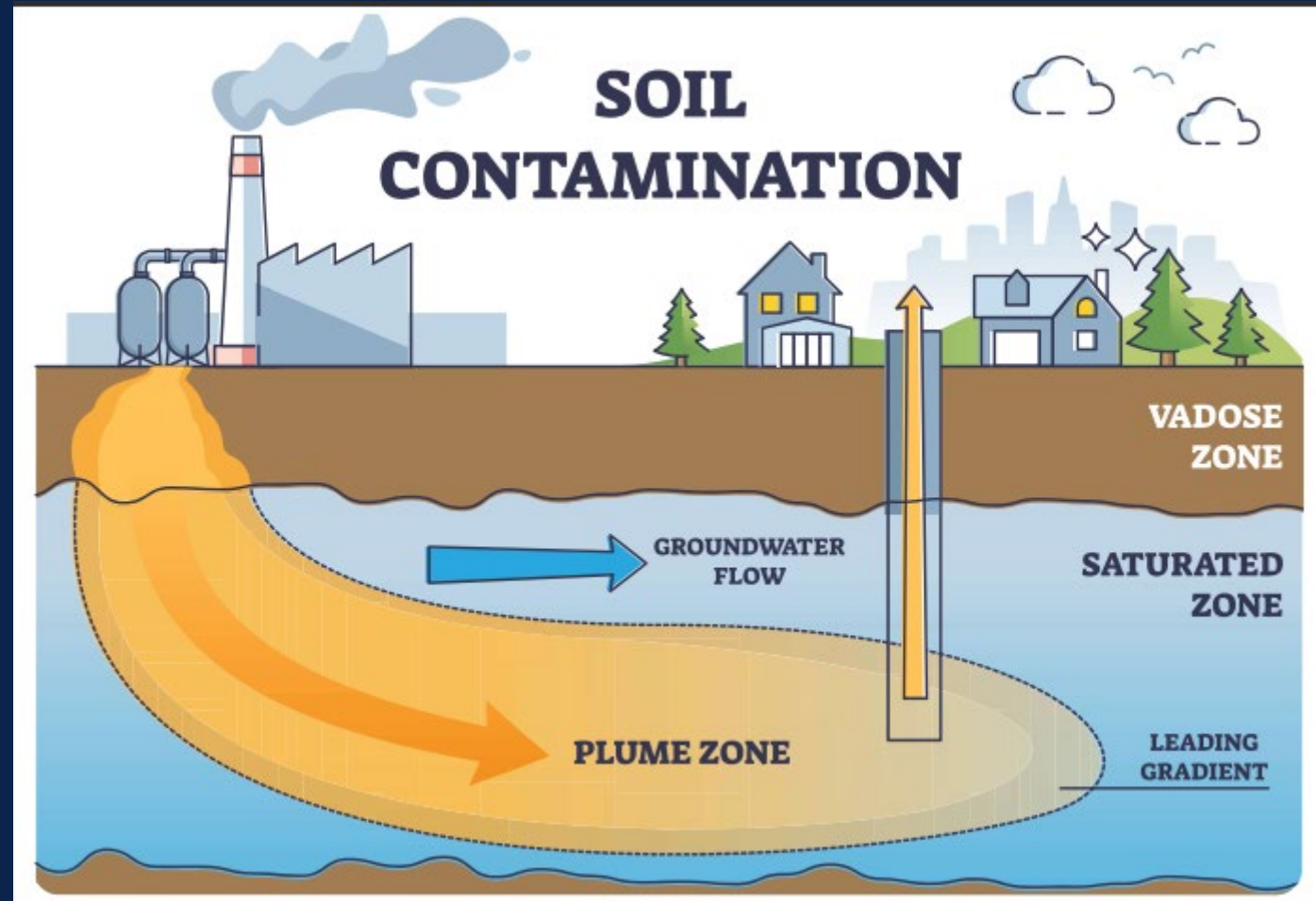
A PLUME PROBLEM



Investigative Questions

- How does water move underground?
- If groundwater is contaminated, will pollutants move to other nearby locations?

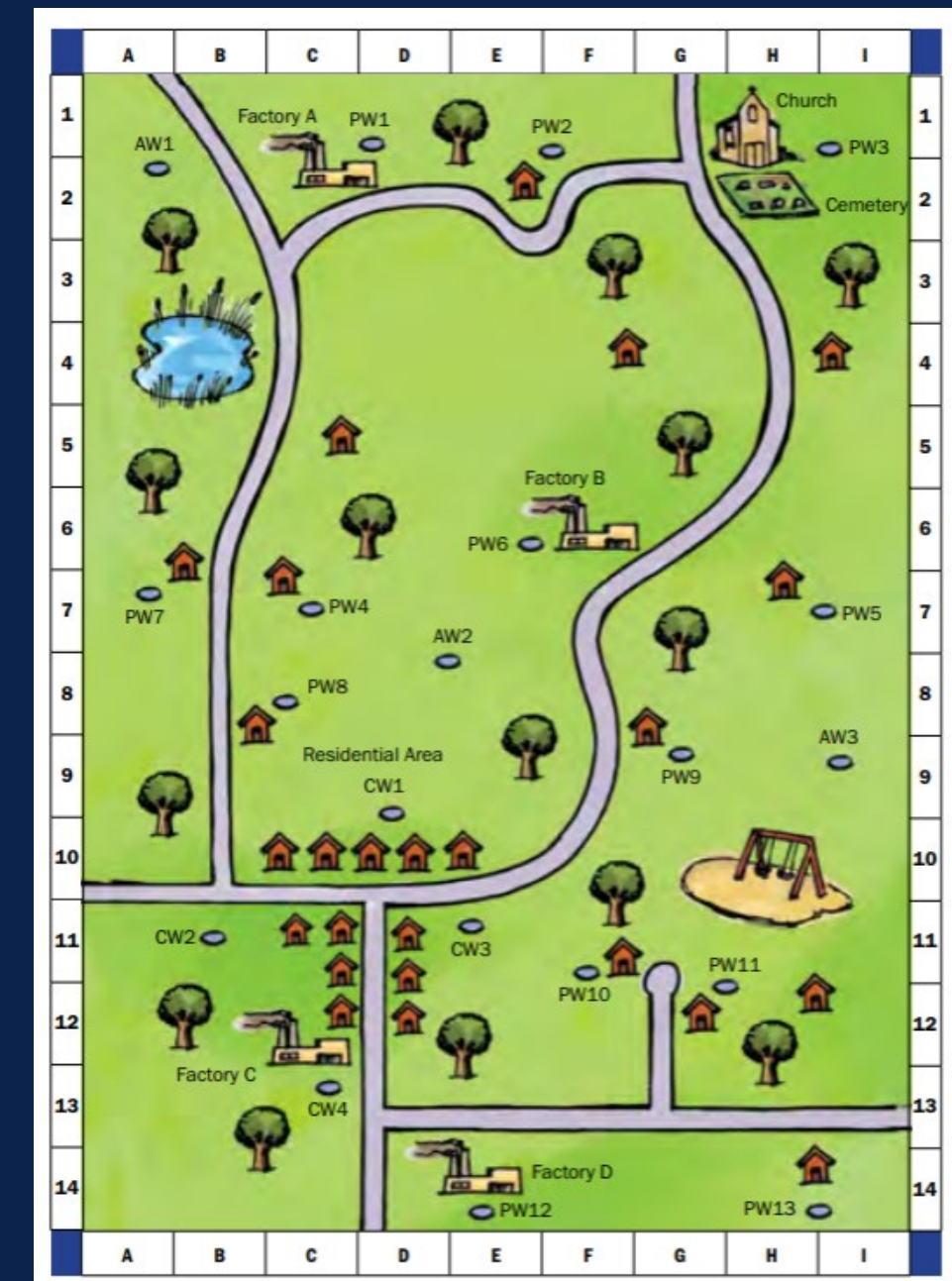
GROUNDWATER: A Plume Problem



The Activity:

- Students read through a scenario and plot data on a map to discover groundwater contamination levels.
- They soon learn that with new evidence their data may not lead to only one answer.

➤ Sometimes past solutions become current problems.





Now think about how this activity might play into the case file?

➤ Provide Lead #1 & #2 after lesson:

CWC FILE: #33788DD

DESERT DAISY'S OSTRICH OASIS

NEW LEAD: #1

Detectives were able to find and speak with a former worker from the Derby Demolition days, and he explained more details about what happened on the property before the derby was decommissioned. He also provided a few photos showing some possible concerns of mishandling of hazardous materials that could be a concern. **Exhibit D**







EXHIBIT D

August 2nd, 2024

"When I worked at Desert Daisy's back in the day, we had batteries and paint that we needed to get rid of. But, honestly, the people in charge didn't seem to care much about how we threw these things away.

I remember seeing batteries and paint cans piled up with other trash. There were no special bins or recycling processes for these items. We didn't get any instructions on how to handle them safely. They needed to be accessed fast and quick, since we would freshen up the paint before the derby would start. After painting we just left the materials outside on the ground, honestly it was like no one really cared."

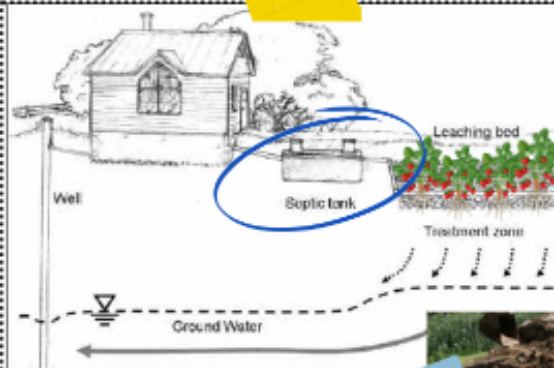
- John Dale

CWC FILE: #33788DD

DESERT DAISY'S OSTRICH OASIS

NEW LEAD: #2

- While on site detectives noticed there were some sewer smells coming from near the employee restrooms and strawberry fields. With further investigation they learned that these units are still draining to an old septic tank system. Daisy finally provided them with septic company info so they could follow up. **Exhibit F**
- Also an ostrich farm employee came forward letting the detectives know he and his family have been sick on and off for the last 3 weeks with stomach problems, ever since they ate some strawberries. **Exhibit G**



Well




Septic tank

Leaching bed

Treatment zone

Ground Water

Could Septic tank be making strawberries bad?





Sunrise Septic Services
987 Everywhere Ln.
Discover City, AZ 12345
(602)-867-5309
info@sunrise-septic.com
www.sunrise-septic.com

Cold-Weather Case Squad
456 Always St., Discover City, AZ 12345

Dear Detective,

According to our records, the septic tank on Daisy's property was last serviced by our company 10 years ago. In the inspection report that was submitted with this service, there is a note about a potential leak coming from the septic tank. We recommended that Daisy follow up with our team if she had any concerns about this leak, but our records show that she never contacted us again. Please let us know if we can provide any further assistance to you. I have attached the inspection report to this letter.

Sincerely,

John Doe
Head Septic Engineer



EXHIBIT F

Wrap-Up

Stability & Change

Lesson 1

- What have you learned about how groundwater moves?
- If it is contaminated, can pollutants move to other locations?
- How does groundwater fit within the Arizona Water Cycle?
- How can you protect and conserve groundwater?

