

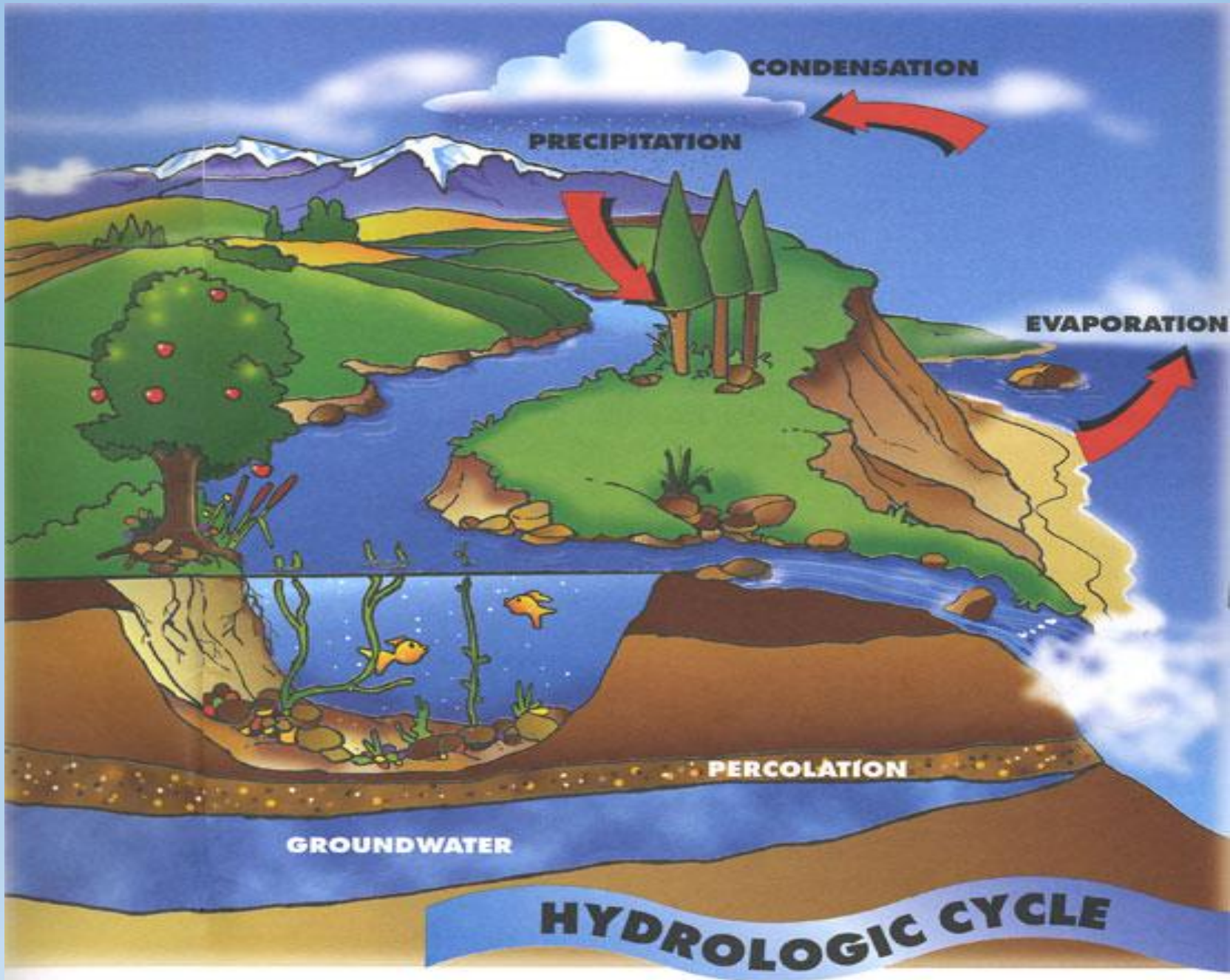
WATERSHEDS

**JOANN P. DELUNA EDUCATIONAL
PROGRAMS DIRECTOR**

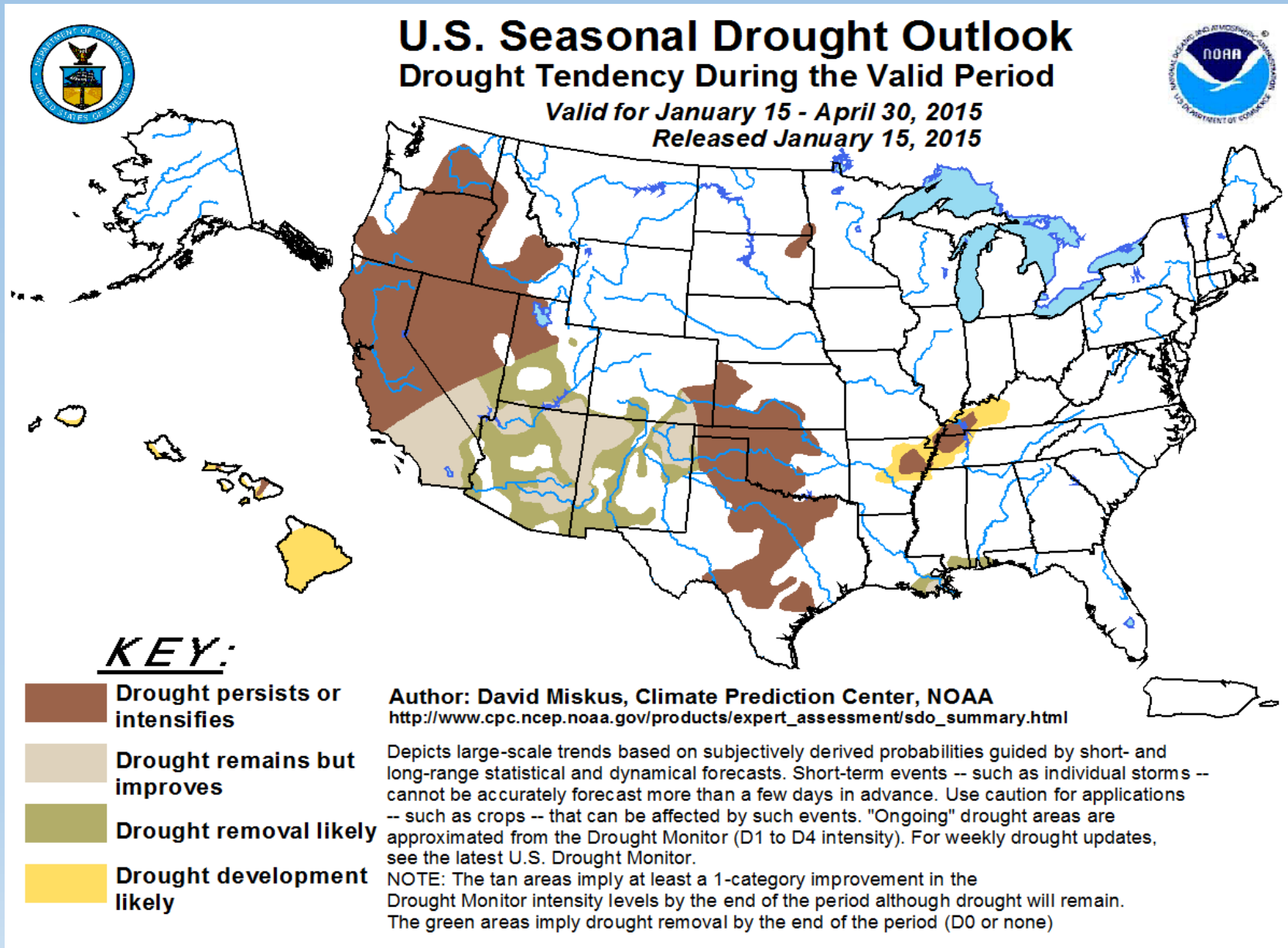


OBJECTIVES:

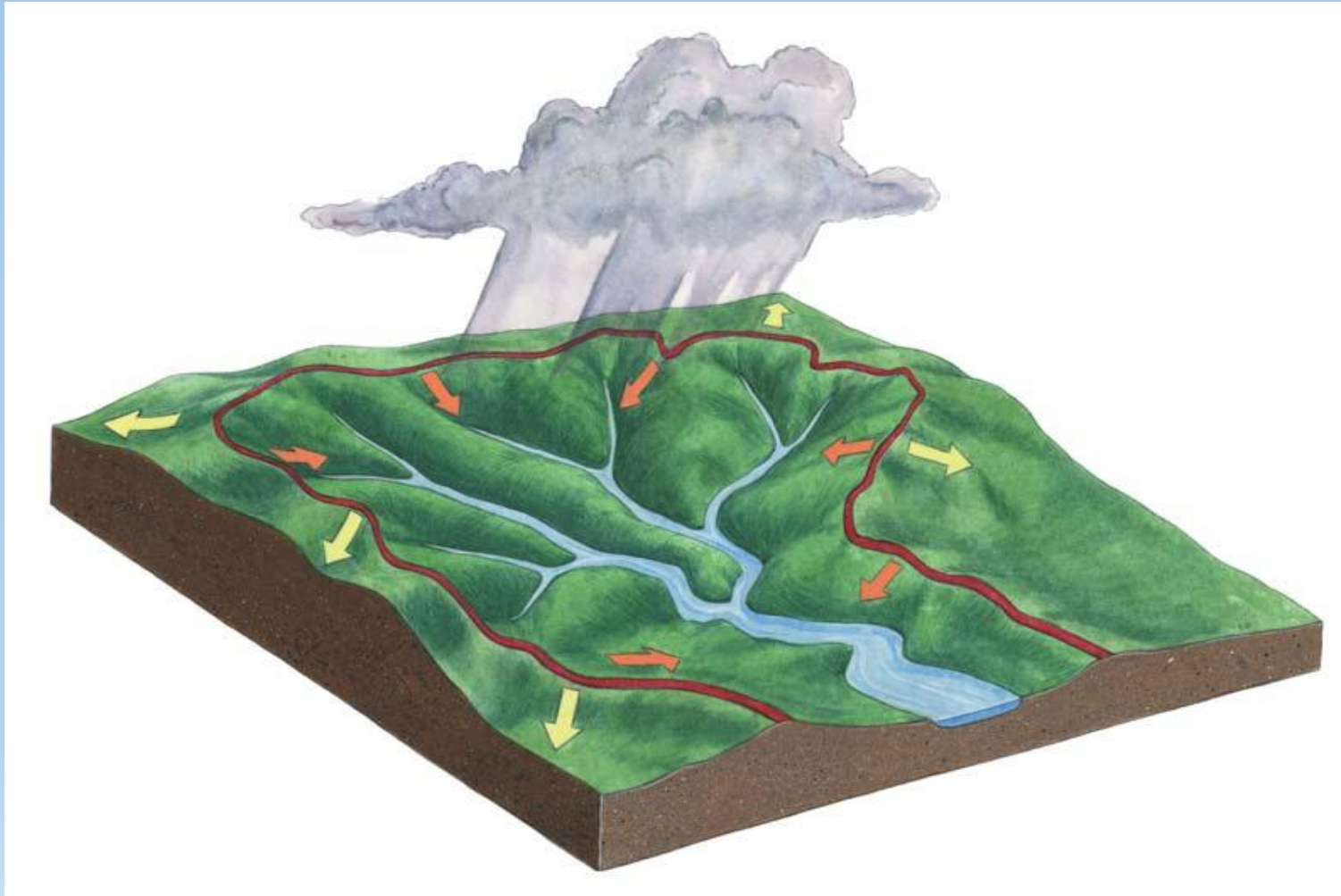
- **BE ABLE TO DEFINE WHAT A WATERSHED IS.**
- **BE ABLE TO LIST 5 WAYS THAT HUMANS IMPACT WATERSHEDS.**
- **BE ABLE TO LIST 5 ACTIONS THAT YOU CAN TAKE TO HELP PROTECT WATER QUALITY IN OUR WATERSHED.**
- **BE ABLE TO EXPLAIN WHY WETLANDS AND ESTUARIES ARE IMPORTANT.**



Drought has become a major threat to our water supply



A **WATERSHED** is the area of land where all of the water that falls in it and drains off of it goes into the same place. Think of a watershed as a precipitate collector.



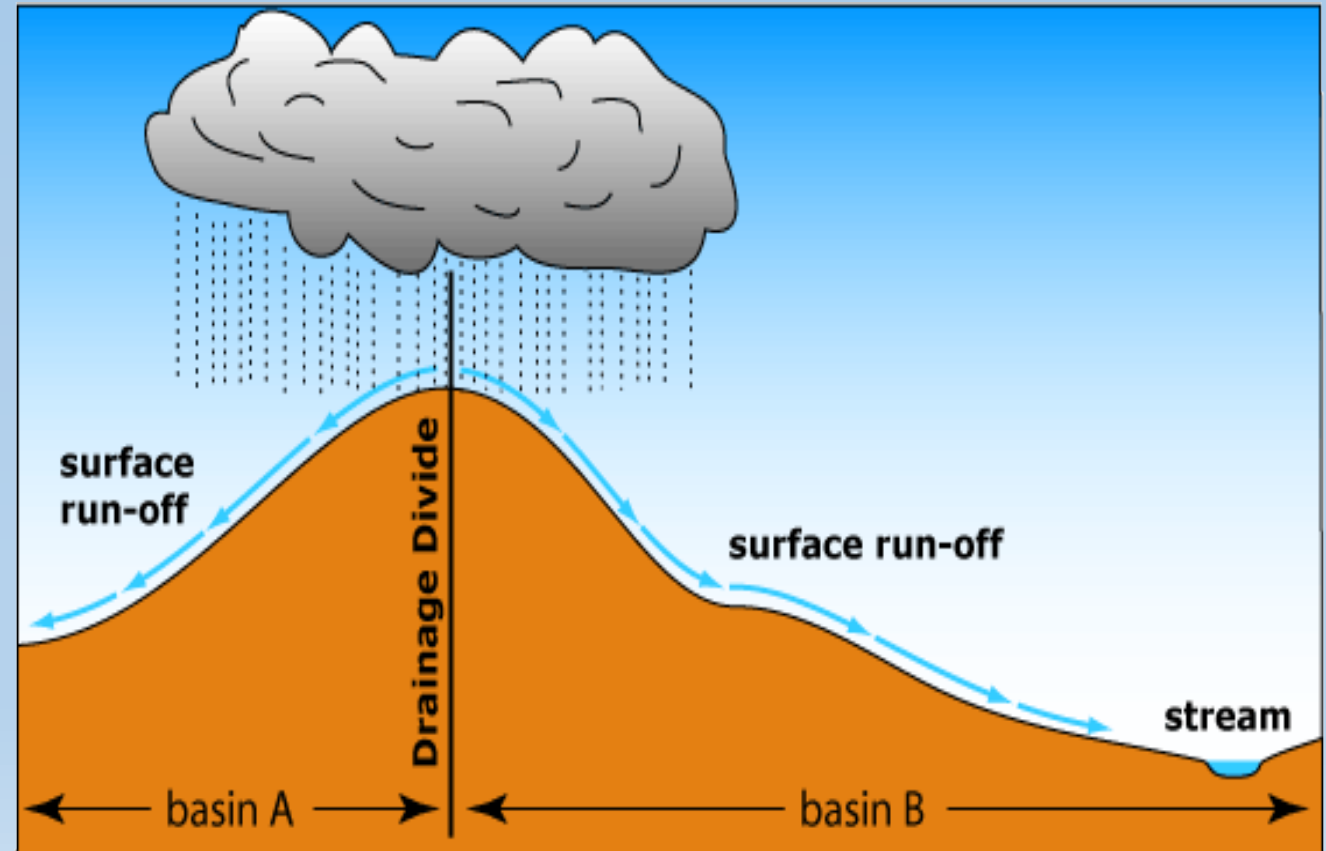
The watershed consists of surface water--lakes, streams, reservoirs, and wetlands--and all the underlying ground water.



Watersheds can also be called drainage basins or catchment areas or contributing zone.



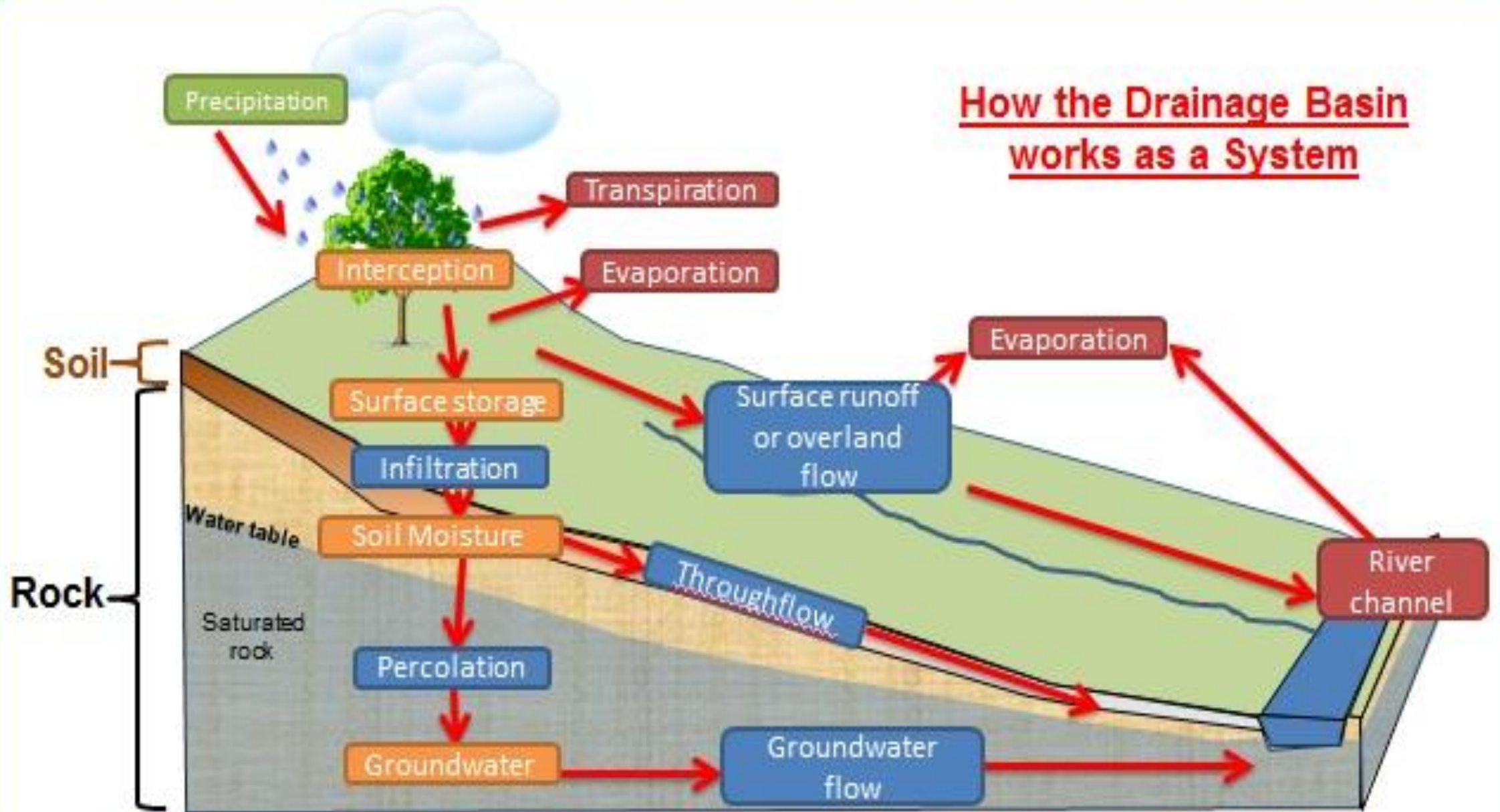
Elevated areas like ridges or hills that separate two watersheds are called a drainage divide



cross-section

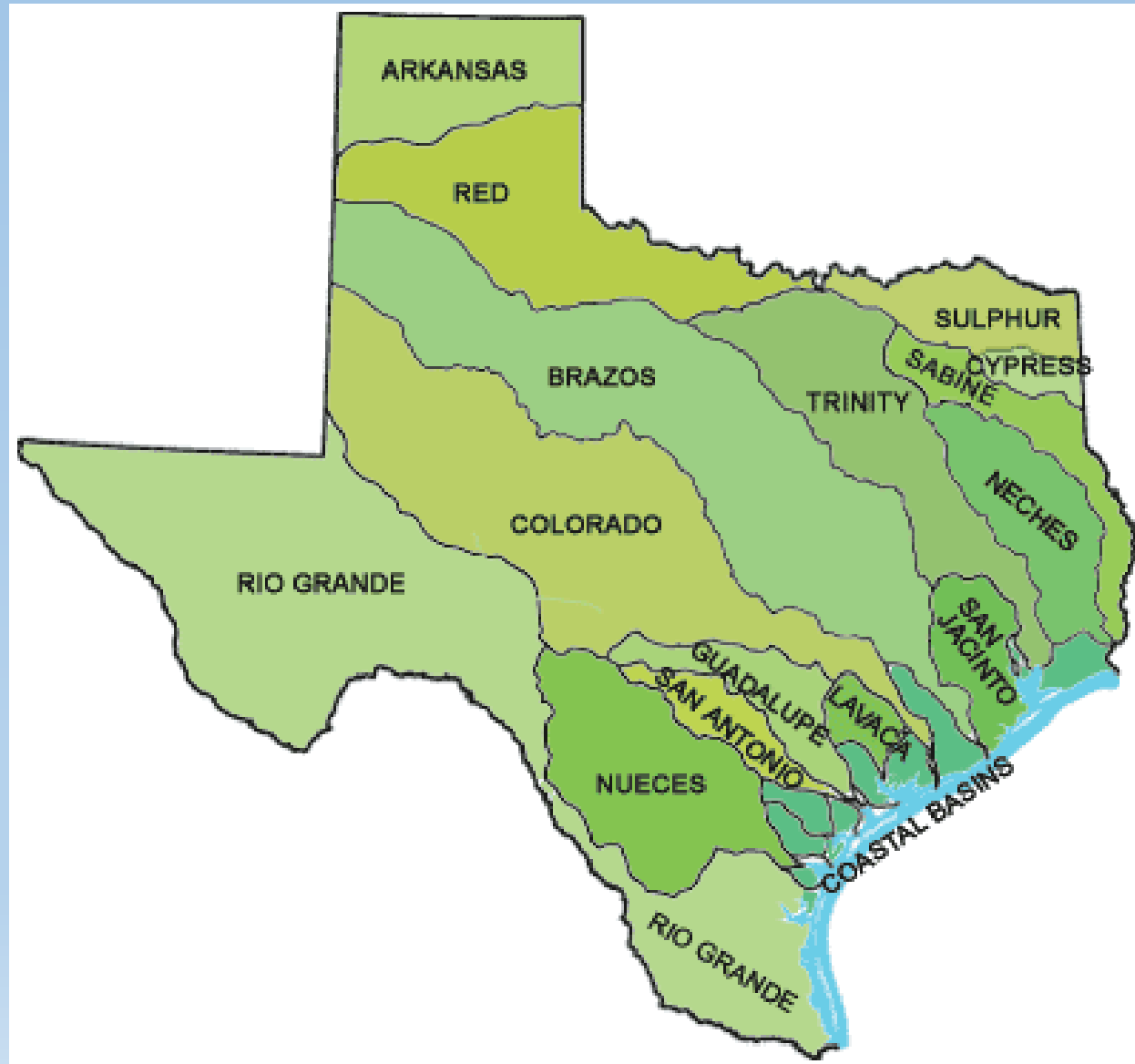
- **A catchment is an area where water is collected by the natural landscape. In a catchment, all rain and run-off water eventually flows to a creek, river, lake or ocean, or into the groundwater system. Natural and human systems such as rivers, farms, dams, homes, plants, animals and people can co-exist in a catchment.**
- **Healthy catchments provide:**
 - a source of clean drinking water
 - unspoiled natural areas for recreation
 - habitat for plants and animals
 - healthy vegetation and waterways
 - reliable and clean water for stock and irrigation
 - opportunities for sustainable agriculture and industry.

How the Drainage Basin works as a System

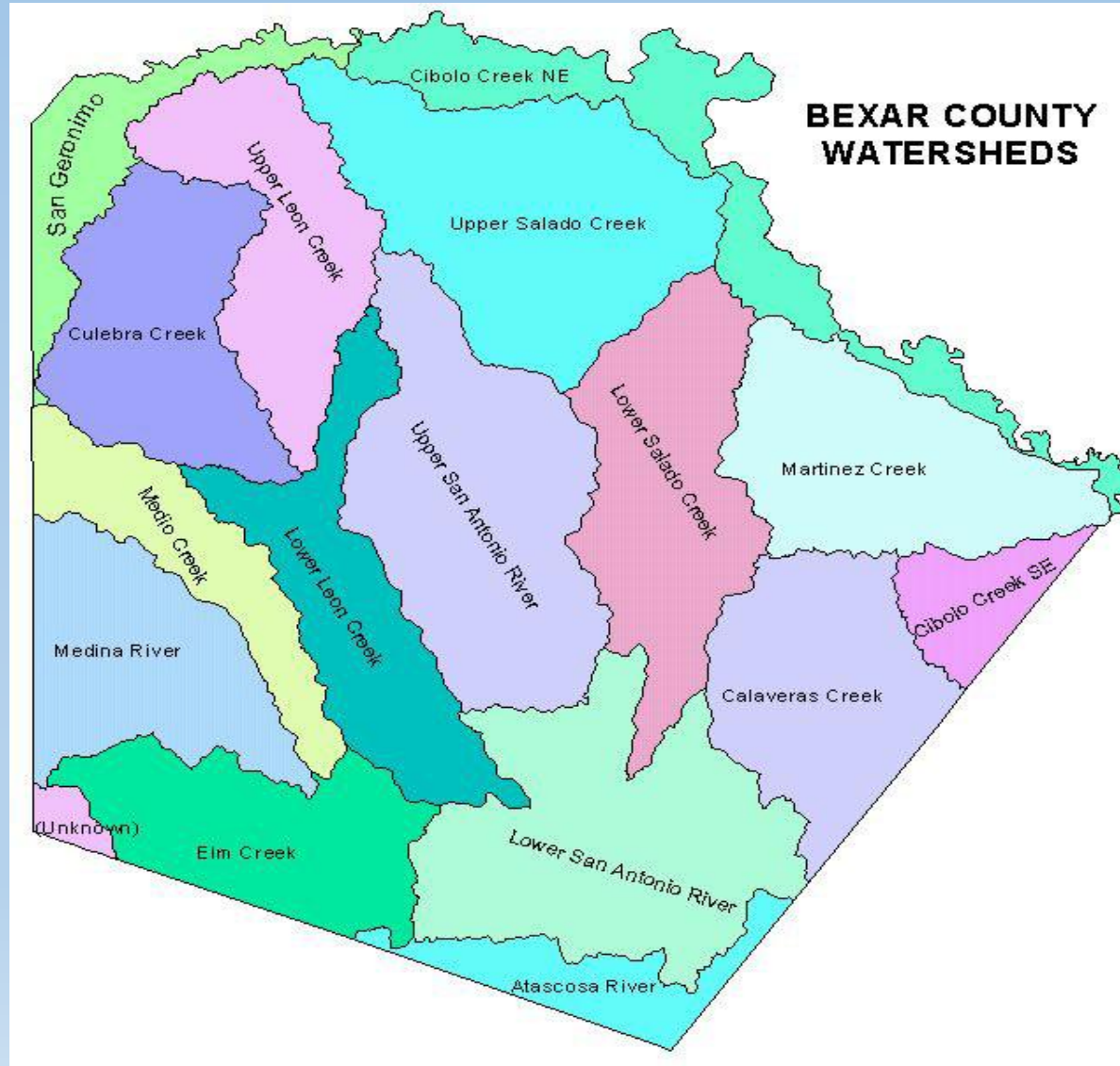


Key INPUT STORAGE FLOW OUTPUT

Texas watersheds



Bexar County has several watersheds



Government Canyon State Natural Area is part of the upper Leon Creek watershed and located over our recharge zone.



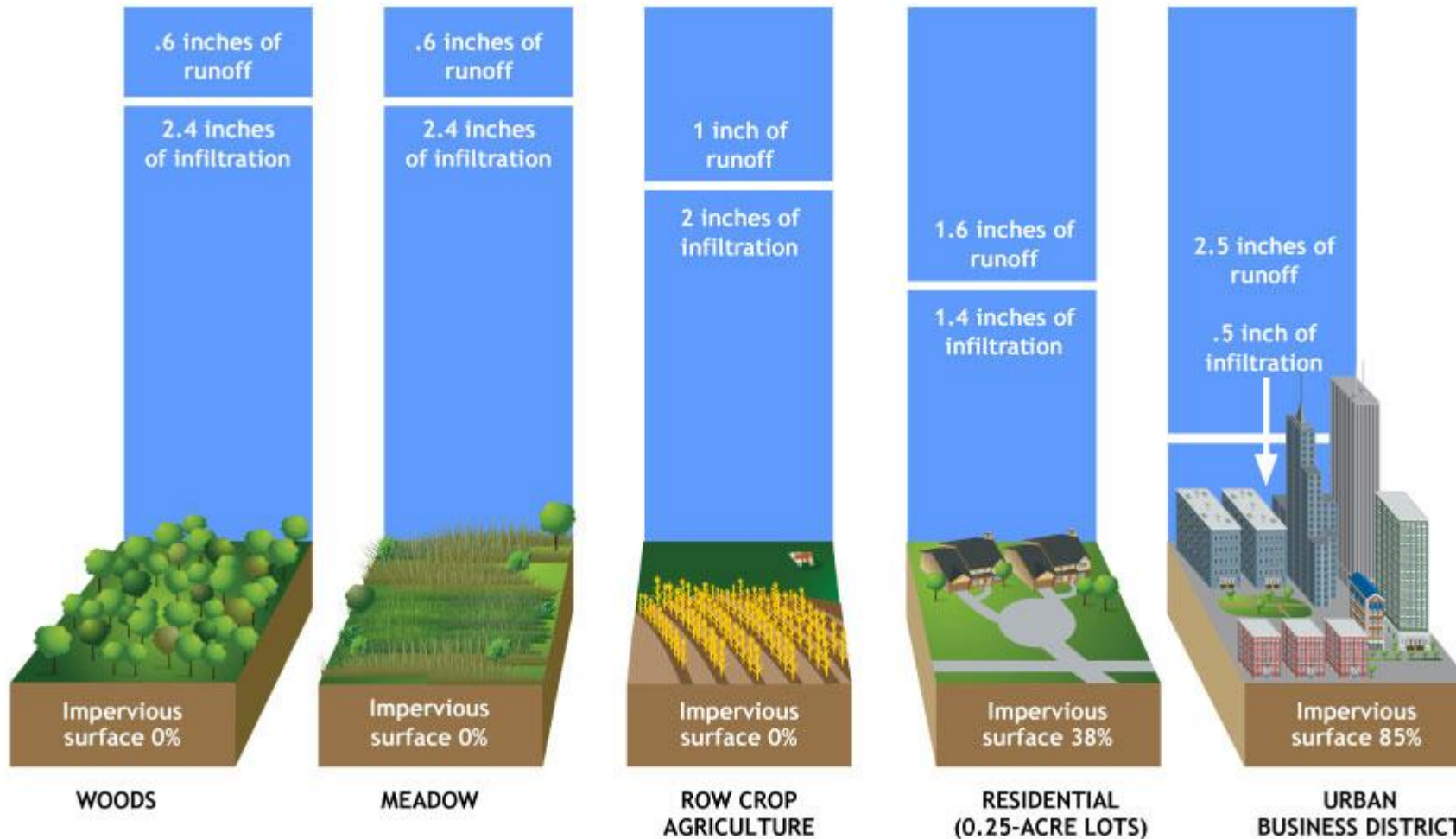
This watershed was purchased by the city of San Antonio to protect the quality of the recharge water entering our aquifer.



Runoff is when water drains from elevated areas to lower ones.



The amount of impervious (impermeable) surface in an area is a major factor in determining the amount of runoff.



When creeks cross fractures in the limestone over the recharge zone water will enter our aquifer.



Seco Creek Recharge Project

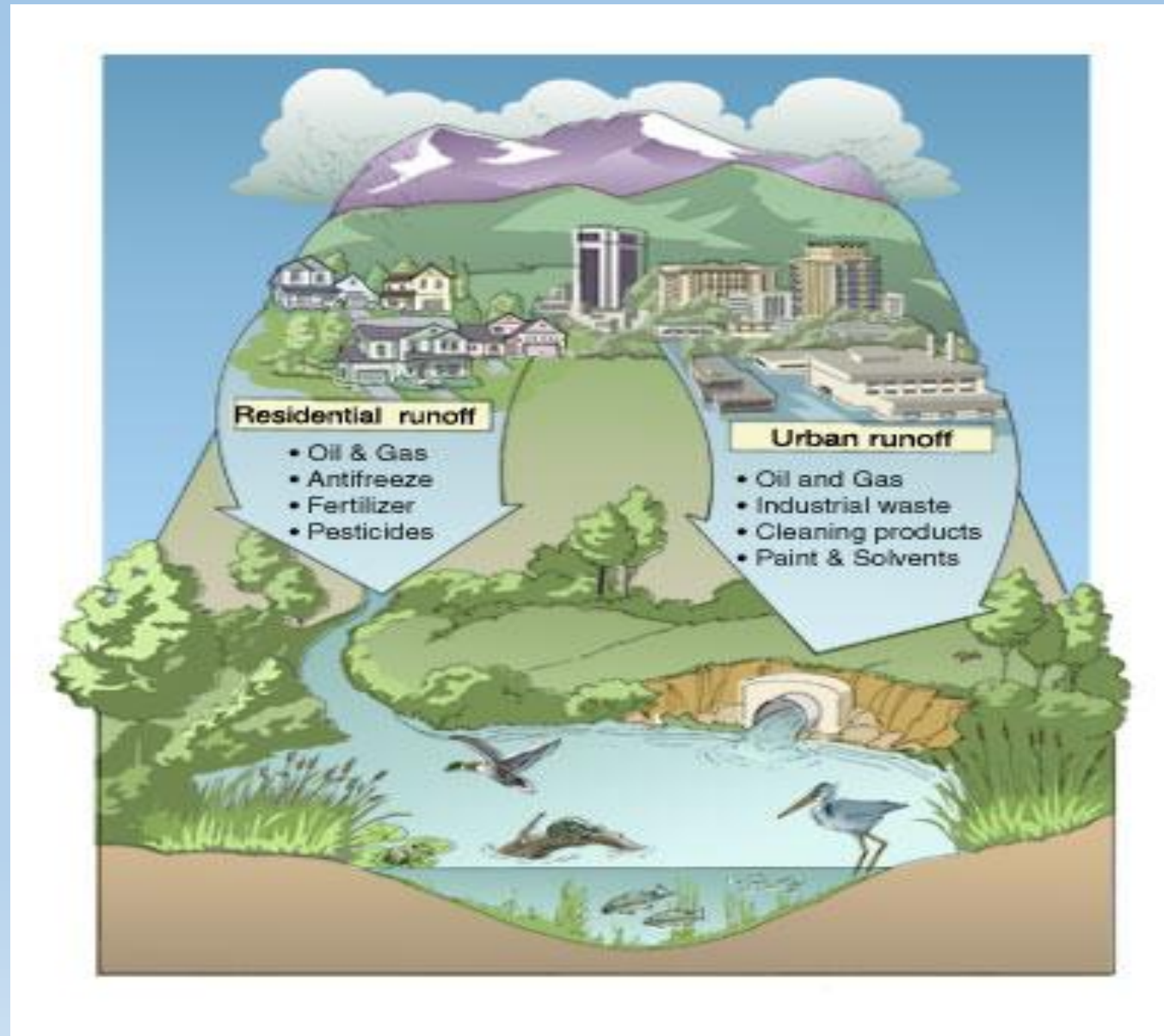
- **Water is collected and channeled into the sinkhole to increase aquifer recharge . Sinkholes can quickly receive large volumes of recharge during rainstorms and transmit the recharge directly into the aquifer.**



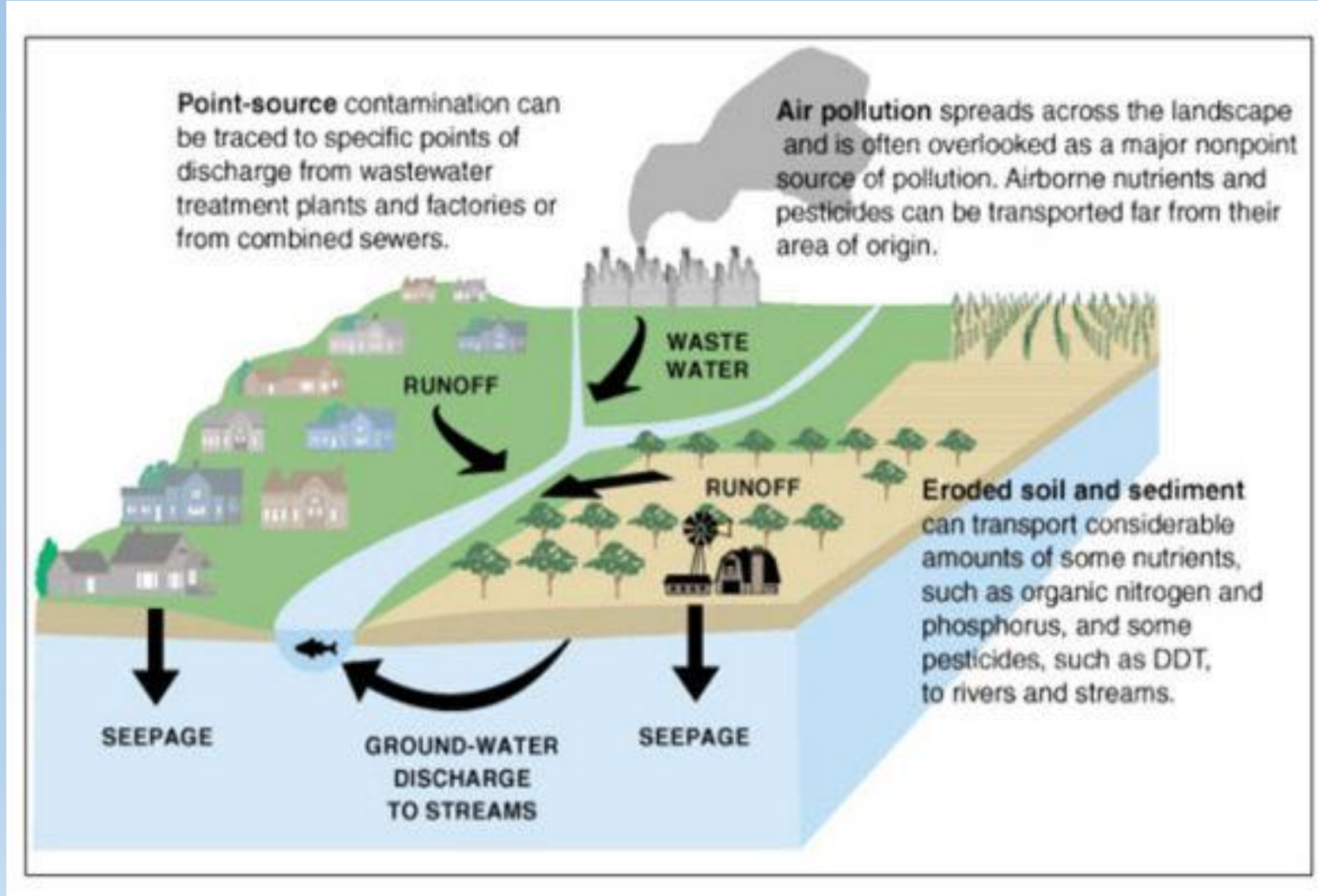
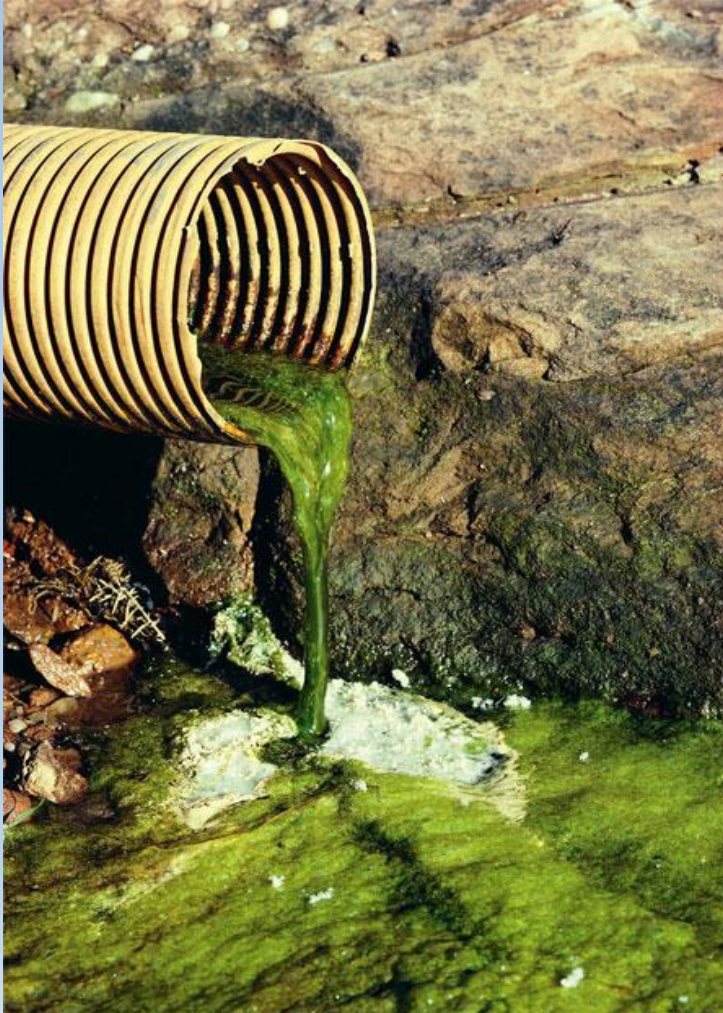
The San Antonio River watershed drains into the Gulf of Mexico.



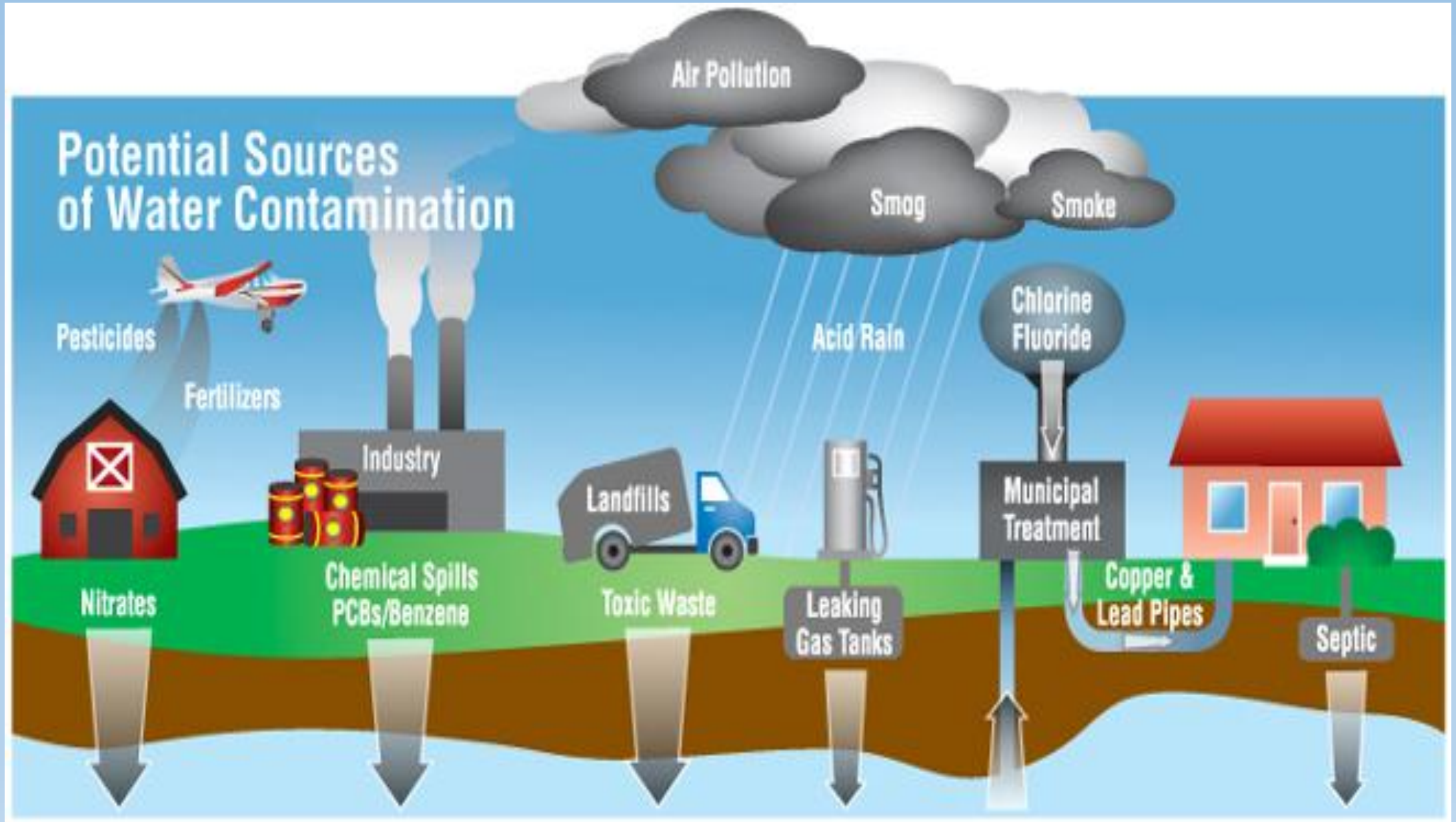
We need to realize that our actions affect everyone that is downstream in our watershed.



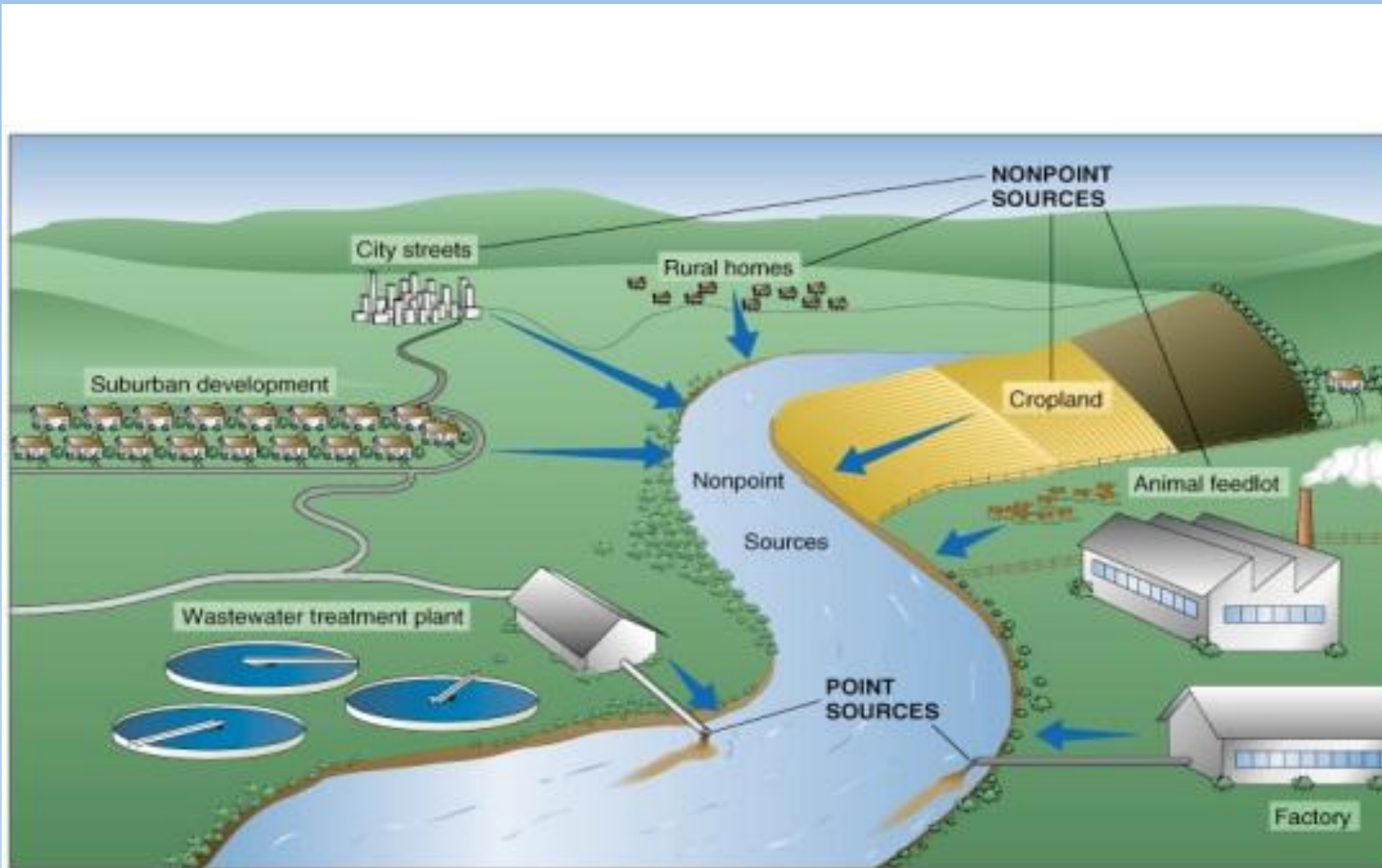
There are 2 kinds of pollution that affect our surface and groundwater. Point Source Pollution comes from an identifiable source.



Potential Sources of Water Contamination



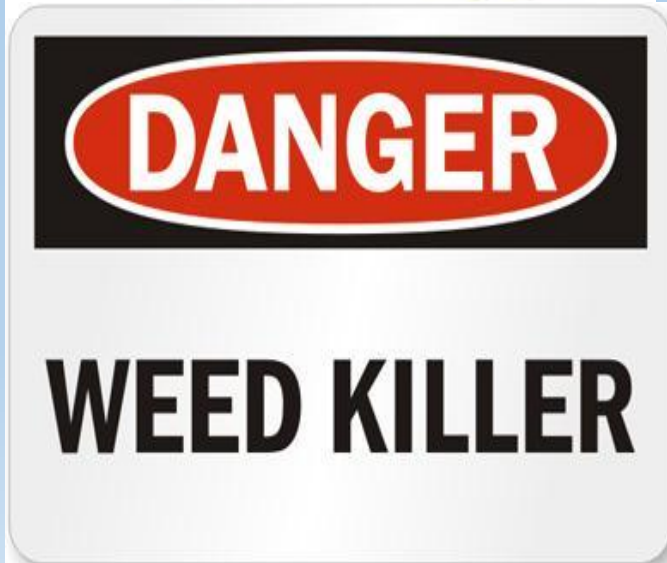
Both Point and Nonpoint Source Pollution have a major effect on the quality of the water that goes downstream in our watershed.





Non Point Source Pollution can come from a variety of sources –especially these soluble (will dissolve in water) substances.

People should Not use these substances on their lawns!



1- AGRICULTURAL POLLUTION

Agriculture is a major source of water pollution .

Leached by rain water , pesticides , chemicals , join streams through runoff and contaminate infiltration. It's the same with chemical or natural fertilizers. Excess spread, they are not eliminated and become harmful to the environment.



**1 GALLON OF OIL
CONTAMINATES**



**1 MILLION GALLONS
OF DRINKING WATER**

**Urban runoff carries
pollution into streams.**

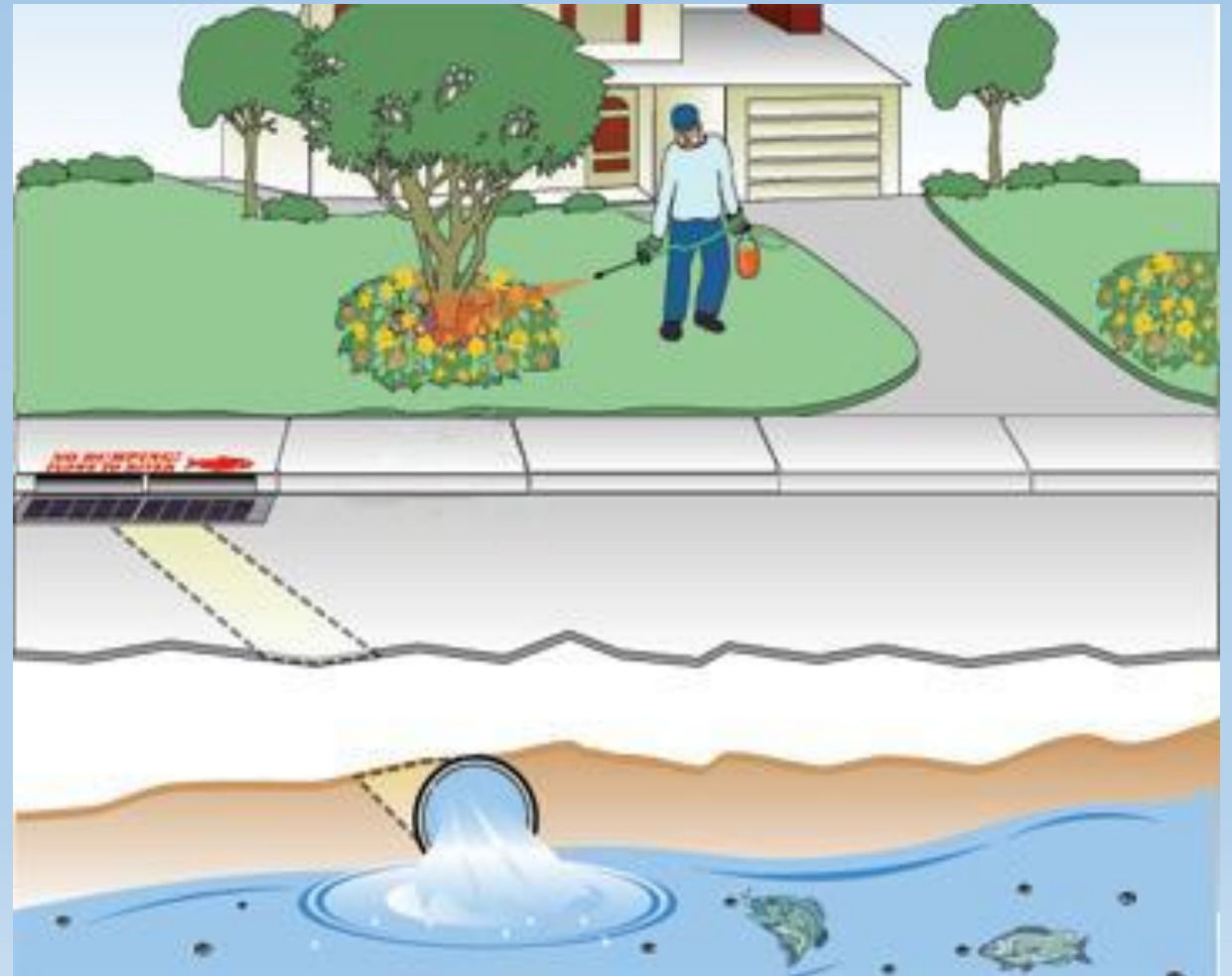


**Someone dumped this
in San Antonio.**



**Are you okay
with that?**

**The most common source of non-point pollution is contaminated storm water.
Think before you wash pollutants into the storm water drain.**



Animal feces is a major problem in water contamination





Pet feces can get into surface and groundwater if not picked up and disposed of in the garbage.



Some things last longer than you think



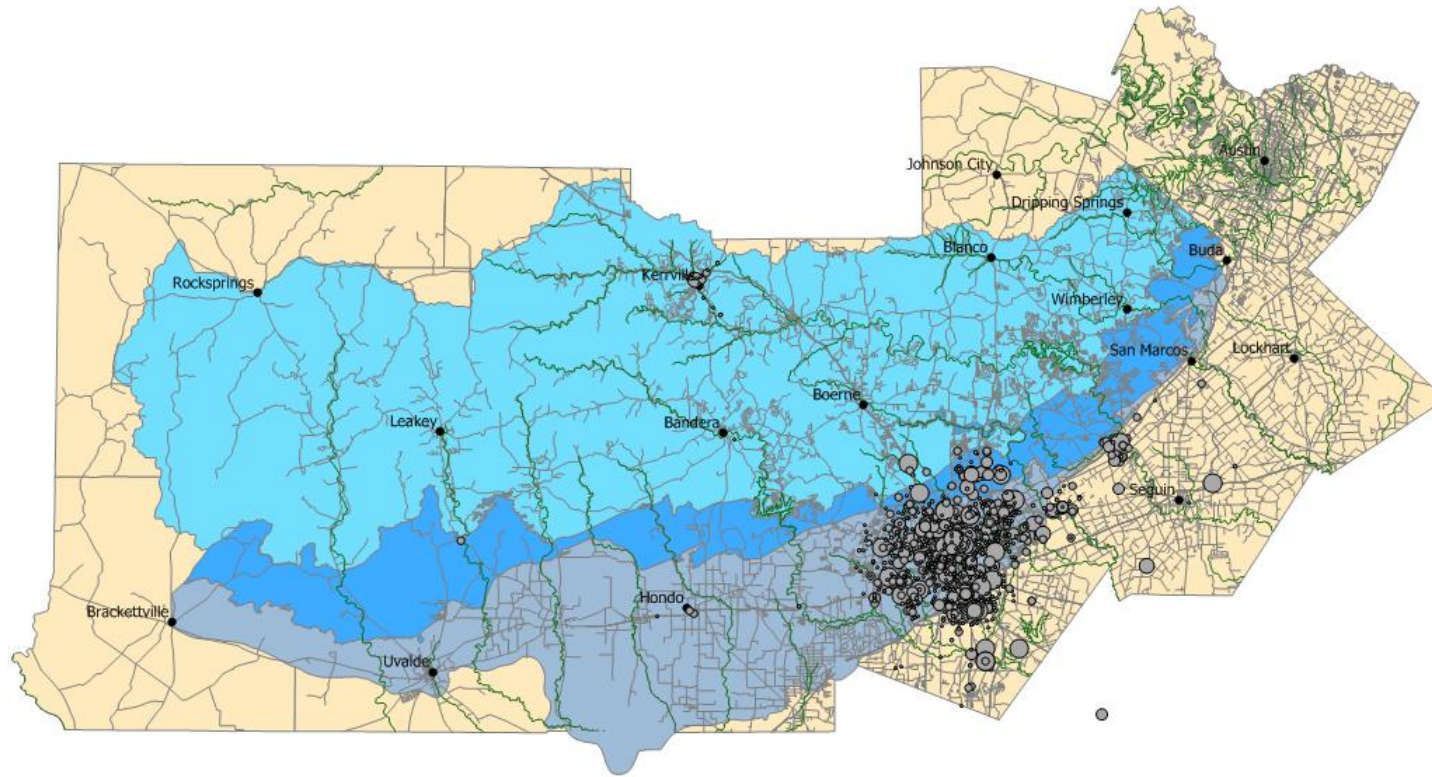
Harmful organisms that can be transmitted from pet waste to children can persist for weeks.

Scoop the poop, bag it, and place it in the trash

Clean yards. Clean Streams. (And clean shoes!)



Map of Sewage Spills in Central Texas



What we dump goes downstream into our watershed.



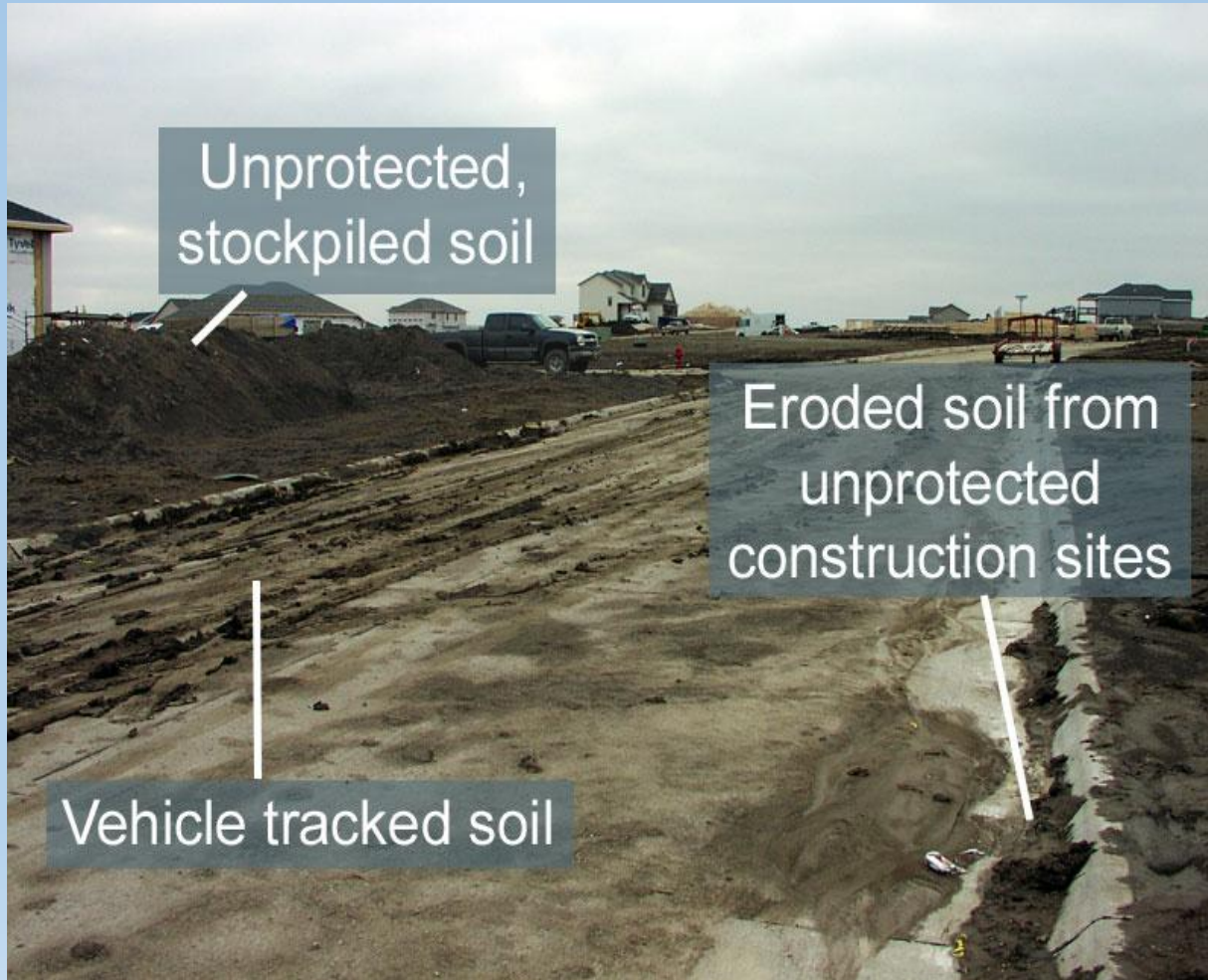
Sediment

- Although natural, sediment can cause major environmental problems.
 - Fill lakes/reservoirs, navigation channels in Rivers
 - Make it hard to treat water for drinking
 - Smother stream bottom (benthic) habitat → kill bugs and fish eggs. May choke out fish (clogged gills)
 - Blocks sunlight → reduces primary production in aquatic systems → may reduce overall biomass of any system linked to the affected aquatic ecosystem
- Anthropogenic erosion is the **largest water pollution problem in the USA.**

**ENTERING
EDWARDS
AQUIFER**
RECHARGE ZONE
ENVIRONMENTAL SENSITIVE AREA



Construction sites are a major source of soil erosion.

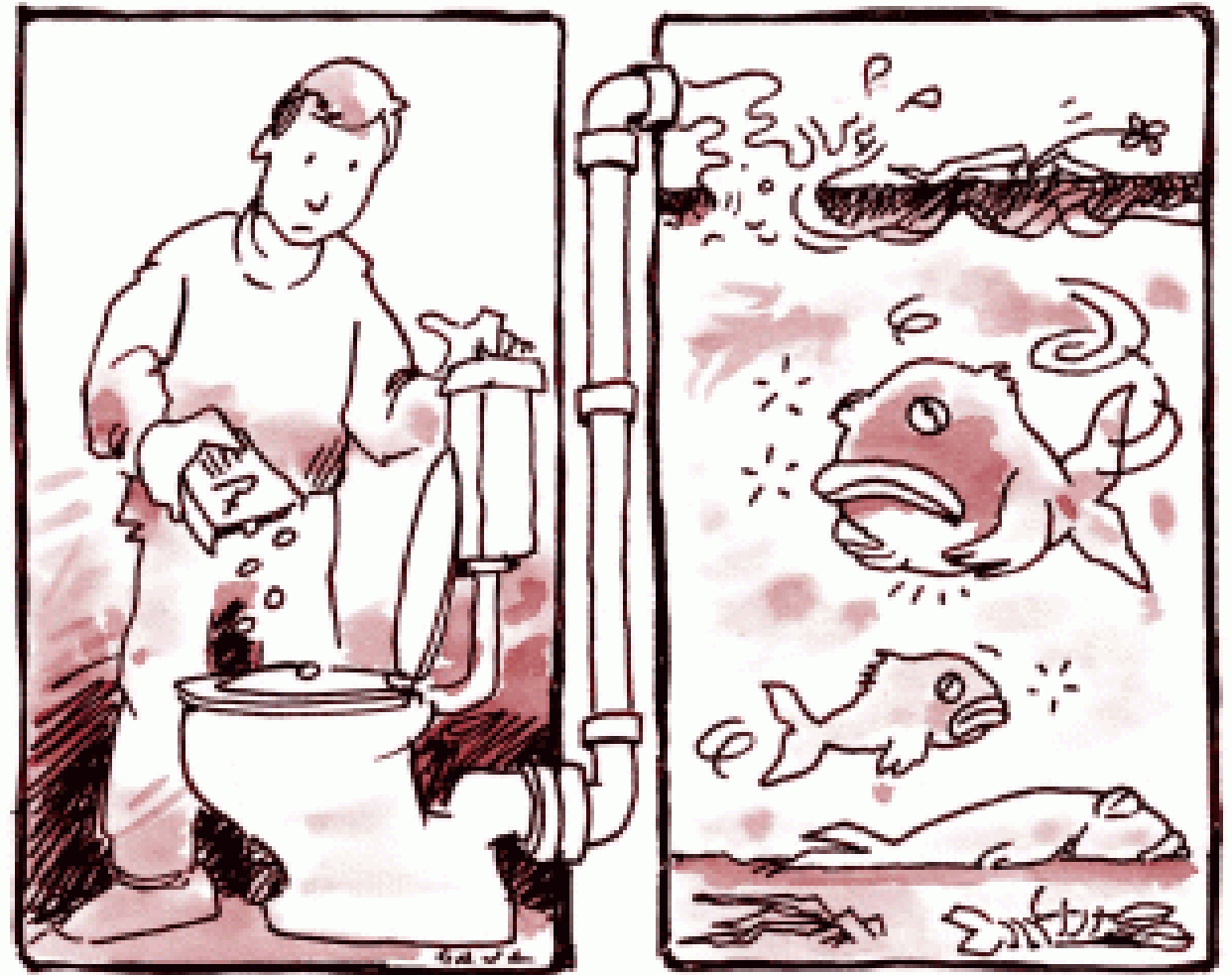


This soil is washed into streams, where it can enter the aquifer or is carried to the coast.



Medicines are now a major source of water pollution.

Don't flush medications!



Every city downstream uses our wastewater for their drinking water.

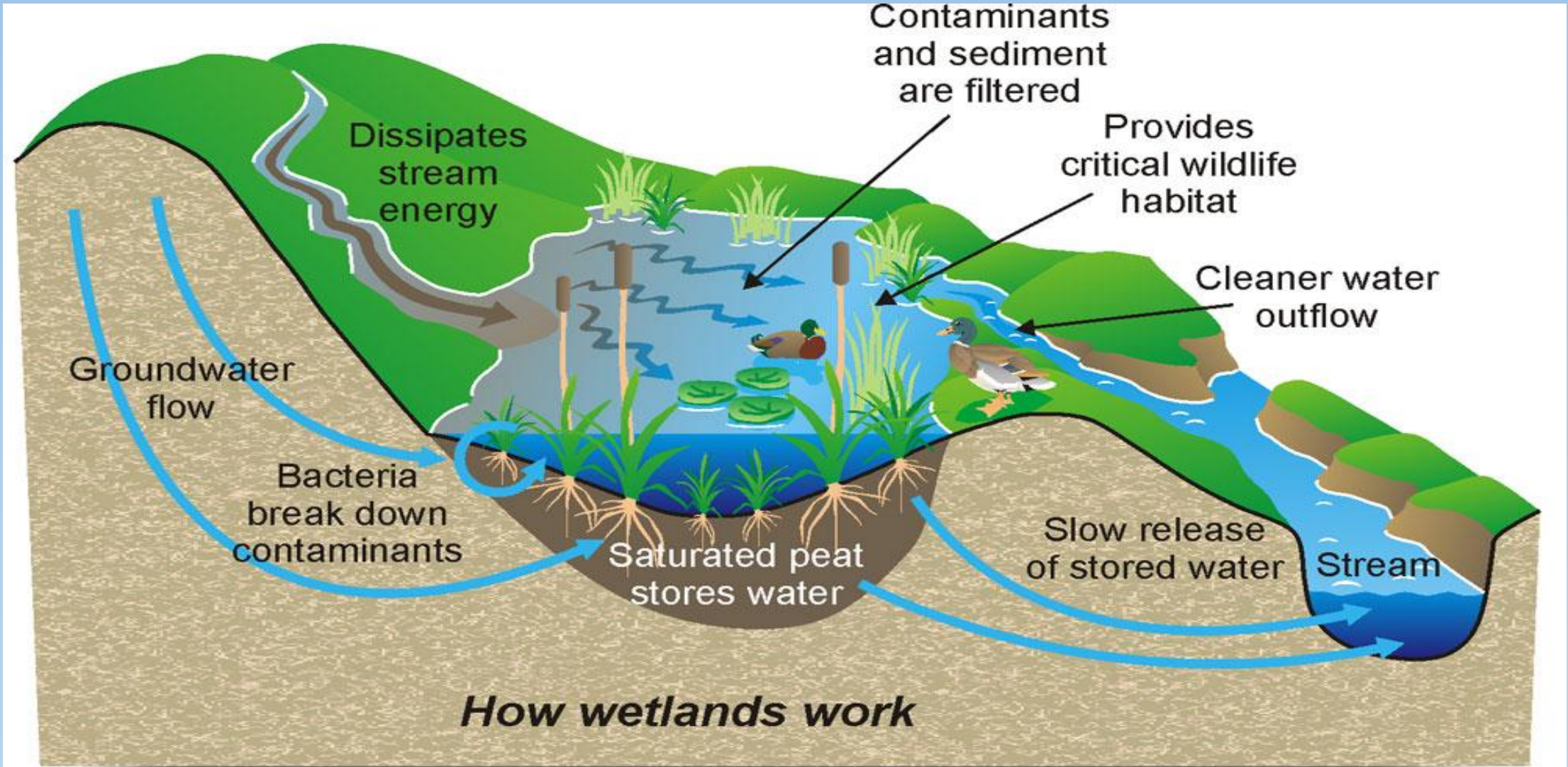
Pollutants such as fertilizers and household products that are put down the drain make their way through streams and rivers into estuaries, eventually into the ocean.



We need to think about how our watershed affects estuaries and wetlands at the coast.



Wetlands help to naturally filter out pollutants from the water.



Estuaries: Where Rivers Meet The Sea

Estuaries are partially closed bodies of water where freshwater rivers and streams meet and mix with the saltwater of the ocean.

Over 60% of coastal rivers and bays in the continental U.S. are degraded by nutrient pollution from things like fertilizers and pet waste.

75% of commercial aquatic species – like salmon, oysters and horseshoe crabs – depend on estuaries for their primary habitat, spawning grounds and nursery areas.

Estuaries come in all shapes and sizes. They can be called bays, lagoons and inlets.

Fresh Water

Mixed (Brackish)

Salt Water

Sources

Environmental Protection Agency
Restore America's Estuaries





Coastal organisms live and reproduce in estuaries. It is very important that estuaries receive a constant source of clean unpolluted water to maintain the balance of fresh and salt water.



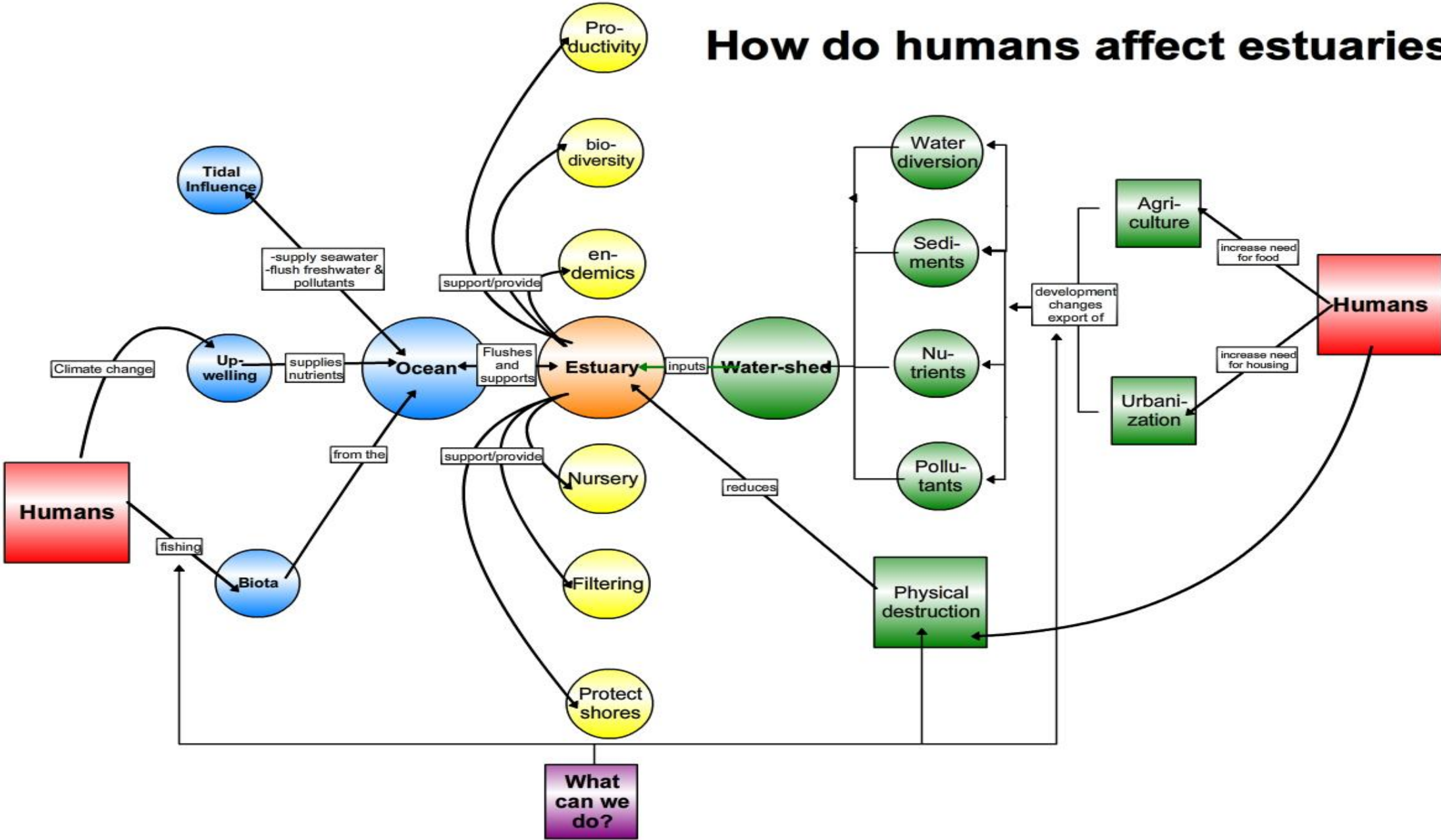
Whooping cranes are one of the endangered species that live at the coast and depend on a constant source of clean water.



If the estuaries do not receive a steady supply of fresh clean water then the salinity and pollution increases causing organisms who are producers and lower level consumers to die off. This can crash the food chain.

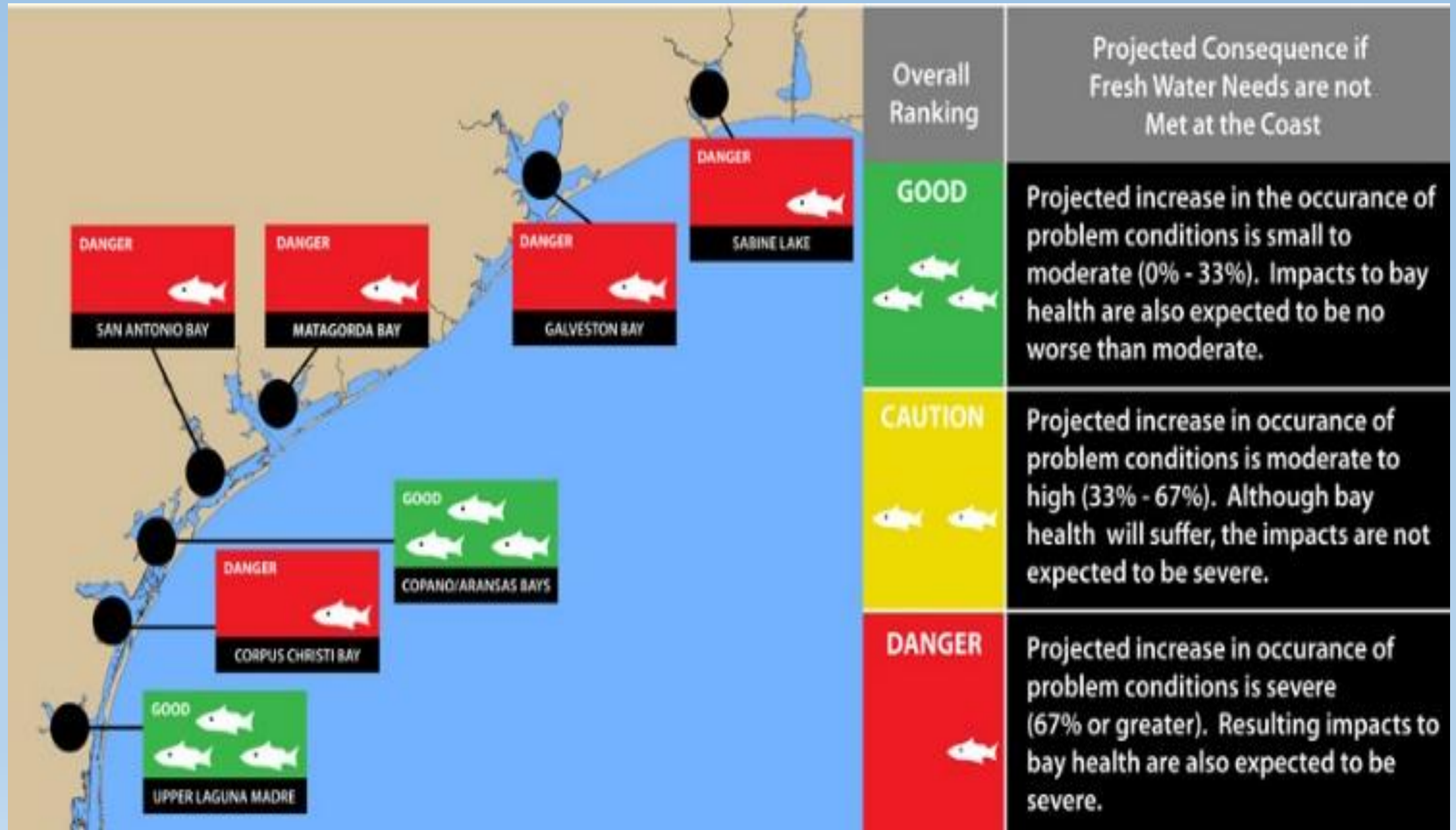


How do humans affect estuaries?



Fertilizers are water soluble and are transported by stream flow to the coast where they can create a toxic algae growth called a Red Tide.





So what can you do to help out? you can make a difference!

- **Conserve water – use it wisely!**
- **Do not ever pour medicine or toxic substances down the drain.**
- **Do not use the toilet as a trashcan.**
- **Do not use pesticides, herbicides, or fertilizer on your lawn.**
- **Pick up after your pets.**
- **Don't litter! Pick up your trash.**
- **Share this information with adults.**
- **Plan and construct a Rain Garden on your school grounds.**

Constructing and maintaining Rain Gardens are one way that we can help to clean the water entering our watershed.



Before & After



Reduce runoff...

SLOW IT DOWN

SPREAD IT OUT

SOAK IT IN!!!

RainScaping.org

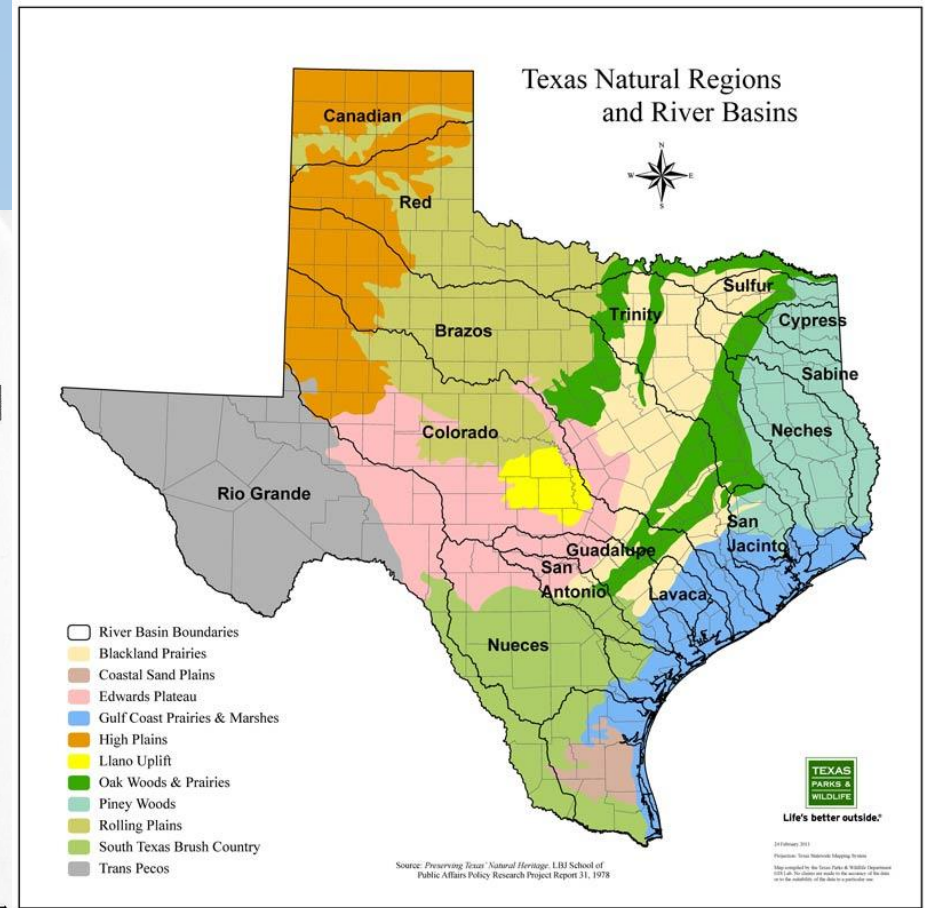
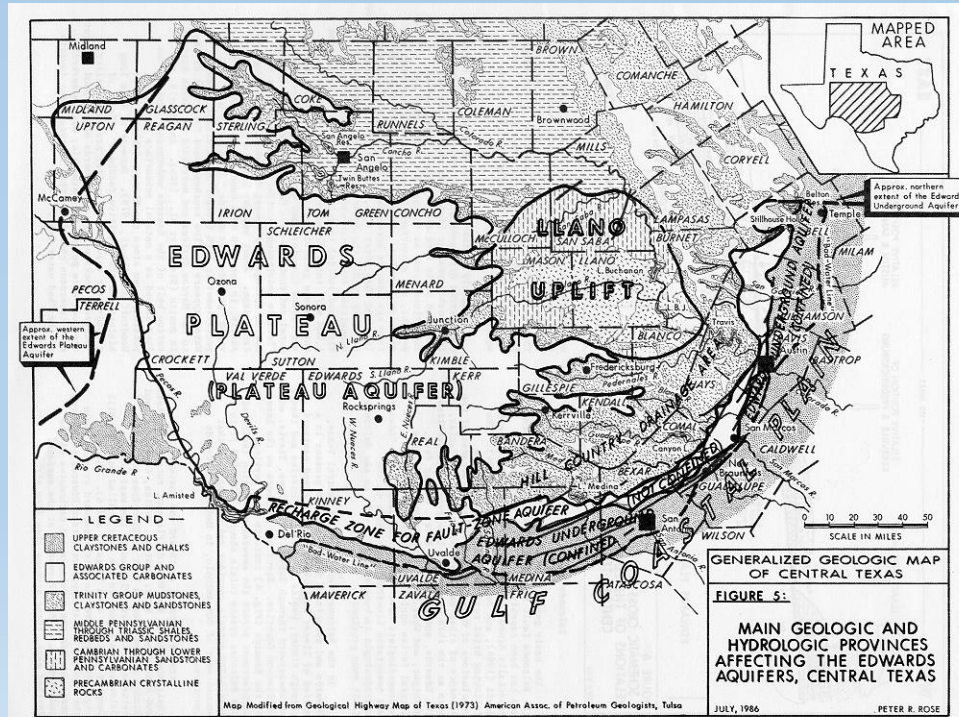
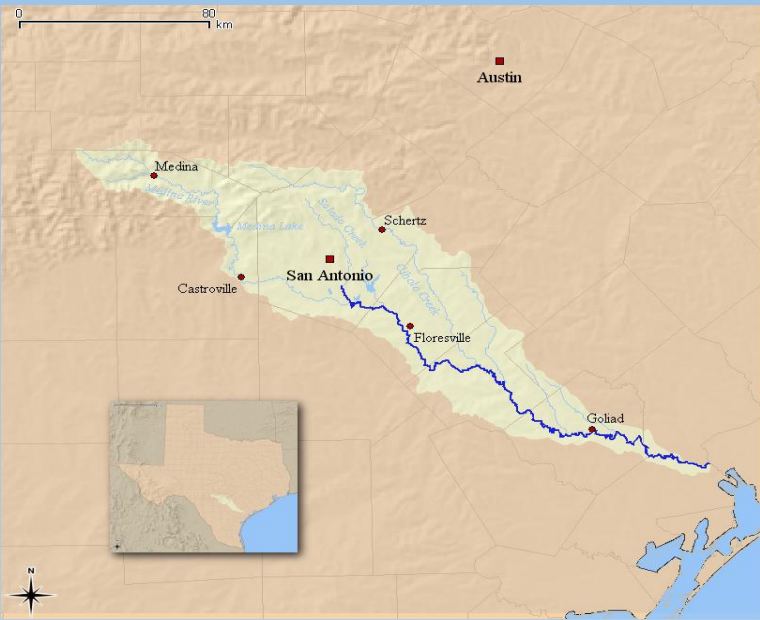
Beautiful Solutions to Water Pollution!



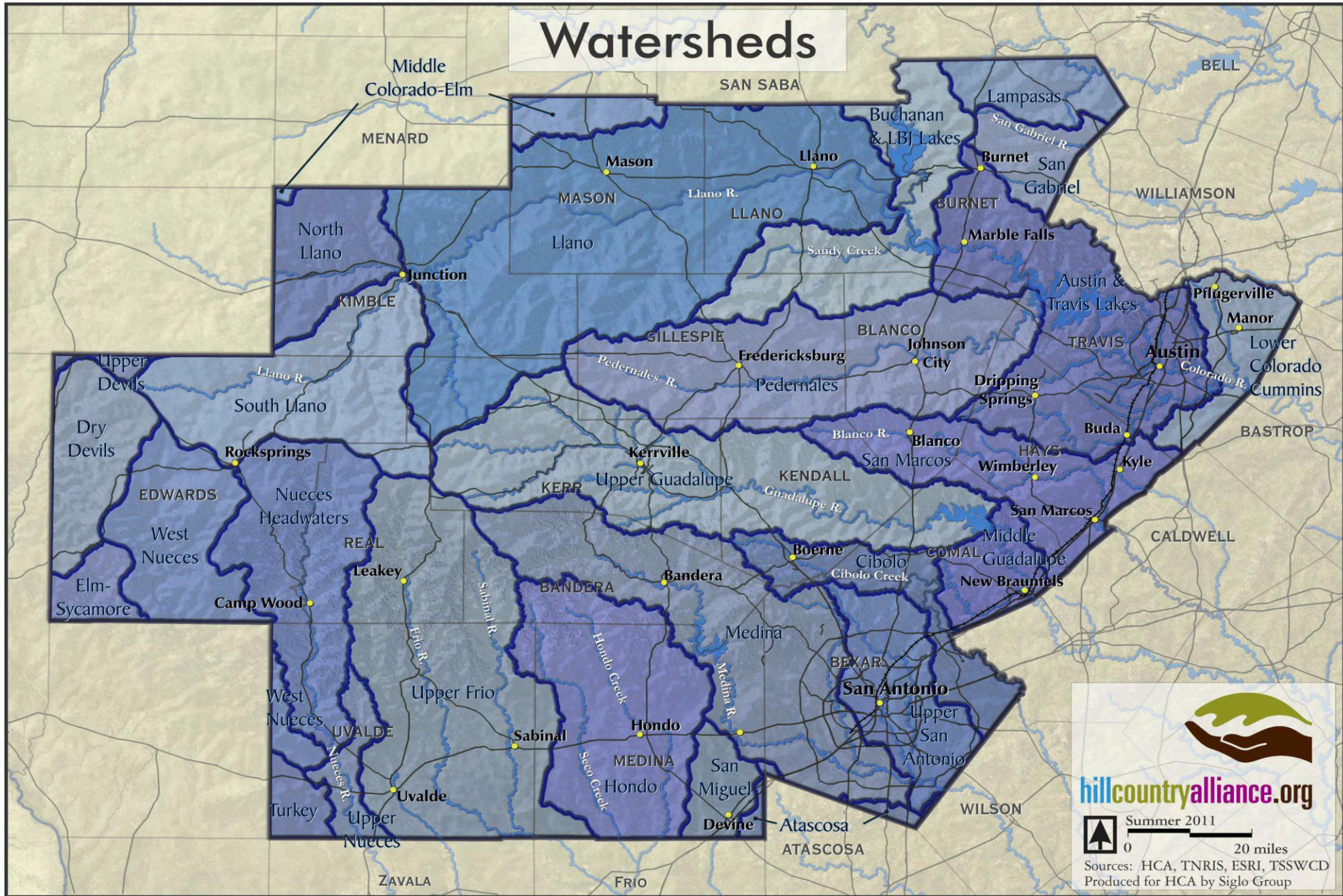


- This presentation was made possible by generous support from **Rackspace** and the **Greater Edwards Aquifer Alliance** a nonprofit organization dedicated to protecting the major source of our drinking water...
the Edwards Aquifer





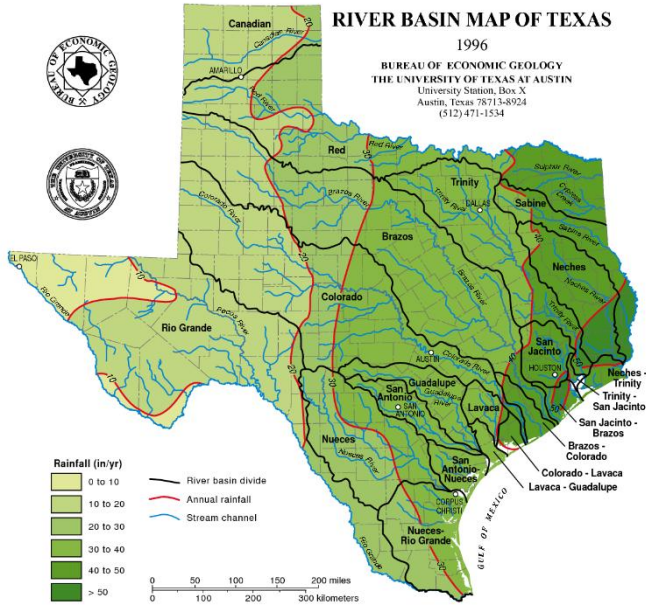
Watersheds



hillcountryalliance.org

Summer 2011
0 20 miles
Sources: HCA, TNRIS, ESRI, TSSWCD
Produced for HCA by Siglo Group



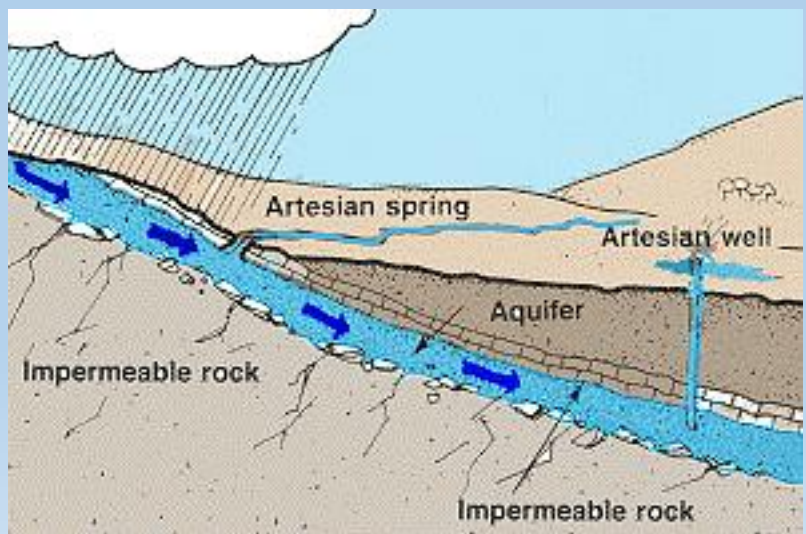
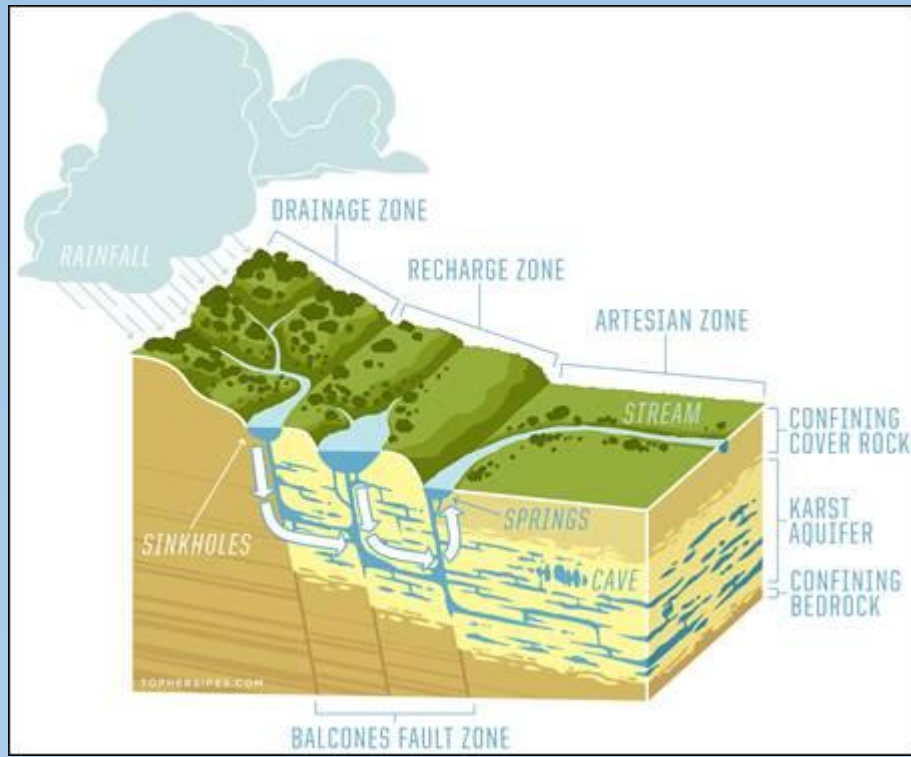


RIVER BASIN MAP OF TEXAS
 1996
 BUREAU OF ECONOMIC GEOLOGY
 THE UNIVERSITY OF TEXAS AT AUSTIN
 University Station, Box X
 Austin, Texas 78713-8024
 (512)471-1534

Rainfall (in/yr)
 0 to 10
 10 to 20
 20 to 30
 30 to 40
 40 to 50
 > 50

River basins	Texas length (miles)	Texas area (sq mi)	Number of major reservoirs*	Conservation storage (acre ft)*	Storage (acre ft/sq mi)
Brazos	840	42,800	19	3,322,880	75
Canadian	200	12,700	2	560,900	44
Colorado	600	39,893	11	3,803,900	95
Guadalupe	250	6,070	2	420,000	70
Lavaca	74	2,309	1	157,900	68
Neches	416	10,011	4	3,455,500	345
Nueces	315	16,950	2	931,640	50
Red	680	30,823	7	4,593,460	149
Rio Grande	1,250	48,259	3	3,772,000	78
Sabine	360	7,426	2	6,041,300	814
San Jacinto	70	5,660	2	570,400	102
Trinity	550	17,896	14	6,969,710	388

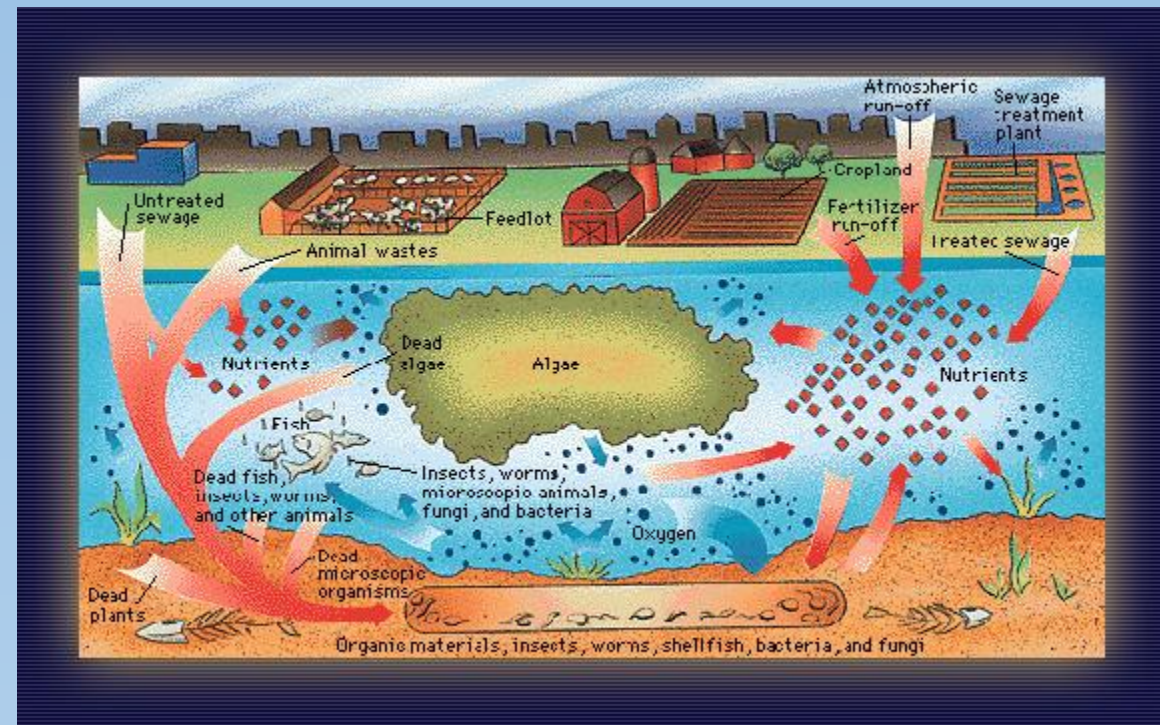
*Data from Texas Water Development Board.







The Non-Food Food Chain...



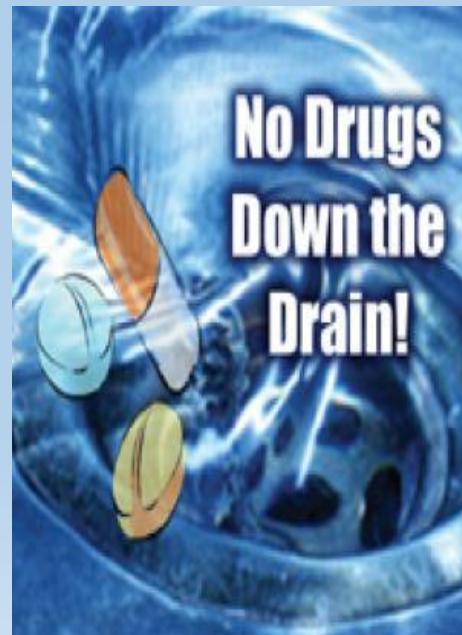
Smart Bunnies

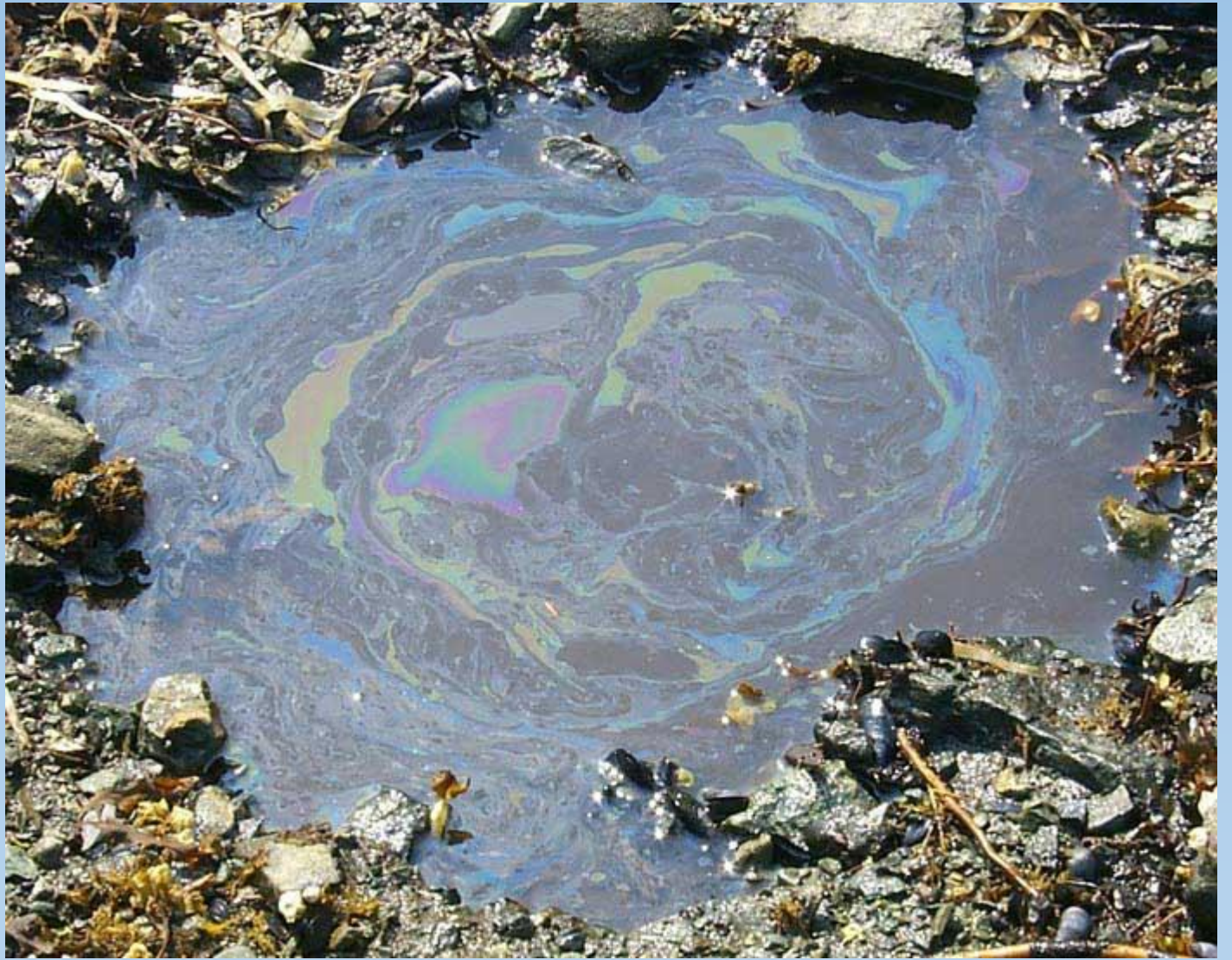
flush only toilet tissue



All wipes and other products will clog the pipes!

SmartBunnies - The Difference.™





Estuaries are where fresh water meets salt water.



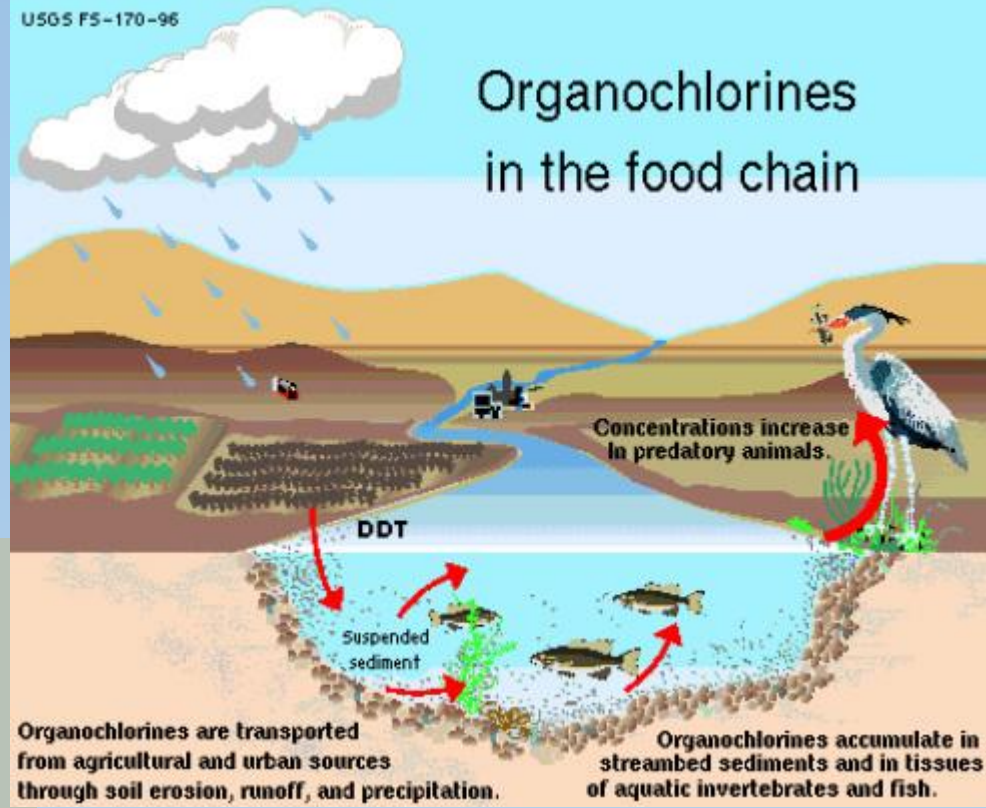
The water that our city discharges into the San Antonio River has a direct impact on the quality of the water downstream and at the coast.



We need to do our part to protect the quality of water going into our watershed if we want to continue to have enough clean water for all of our needs.



The Non-Food Food Chain...



Pollutants Entering the Oceans

