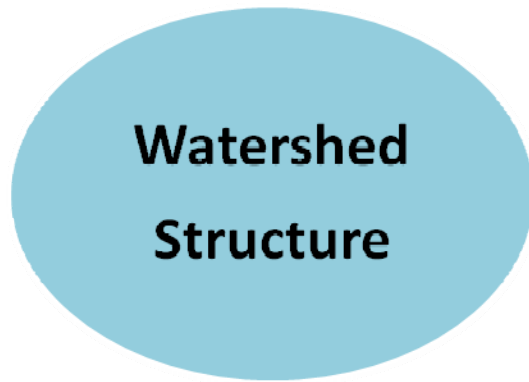
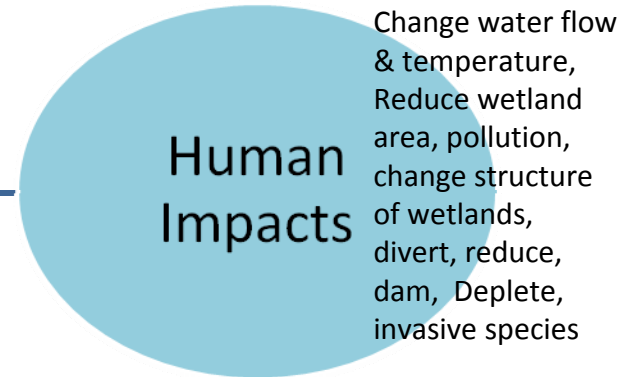
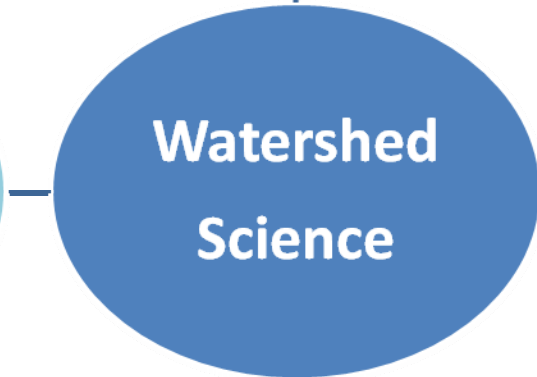


Power, recreation, drinking, agriculture, irrigation, aesthetics, housing, industry, food

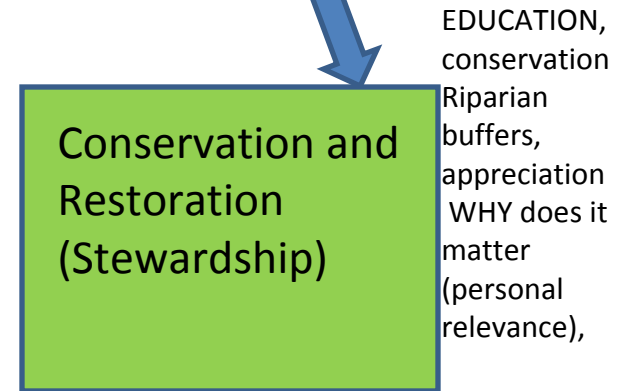
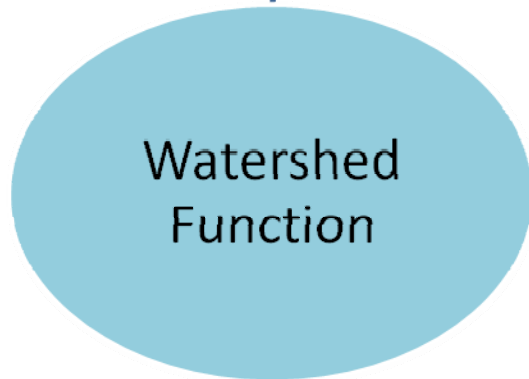


Abiotic: water !, Soil, Sunlight, wind, air, weather, climate
Biotic: soil, organisms (flora, fauna, microorganisms, fungi), Dead stuff (detritus),

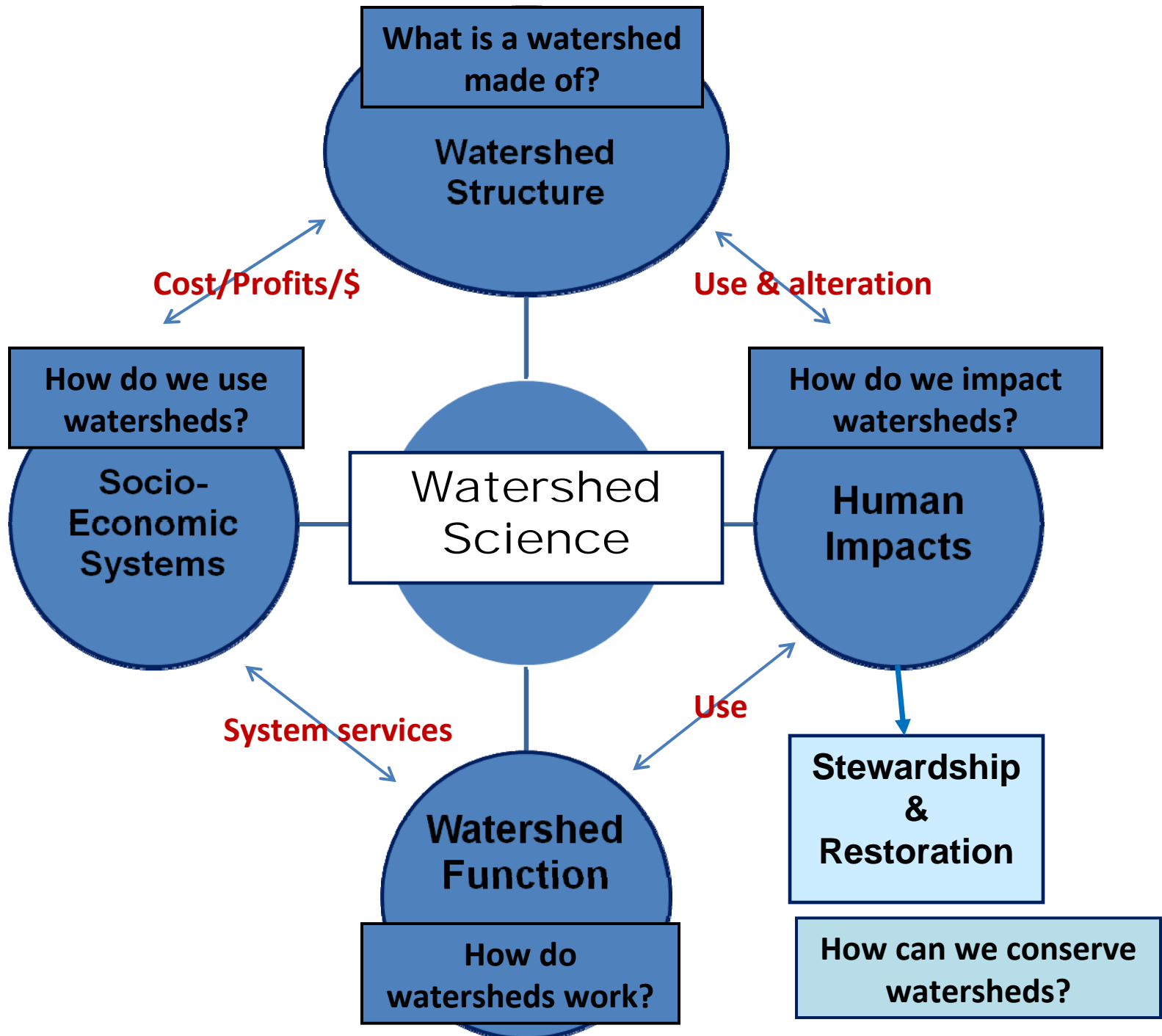


Change water flow & temperature, Reduce wetland area, pollution, change structure of wetlands, divert, reduce, dam, Deplete, invasive species

Water cycle, energy flow (energy spirals), water flow, nutrient cycling, filtering, erosion, precipitation, deposition, infiltration, gravity, food webs



EDUCATION, conservation
Riparian buffers, appreciation
WHY does it matter (personal relevance),



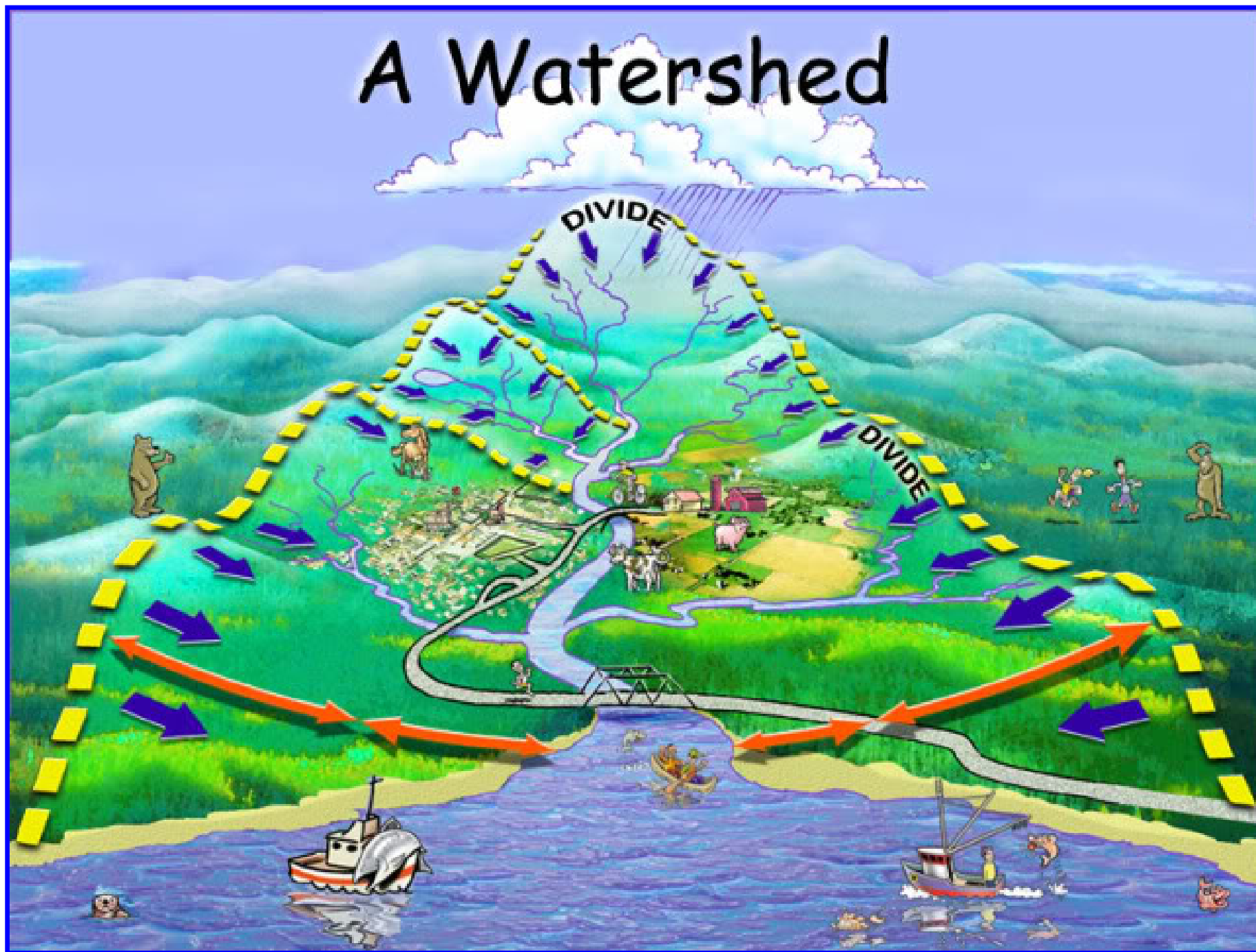
Watershed Science Components

Environmental Structure	Ecosystem Processes	Socio-Economic Systems	Human Impacts
Abiotic Components Air Water Sun Soil matrix Weather (Wind Temp) Climate geology Topography Nutrients, Habitat?	Climate/Weather	Flood control	Water diversion- dam
	Geologic Processes	Create power	Overconsumption of H ₂ O
	Energy Flow- solar energy to chemical energy to	Recreation & aesthetics	Structural changes (i.e, channelization, damming, channel course alterations)
	Nutrient cycling Oxygen, hydrogen, sulfur, carbon, nitrogen, phosphorus Hydrologic Cycle	Drinking water-Dam 'em! Water treatment	Sedimentation Nutrient , temp and chemical pollution Change community structure (through reduce spp. diversity, invasive spp.)
		Industrial processes, transportation	
Biotic Components Organisms Macro, micro flora and fauna, microorganisms, detritus, humans, Soil community,	Ecological succession	Biological productivity (fisheries, plant ag.)	Habitat fragmentation or alteration
	Organism adaptations and evolution	Food resources	Biodiversity change or loss
	Community dynamics (food webs, interactions,	Agriculture, hydroculture	Laws governing species, habitats, Stewardship

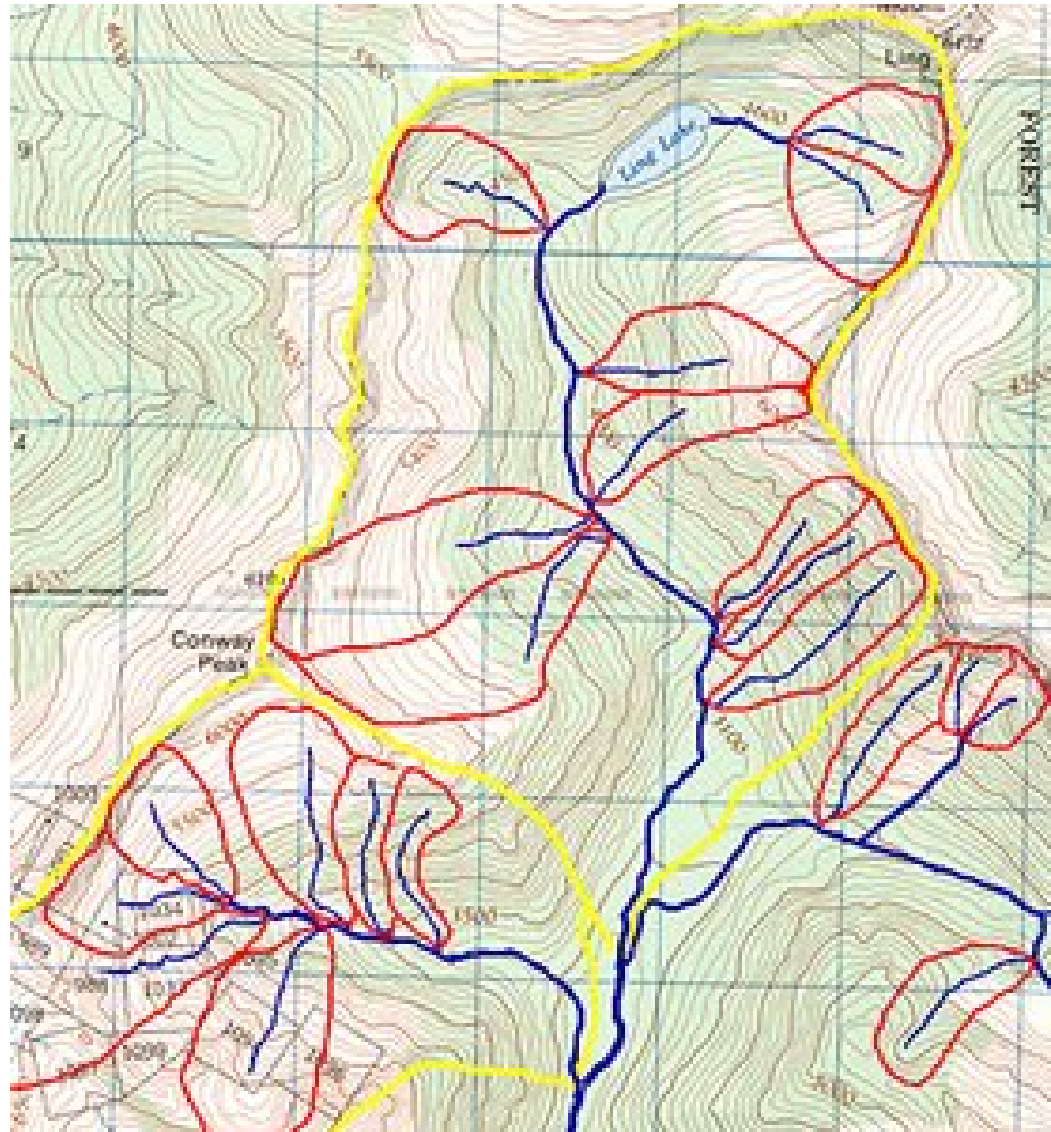
Watershed Science Components

Watershed (Environmental) Structure	Watershed (Ecosystem) Processes	Socio-Economic Systems	Human Impacts
Abiotic Components <ul style="list-style-type: none"> •Physical •Chemical •Habitat •Solar •Water •Nutrients •Soil •Geology •Topography •Atmosphere •Climate •Weather 	Climate/Weather	Flood control	Water diversion
	Hydrologic Cycle	Drinking water (water capture & storage)	Overuse of water: (change rate of flow--rivers) (water depletion—groundwater)
	Energy Flow •Solar •Food Webs •Water Flow	Recreation & aesthetics Transportation	Structural changes (i.e, channelization, damming, course alterations)
	Nutrient Cycling (major nutrients) •Carbon •Nitrogen •Phosphorus •CO ₂ & O ₂ •Sulphur	Industrial processes	Nutrient & chemical pollution
		Agricultural activities	
Biotic Components <ul style="list-style-type: none"> •Macroflora •Macrofauna •Microorganisms •Detritus (litter) •Habitat •Soil •Humans 	Ecological Succession	Biological Productivity (ecosystem material products):	Habitat fragmentation or alteration
	Geologic Processes	Fisheries Plants	Alter ecosystem structure
	Organism Adaptations & Evolution	Food Resources	Erosion Sedimentation
	Community dynamics	Generate power: Hydro-electric power	Biodiversity change or loss Invasive species
	Organism interactions	Waster water treatment	Increase temperature

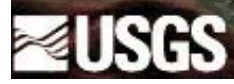
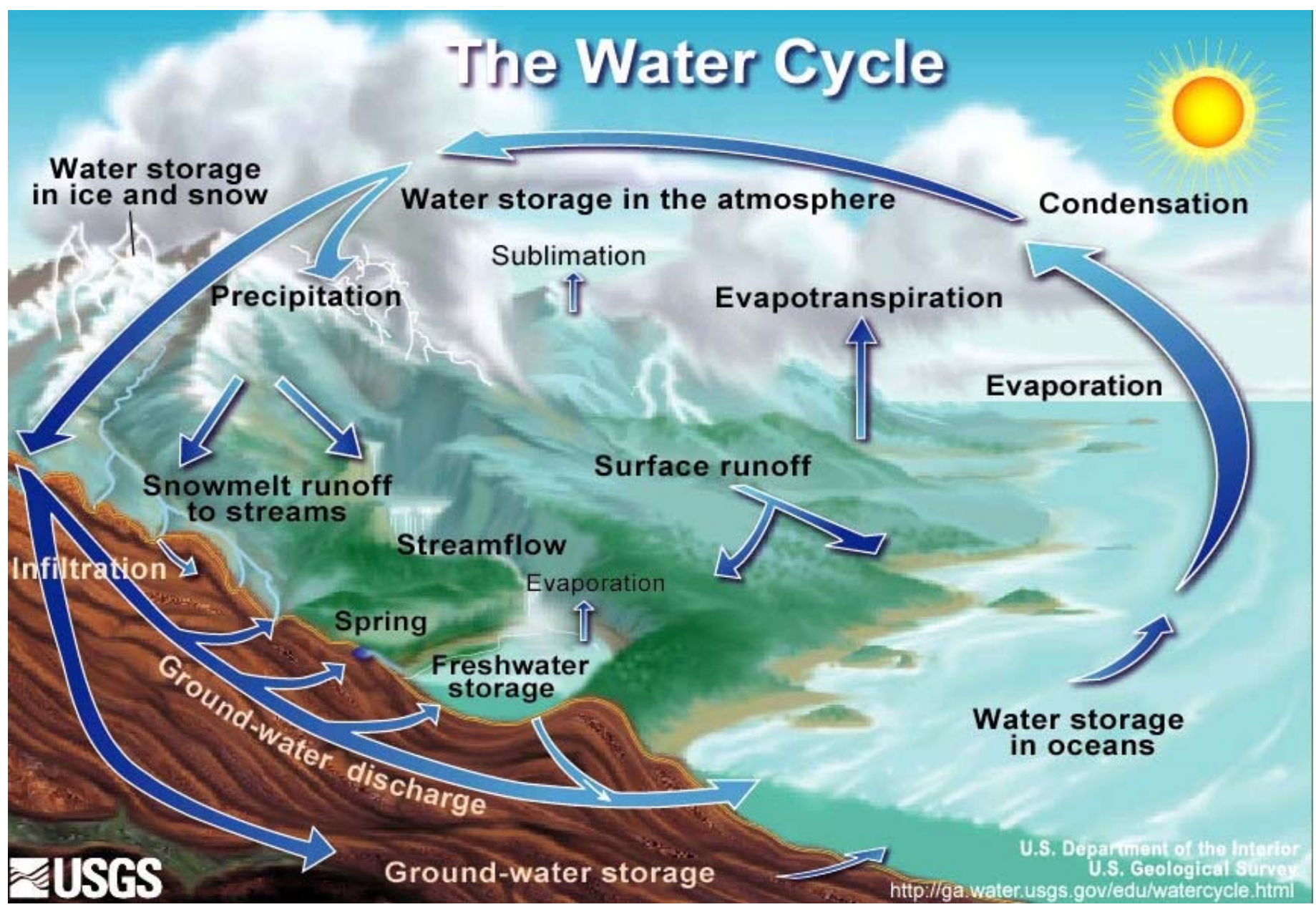
A Watershed



Watershed Scale & Hierarchy



The Water Cycle



U.S. Department of the Interior
U.S. Geological Survey
<http://ga.water.usgs.gov/edu/watercycle.html>

plants open their pores for carbon dioxide and lose water to evaporation (transpiration)

water vapor cools and changes back into liquid form (condensation)

water, driven by the heat of the sun, changes into vapor and rises into the air (evaporation)

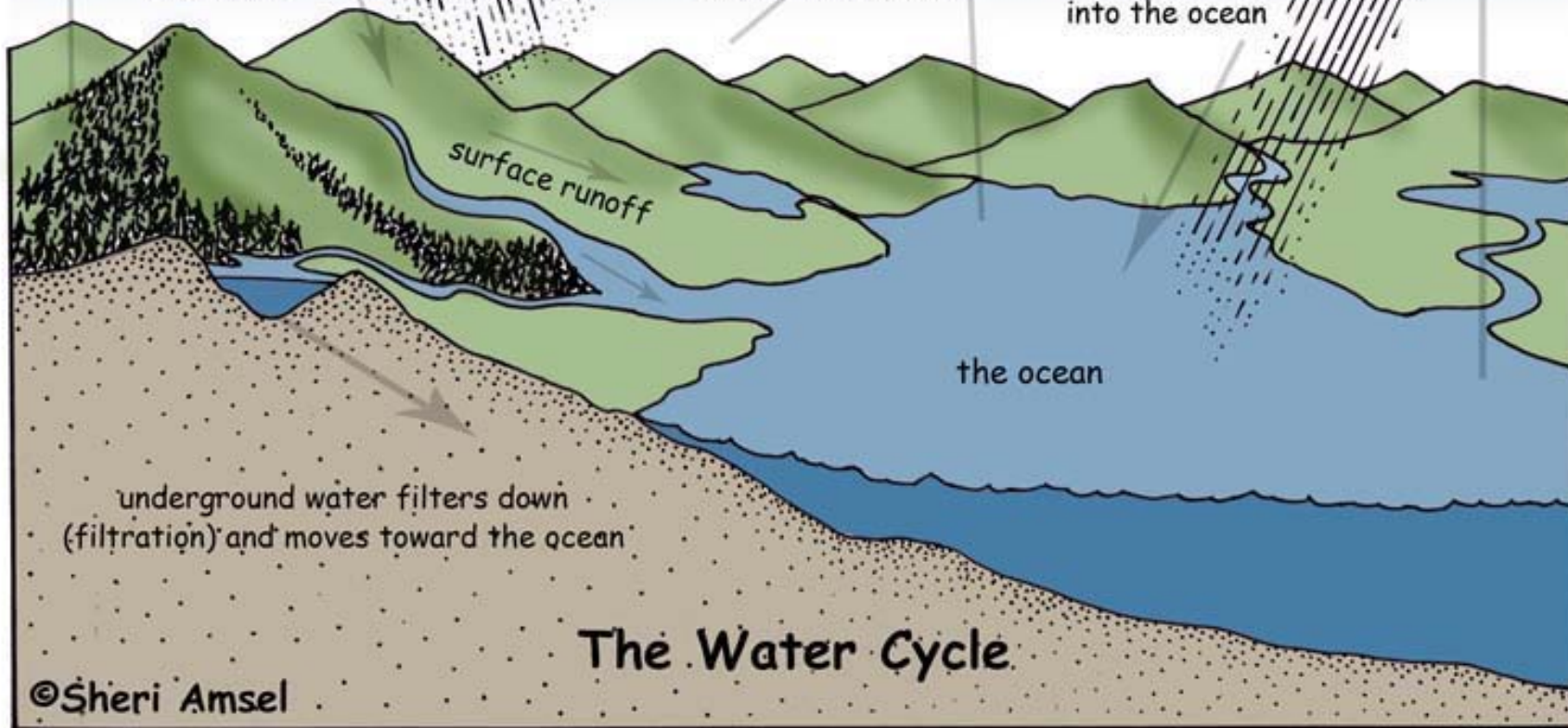


rain and snow (precipitation) onto land



rain and snow (precipitation) into the ocean

evaporation from the land and ocean



The Water Cycle

©Sheri Amsel



Clouds are made of water vapor.



When it is cold, rain turns to snow.



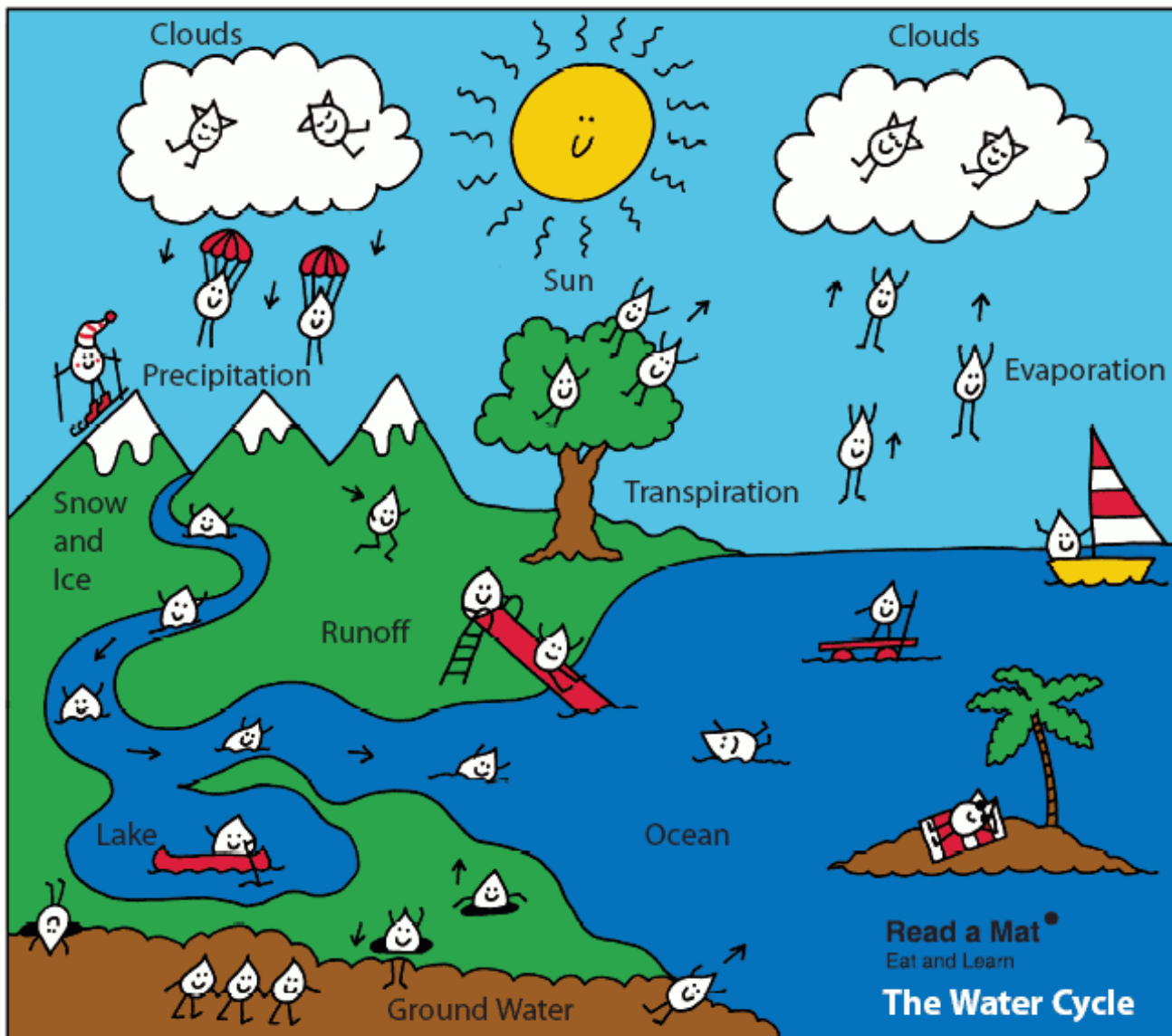
The warmth of the sun makes water evaporate.



Water vapor evaporates (transpires) into the air from plants and trees.



The same water goes around and around the earth in the water cycle.



Ground water seeps back to the surface to flow out.



Water freezes into ice and snow on mountains.



Water flows down rivers to the ocean.



Long ago dinosaurs may have drunk the same water we drink today.

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Read a Mat[®]
Eat and Learn

The Water Cycle

