

Earth and Space – The Hydrosphere

- Earth's outer layer of water, found in three states: liquid, gas and solid.
- Of this, 2.5% is freshwater, out of the 2.5%, 79% is frozen

We can “separate” the hydrosphere into 3 general categories:

1. Inland water
2. The cryosphere
3. Ocean water

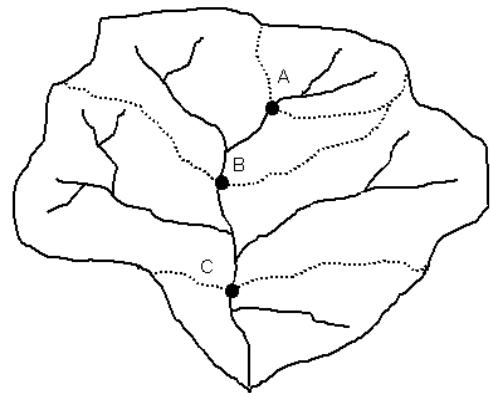
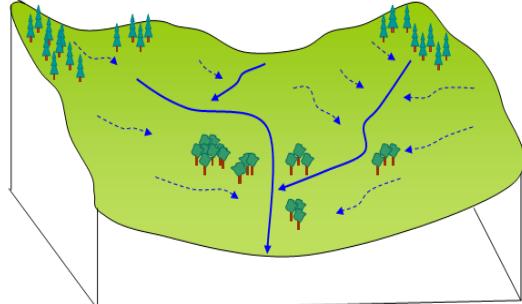
1. Inland water

Fresh water bodies found on continents. This unites rivers, lakes and groundwater

To study inland water we divide the continent up into catchment areas

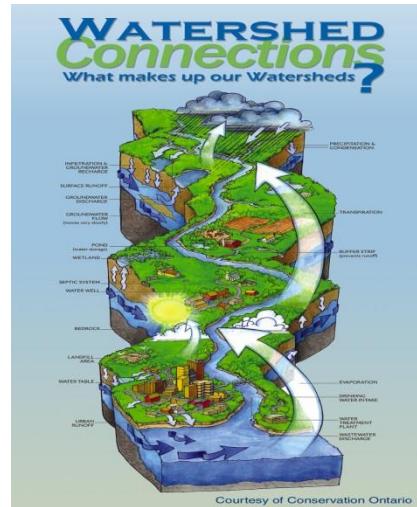
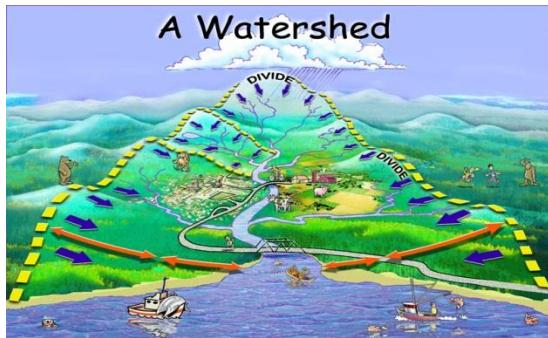
Catchment areas

- A catchment area is an area which surrounds a waterway and all rainfall drain into the waterway. Ex: river, lake, or reservoir.



Watershed:

An area or ridge of land that separates waters flowing to different rivers, basins, or seas.



Criteria to consider while deciding a watershed:

- *Topography: Natural and artificial features of area*
- *Geology: Rocks*
- *Climate*
- *Vegetation: Plant life*
- *Agriculture: Farming*

2. The cryosphere

Frozen water on earth's surface

The cryosphere encompasses:

Ice floes Glaciers Permafrost Frozen lakes and rivers Snow

Ice Floes vs. Glaciers

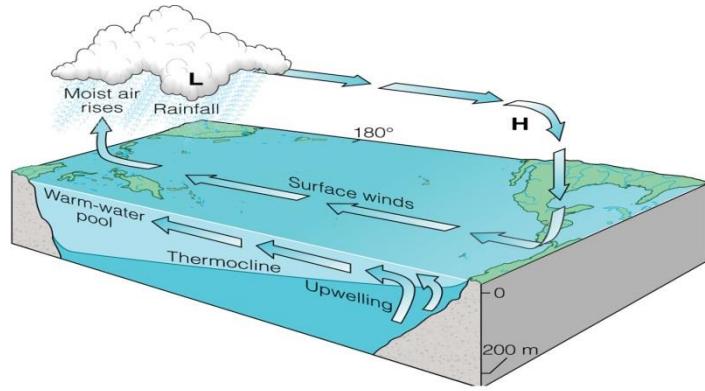
Ice floes	Glaciers
<p><i>Ice floes are composed of ice floating on the oceans near the North and South poles.</i></p>	<p>-A glacier is a mass of ice on land formed by compressed snow which does not float.</p> <p>-When chunks break off of glaciers and fall into the sea they create icebergs, this causes a rise in sea level.</p>
	
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3. The Oceans

- Large masses of salt water
- The oceans are moved all over the world by currents.
- There are two types of currents
 - Surface currents
 - Subsurface currents (Deep currents)

1. Surface currents

- *Controlled mostly by wind*
- *Move horizontally, usually in the first 400 m*
- *Example: the gulf stream*



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2. Subsurface currents (deep currents)

- *Occur at a depth of more than 800 m*
- *Currents caused by density and salinity (colder and saltier = more dense)*

Current changes due to temperature

- 1- Depth
 - *The deeper the colder*
 - *The mixed layer's temperature relatively stable*
- 2- Seasons
 - *In winter, the water will lose its stored energy*
- 3- Latitude
 - *Increase in latitude, decrease in temperature*
 - *At the equator the average surface temperature 25°C-28°C*
 - *At the temperate zones the average temperature 12°C-17°C*

Changes due to salinity variation

- Where does salt come from?

Salt comes from the erosion of rocks and the dissolution of salts. As salt does not evaporate, rivers and groundwater also bring salt to the ocean.

- The higher the salinity, the denser the water will be.

Thermohaline circulation

- Huge “conveyor belt” effect connecting the surface and the subsurface circulations
- Responsible for the distribution of heat around the world

