

Sources of Fresh Water

Lesson 30

Sources of Fresh Water

If only 1% of all of Earth's fresh water supply is easily accessible, where is all the fresh water?



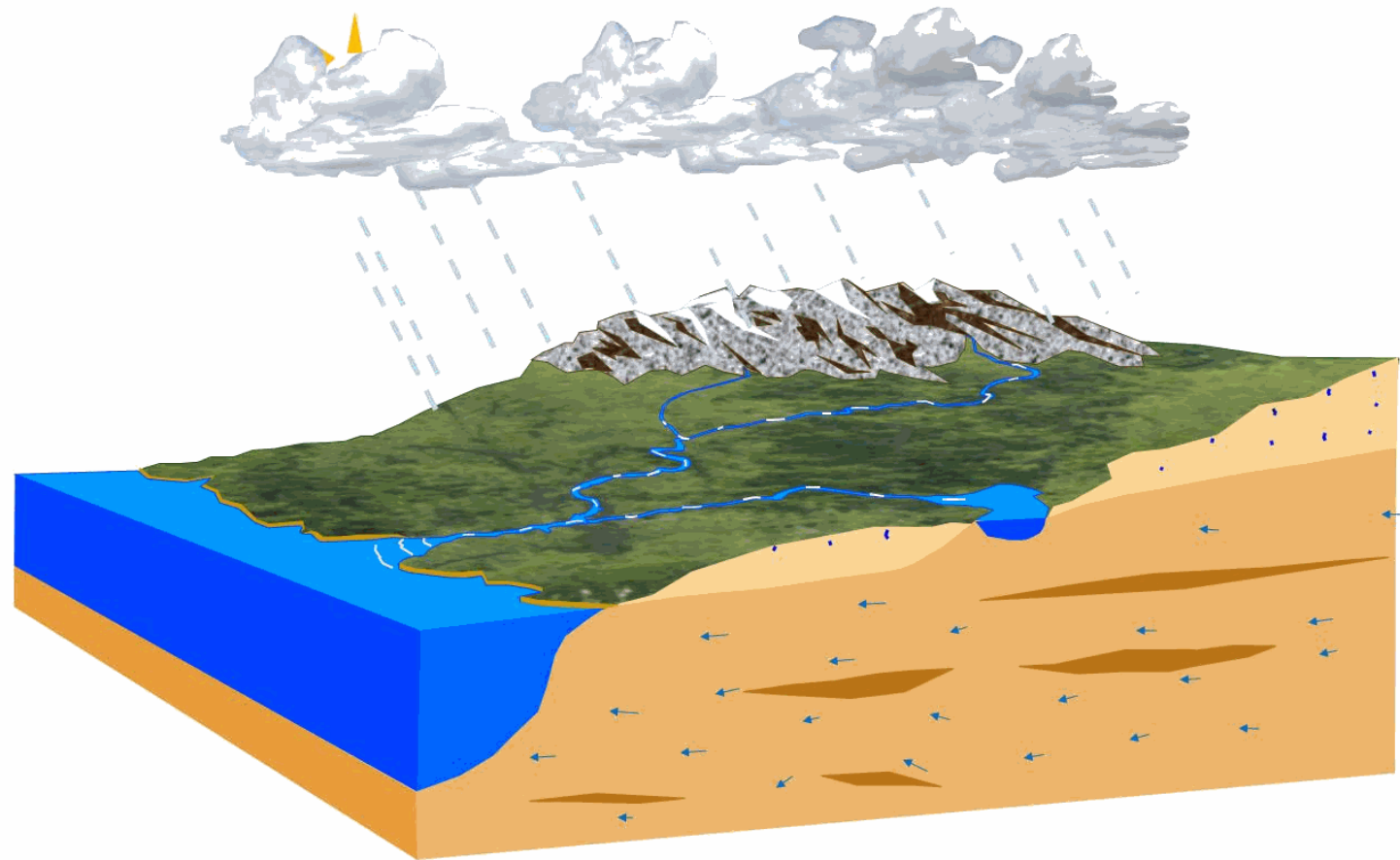
Sources of Fresh Water

- You may have noticed that after heavy rain showers, mini-rivers of water wash over sidewalks, driveways, and roads
- Where does this water go?
 - Some evaporates or soaks into the ground
 - A lot of it flows over the surface of the ground and “runs off” into streams, rivers, other water bodies, and even city sewer systems



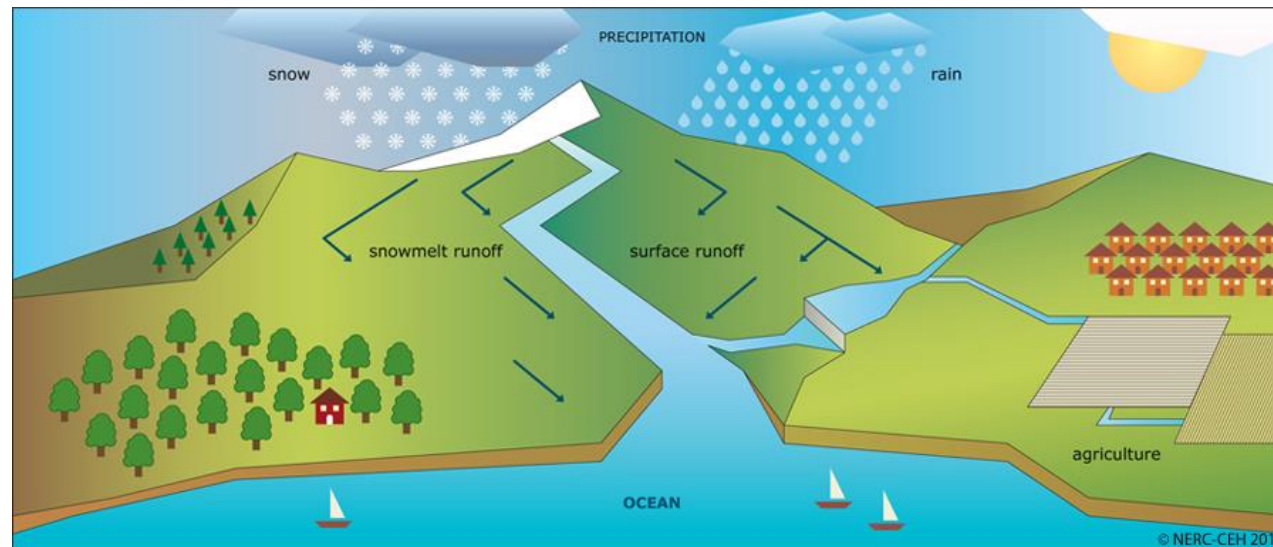
Sources of Fresh Water

- This flow is called **run-off**
- The force pulling water downwards is **gravity**
- Under gravity's influence, rain hitting pavement or hard rock will flow along the ground until it hits a low point on the surface or finds its way into a stream



Factors Affecting Run-off

- Run-off is essential for filling the lakes, streams, and rivers which helps keep the oceans filling with water
- Run-off plays a vital role in the water cycle and, therefore, in supporting all the plant and animal life we see around us
- The amount of run-off is higher in some areas than in others
 - It can also vary in the same area, depending on different conditions



Factors Affecting Run-off

How much run-off is created is affected by the following:

- The nature of the ground material
 - If the ground is covered in rock, it will not absorb the surface water easily → increase in run-off
 - If the ground is mostly soil, it will absorb water better → decrease run-off
- The amount of rain and the length of time it rains
 - If it rains heavily, the ground may quickly become saturated and unable to absorb any more water → increase run-off
- The slope of the land
 - The steeper the land is, the faster the water will flow downhill
 - When water moves too fast, the ground cannot easily absorb it → increase run-off



Factors Affecting Run-off

How much run-off is created is affected by the following:

- The amount of vegetation
 - Plants absorb water, so areas with a lot of vegetation → decrease run-off
- The amount of development in the area
 - Wherever there is a lot of pavement or concrete on the ground, water is usually channeled into storm sewer → increase run-off

Run-off is essential for filling the bodies of water on Earth

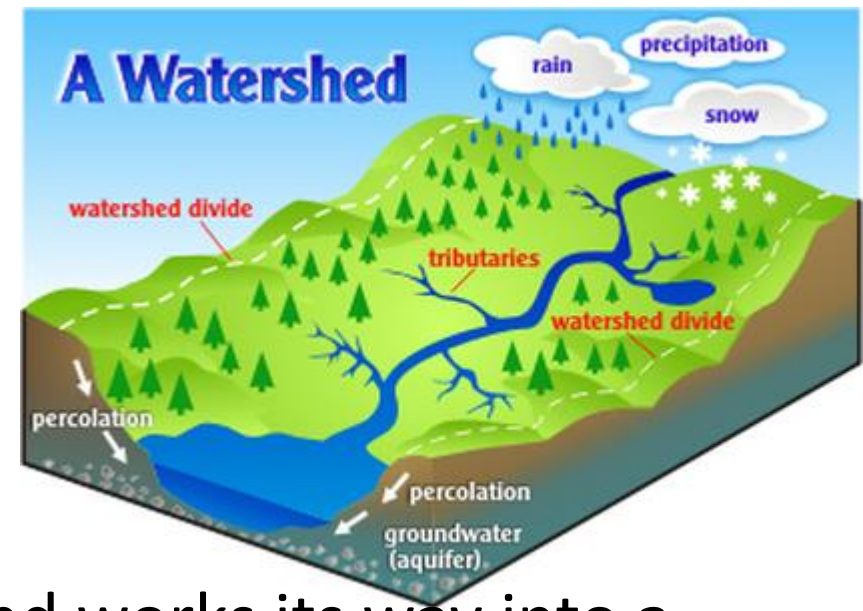


Factors Affecting Run-off

- Natural events or human activity that interfere with the amount of run-off (making the amount increase or decrease) can cause problems
 - Too much run-off may cause rivers to overflow and flood the surrounding land
 - Heavy flooding can wash valuable topsoil away from fields, leaving the ground useless for farming or grazing
 - Fast-moving rivers can also churn up a lot of fine sand and silt (very small particles), which are harmful to fish and other aquatic animals
 - Building of roads and development can damage streams and the quality of water



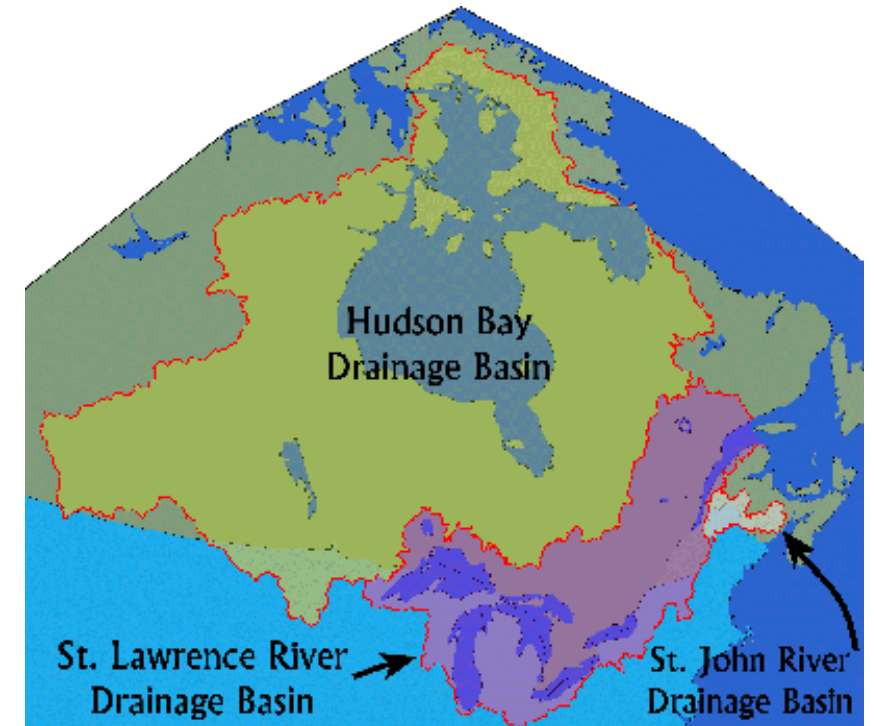
Drainage Basins



- Water must flow or run-off somewhere
- The area of land where precipitation falls and works its way into a common body of water (river, stream, lake) is called a **drainage basin** or watershed
- A drainage basin is like a bathroom sink
 - If you pour any water in along the sides of the sink, the water will flow down to the drain
- Similarly, any water falling into a drainage basin will flow down into a particular stream
 - Many small streams feed into a larger river

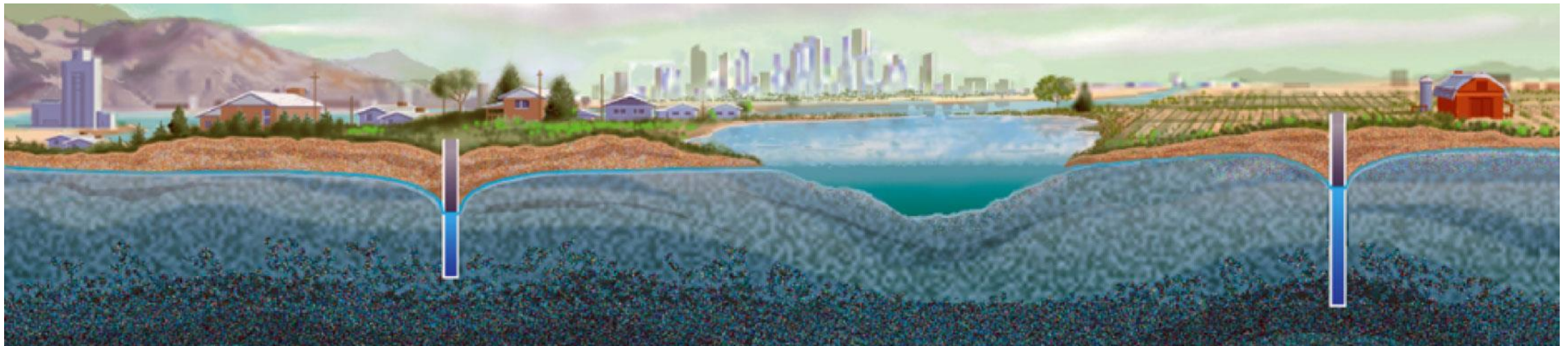
Drainage Basins

- All the connected streams and rivers together are called a river system
- There are many drainage basins scattered across the globe
- A divide, usually separates one drainage basin from another
 - A divide is an area of high ground
 - The Rocky Mountains from the Continental Divide that separates the Pacific watershed from watersheds to the east of the Rocky Mountains



Ground Water

- Most of the rain that falls on land seeps out of sight into the ground
- Below the surface, this water trickles downward through pores (spaces) and cracks in the rock
- Water that moves into and through pores and cracks of underground rock is called **ground water**
- **Ground water** is an important source of water for many people
 - They drill well into the ground to draw water up so it can be used



Reservoirs

- Many people who live in cities or towns get their household water from a large surface storage area called a **reservoir**
- **Reservoirs** are large human-made or natural lakes that store water until people need it



Glaciers

- Almost two thirds of the world's water today is trapped in large masses of snow called **glaciers**
- **Glaciers** are large blocks of ice that slowly move downhill
 - Alpine glaciers (aka valley glaciers) form in mountains and move slowly downhill through mountain ranges
 - Continental glaciers are much bigger than alpine glaciers and cover large areas of land (often called sheets)
- Glaciers cover about 10% of the Earth's land area
- Glaciers affect the water cycle by “holding” water as ice
 - Less water evaporates from glaciers than from liquid bodies of water



Do glaciers ever melt?

- The water in a glacier can stop moving downhill and can melt when the slow-moving glacier reaches a large body of water i.e. an ocean
- As the front of the glacier slowly spills over the edge of the land, deep cracks called **crevasses** form
- Large chunks of the glacier break off as gravity pulls down on them
 - When these large chunks of ice fall into the ocean, they are called **ice bergs**



Do glaciers ever melt?

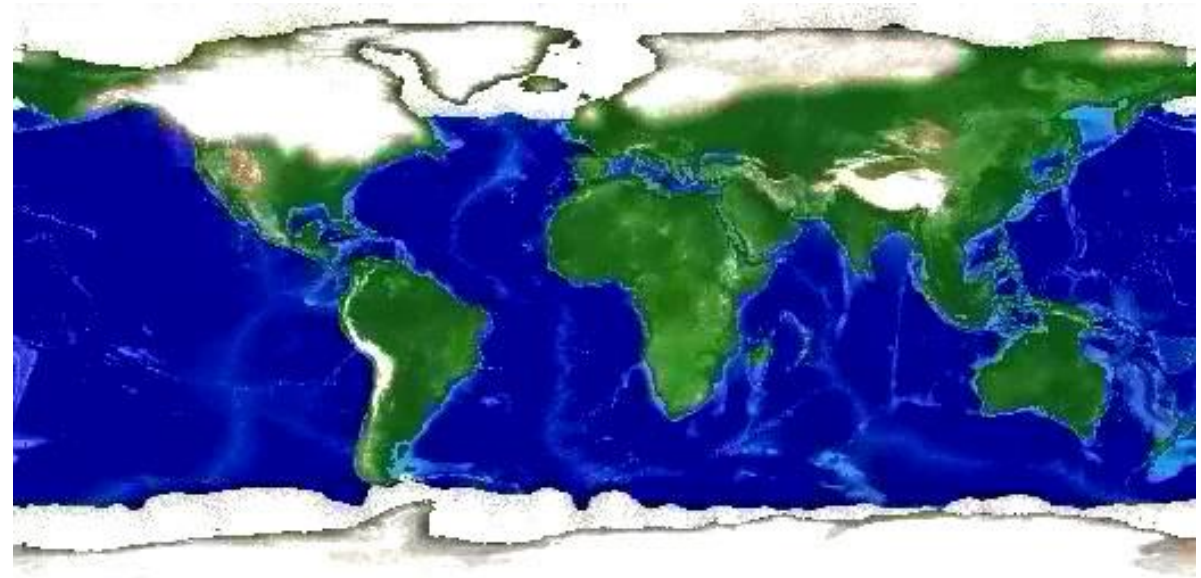
- A glacier can stop moving downhill and melt when the temperature is warm enough to melt the ice faster than the glacier can be moved forward by gravity
- If temperatures increase, the glacier can start receding = melts back up the slope

All glaciers in BC and in most parts of the world are now receding!



Glaciers

- During the last ice age (started about 70 000 years ago and ended about 10 000 years ago), glaciers covered most of the northern part of the world
 - The water that would have normally been moving through the water cycle was frozen in ice
 - Ocean levels around the world dropped about 100m below what they are today



Summary

- Only about 1% of all of Earth's fresh water supply is easily accessible
- Most of the fresh water is trapped in ice and not readily available for human use
- The fresh water that is available is found wherever falling as rain and snow runs off the land and is collected in lakes, rivers, streams, and underground
 - Run-offs
 - Drainage basins
 - Ground water
 - Glaciers

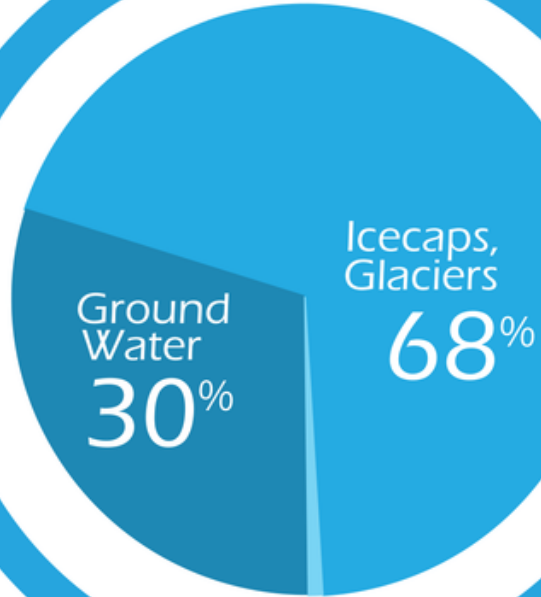
3% Fresh Water

Only 3% of all the water on Earth is freshwater



Earth Water

97% of all the water on Earth is salty ocean water that is unsuitable for Human Consumption



1% Fresh Surface Water

Over 68% of this freshwater is locked up in polar icecaps and glaciers inaccessible to Humans

