

Part 1

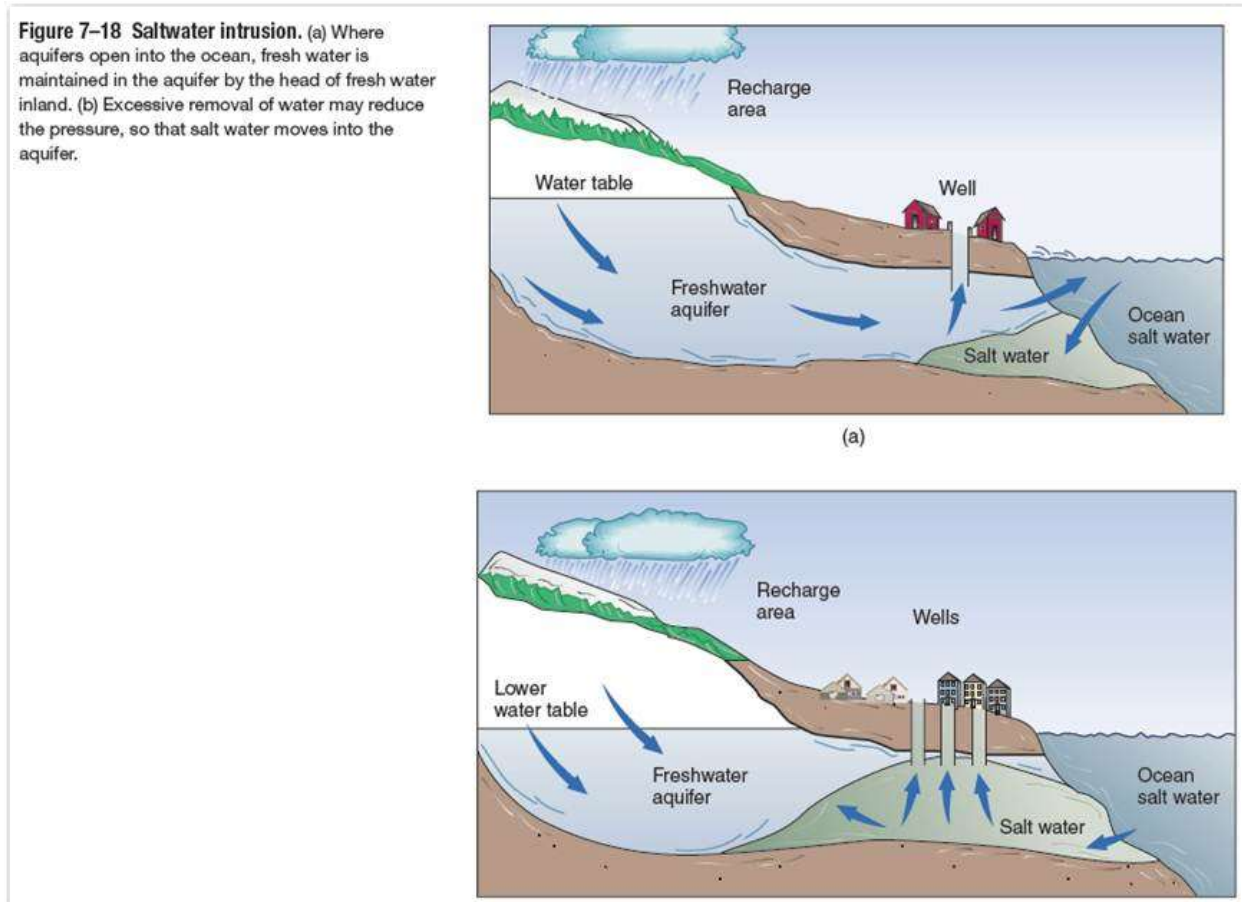
Background Information

Planet Earth's surface is over 70% water, but less than 1% of the water on Earth is considered accessible, usable freshwater for sustaining humans' and other organisms' lives. Of the accessible freshwater, approximately 99% is located in aquifers, natural underground water chambers, and other groundwater sources. Unfortunately, humans are depleting the aquifers faster than they can be recharged by the hydrological cycle. Therefore, three quarters of groundwater is considered nonrenewable.

Conditions

The main reason we use groundwater resources mainly for drinking and irrigation. As a result, this not only decreases an important source of freshwater—it also can cause pollution of that groundwater by saltwater intrusion. The recharge rate of groundwater is further hindered by land clearing and deforestation caused by human development. When land is cleared for human development, more flooding occurs, the *transpiration rate* (the amount of water that evaporates into the atmosphere from plants) is reduced, and rainwater is inhibited from adequately *percolating* (penetrating the soil) into the ground to allow for aquifers and groundwater to be recharged.

Figure below shows Saltwater Intrusion:



(Wright & Boorse, 2010)

Impacts

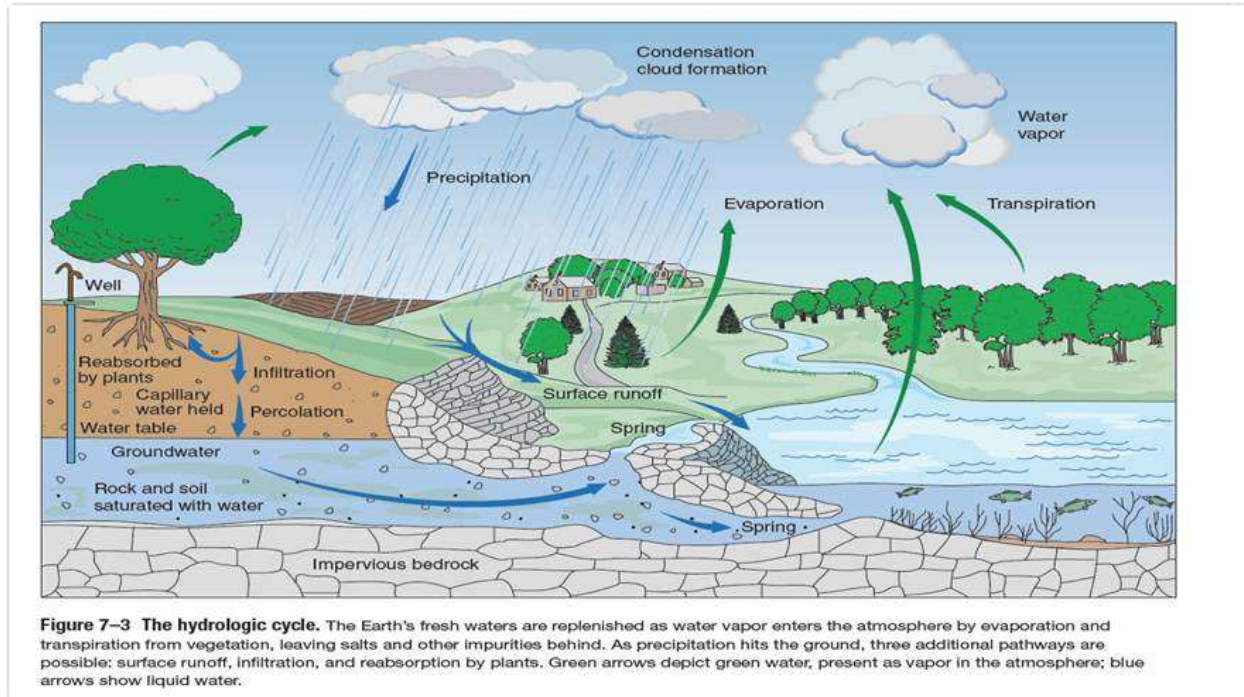
Forty percent of the world's food is produced via irrigation. As a result, if the current rate of groundwater usage continues, food production could be drastically reduced worldwide. This

reduction in food supply would be detrimental in sustaining the projected worldwide human population of over 10 billion within the next 50 years.

Part 2

Time Line

Use the Hydrologic Cycle Figure below to understand the impact of industrialization and human development on ground water over 3 centuries.



(Wright & Boorse, 2010)

The table below shows the impacts:

Time Period	Impact on Forest	Groundwater Levels	Saltwater Intrusion	Farming	Industrial Development	Population
1800s	Large forests	Lots of groundwater	No salt water intrusion	Small farms	No cities	Limited housing
1900s	Decreased by 50%	Decreased by 50%	Ocean moved into groundwater	Farms are larger, but there are fewer	Exceptional growth of cities and industrial development	Substantial increase in housing
2000s	Decreased by 90%	Decreased by 90%	Greater movement of ocean into ground water	Same number of farms, but size decreased by 20%	Industrial development decreased by 10-15%	Housing development decreased by 10-15%

Reference

Wright, R. T., & Boorse, D. F. (2010). *Environmental science: Toward a sustainable future* (11th ed.) White Plains, NY: Addison Wesley.

End of Activity



® Registered Trademark CEC 2018.