

## **Water Resources**

### **Chapter Thirteen**

#### **Fresh Water**

- About 97% of the earth's water is too salty for drinking, irrigation, or industry. The remaining 3% is fresh water, but most is locked up in ice caps and \_\_\_\_\_. Only 0.024% of all water on earth is available to us as soil moisture, usable groundwater, water vapor, and lakes and streams.

#### **Surface Water**

- Precipitation that does not \_\_\_\_\_ the ground or evaporate is called surface runoff
- A watershed, or river basin or drainage basin, is a region from which water drains into a body of water.

#### **Groundwater**

- Groundwater is water that infiltrates into soil and rock.
  - The zone of \_\_\_\_\_ is the depth at which the spaces in soil and rock are filled with water.
  - The surface of the zone of saturation is the water table.
  - Porous, water-saturated layers of sand, gravel, or bedrock through which groundwater flows are called \_\_\_\_\_.
  - Any area of land through which water passes into an aquifer is called a recharge area.
- Groundwater in the U.S. is being withdrawn at four times its replacement rate. This leads to two major problems:
  - aquifer subsidence - the sinking of land when groundwater is withdrawn
  - \_\_\_\_\_ - salt water from the coast enters the aquifer, rendering it unusable for terrestrial organisms

#### **Freshwater Use**

- The U.S. has the world's highest per capita use of water, amounting to 1,600 gallons per person every day.
- Use of water in the U.S.:
  - 41% \_\_\_\_\_
  - 38% power plant cooling
  - 11% industry
  - 10% public

#### **Causes of Water Shortage**

- There are four causes of water scarcity:
  - dry climate
  - drought
  - \_\_\_\_\_
  - water stress
- Water stress is caused by increasing numbers of people relying on limited levels of runoff. This is the concern in Cary, whose water supply is from Jordan Lake. Jordan Lake is primarily in Chatham County, which, like Wake County, is experiencing rapid growth. This is leading to conflicts over water rights and usage.

#### **Sustainable Water Future**

- There are three underlying forces that can lead humans to use renewable resources in unsustainable ways:
  - depletion or degradation of a shared resource (\_\_\_\_\_ of the \_\_\_\_\_)
  - population growth
  - unequal distribution or access

#### **Water Conservation**

- The average American uses 295 liters of water per day
  - Take shorter showers
  - install a low-flow devices in showers, faucets, and toilets
  - don't let the water run while brushing your teeth
  - water the lawn in the evening to minimize \_\_\_\_\_

### **Watershed Transfer**

- Another concern in Cary is watershed transfer. This is when water from one watershed (Jordan Lake is in the \_\_\_\_\_ river basin) is transferred to another watershed (Cary is in the \_\_\_\_\_ river basin). Watershed transfer further reduces groundwater levels and has detrimental effects downstream, with the Cape Fear River experiencing too little flow and the Neuse River experiencing greater flooding.

### **Dams and Reservoirs**

- Large reservoirs, like Jordan Lake, are created by damming rivers. They can capture and store water for town and city use, hydroelectric power, \_\_\_\_\_, flooding control, and recreation.
- Negative effects of dams and reservoirs include the reduction of downstream flow, destruction of habitats, and the disruption of fish \_\_\_\_\_.

### **Colorado River**

- The Colorado River, which runs through the southwest U.S., rarely reaches the Gulf of \_\_\_\_\_ due to overexploitation and a major series of dams. This includes \_\_\_\_\_ Dam and Lake Mead, which supplies 90% of the water for Las Vegas.

### **Three Gorges Dam**

- China's Three Gorges Dam, built across the \_\_\_\_\_ River, is the largest dam in the world. The project will supply large amounts of energy and reduce flooding, but displaced 5.4 million people and is built over a seismic fault.

### **The Aral Sea**

- The Aral Sea in central Asia was once the world's fourth largest freshwater lake. Since 1960, it has been shrunk significantly due to diversion for \_\_\_\_\_.

### **Desalinization**

- The removal of dissolved salts from ocean water or brackish groundwater is called desalinization. The two most widely used methods are \_\_\_\_\_ and \_\_\_\_\_.
- Due to the large amount of energy (read: electricity) needed for desalinization, it is not affordable. It costs three to five times more to acquire water in this way.

### **Flooding**

- Natural flooding by streams is caused primarily by heavy rain or rapid melting of snow; this causes water in the stream to overflow its normal channel and to cover the adjacent area, called a floodplain.
- People have always settled in floodplains because of the fertile \_\_\_\_\_ and ample water. Floodplains are also beneficial areas for aquifer \_\_\_\_\_ and wetland habitats.
- Negative effects of flooding center around the loss of human life and property.

### **Flood Management**

- Ways humans can reduce the risk of floods include:
  - channelization - straightening and deepening streams
  - building levees and dams
  - restoring \_\_\_\_\_
  - floodplain management - move people out of floodplains