

EQ #11 - WHAT IS THE CLEAN WATER ACT?

How does the CWA address water pollution?

WATER SUPPLY

- Water is essential to life on earth.
- The earth is approximately 97% Salt Water and 3% Fresh Water.
- Most fresh water is frozen, in plants and animals and cycling in the atmosphere.
- Less than 1% is surface water (.3%) & groundwater (.7%) available for use

WHAT RIVERS DO WE USE IN EUGENE?

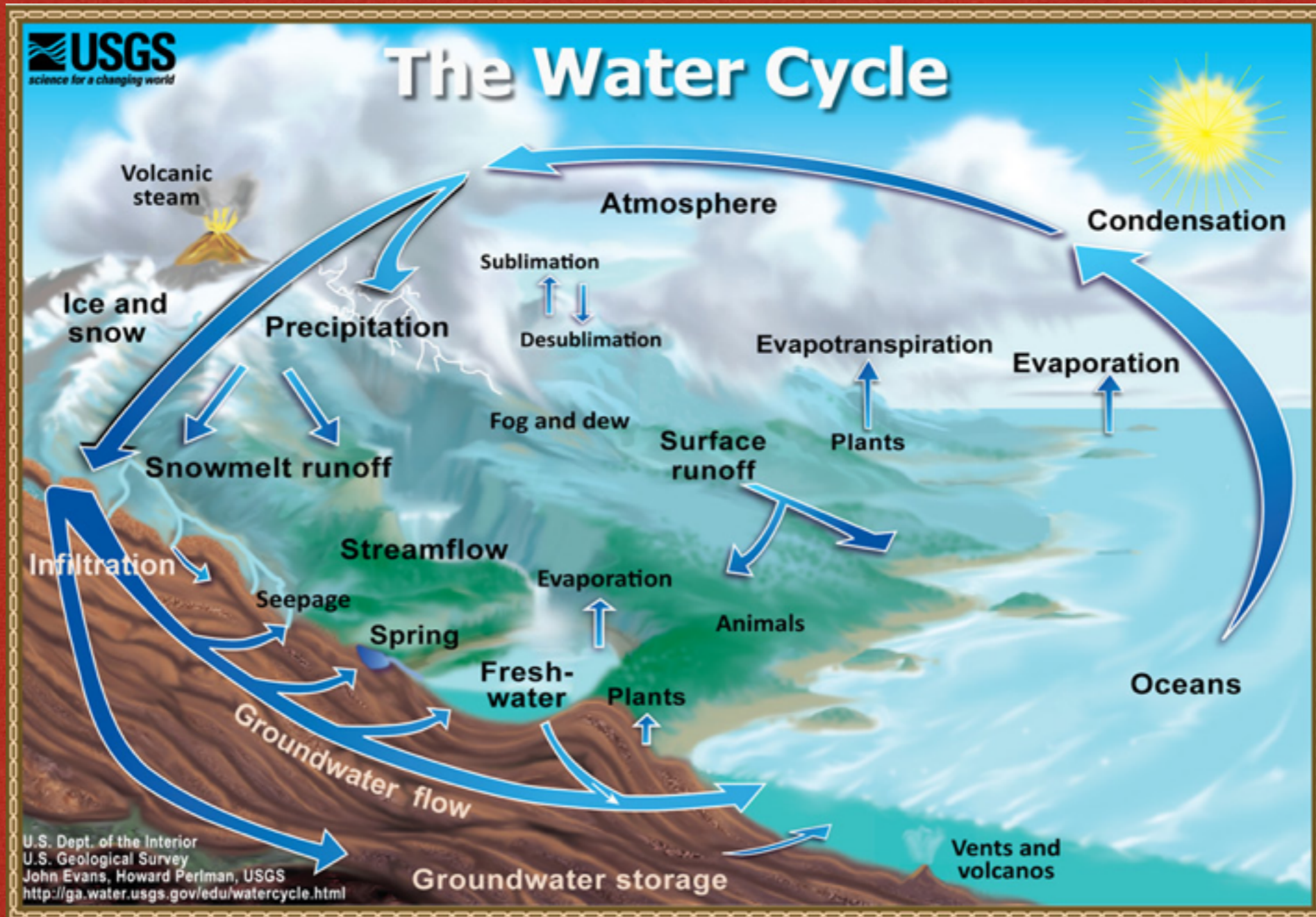
- Eugene's drinking water comes from- The McKenzie River.
- Eugene's treated wastewater goes into- The Willamette River



HYDROLOGIC CYCLE

- Water constantly cycles through the atmosphere and cleans and replenishes itself. We canNOT make more (non-renewable)
- 1. Evaporation- Sun heats and changes liquid to vapor
- 2. Condensation- Vapor rises, cools and forms droplets as clouds
- 3. Precipitation- Drops fall to earth as rain or snow
- 4. Collection- Precipitation runs off and collects in lakes, streams, ocean & underground (infiltration)

WATER CYCLE



WHAT IS WATER POLLUTION?

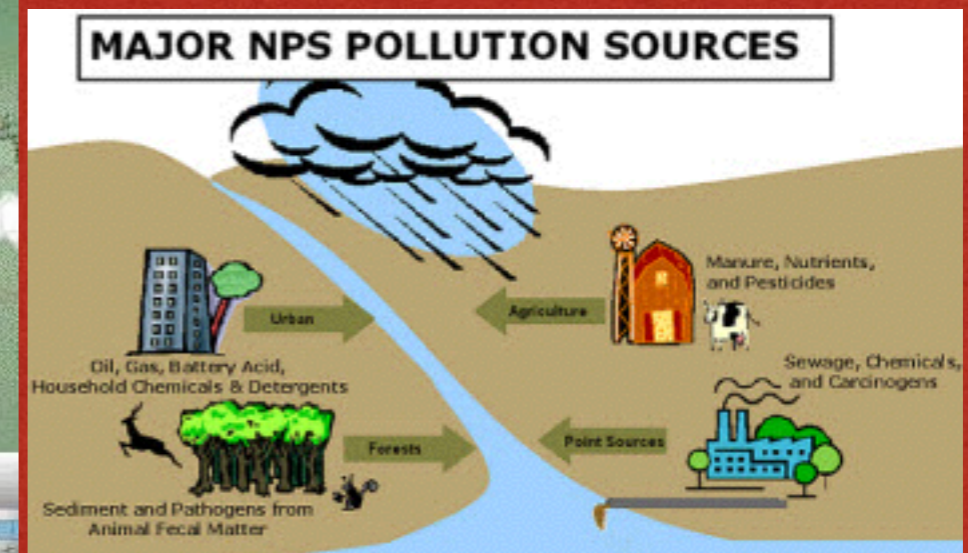
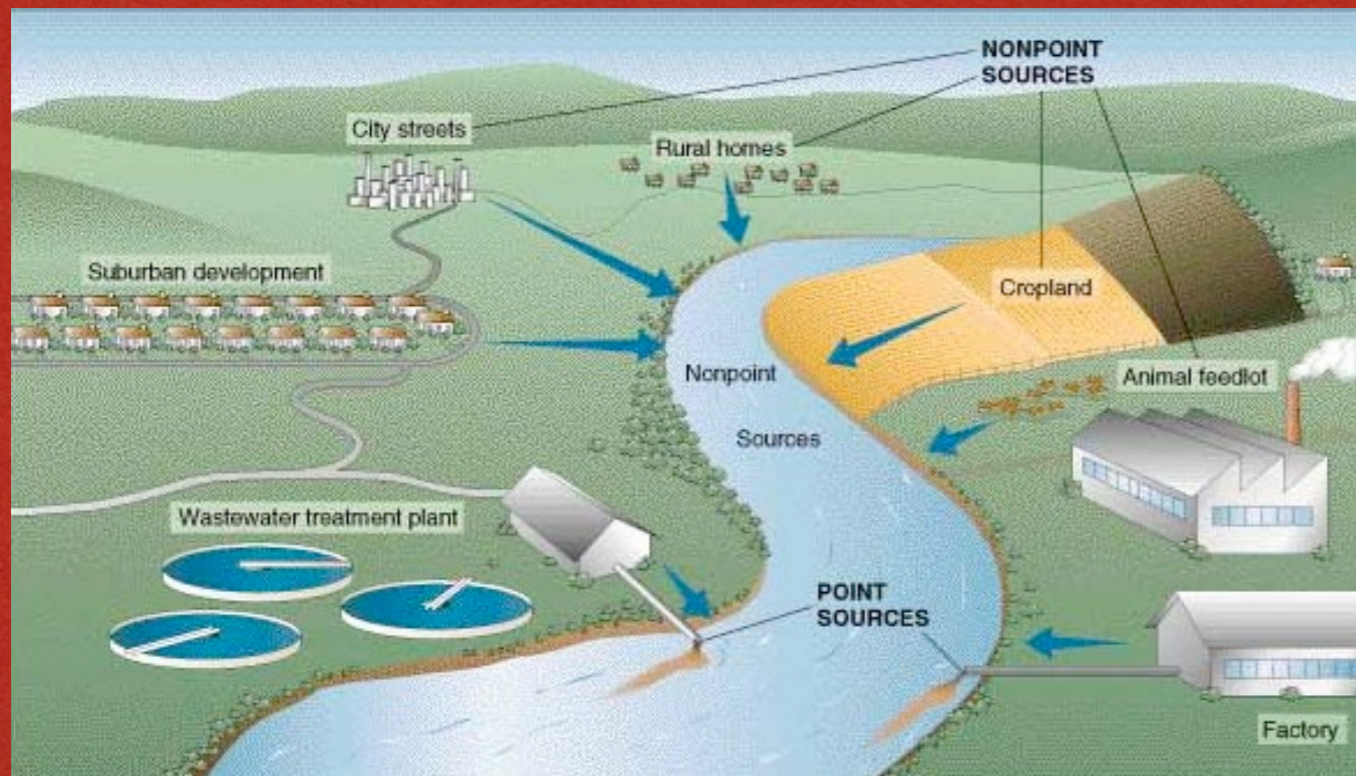
- **Water Pollution-** Is any chemical, biological or physical change in water quality due to natural or human activities.



TWO CATEGORIES OF WATER POLLUTION

- **Point-Source (PS)- Water pollution from a traceable source** (a pipe, a factory; a particular farm)
- **Non Point-Source (NPS)- Water pollution that is not traceable to a single source** (urban, farm runoff...) but comes from many sources carried by stormwater runoff.
Stormwater Runoff- Pollution from streets carried by rain

POINT-SOURCE & NON POINT-SOURCE



WHICH TYPE OF POLLUTION IS HARDER TO REGULATE?

- The Clean Water Act is more successful in regulating Point-Source pollution.
- It is MUCH less effective regulating Non Point-Source pollution.
- Why?- Because it is more easily monitored and measured.

WATER QUALITY FILM

- <https://www.youtube.com/watch?v=RMyCcWECbNE>
- Watch the film on Water Quality.
- Use the Water Quality Film Notes handout and answer questions as the film plays.
- It provides a good overview about water pollution in US today.

FRIDAY 2/28

- What are the main types and sources of water pollution?
- Activity- How much water do you use?

WHAT ARE THE COMMON SOURCES OF WATER POLLUTION?

- I. Nutrients-

- From fertilizers used for plants & detergents / soaps



- Promotes plant growth= algae; reduces oxygen

- From Animals-

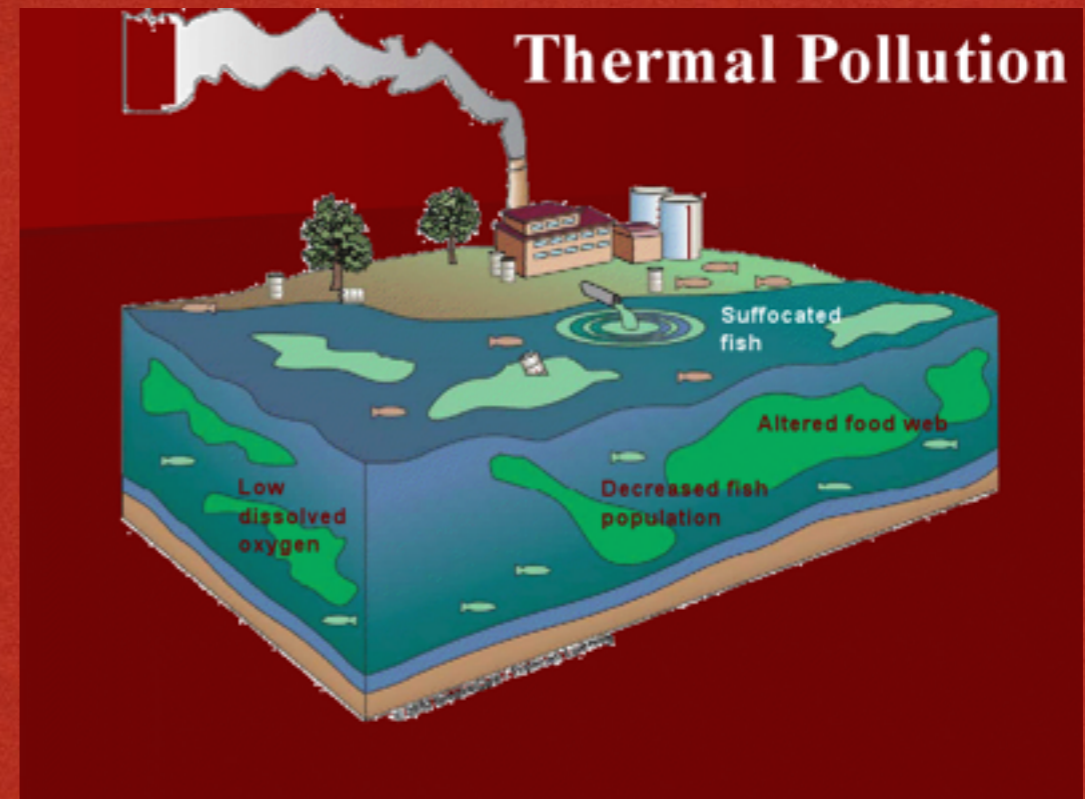
- Sewage, manure & food scraps;



- Feeds bacteria that cause disease.

WHAT ARE THE COMMON SOURCES OF WATER POLLUTION?

- 2. Heat / Thermal-
 - From industries that use water to cool.
 - Increases water temperatures & kills aquatic life
 - Lowers dissolved oxygen in water



WHAT ARE THE COMMON SOURCES OF WATER POLLUTION?

- 3. Hazardous / Toxic Chemicals-
 - From household chemicals, industrial processes, agricultural pesticides & road runoff;
 - Is TOXIC and kills aquatic life



WHAT ARE THE COMMON SOURCES OF WATER POLLUTION?

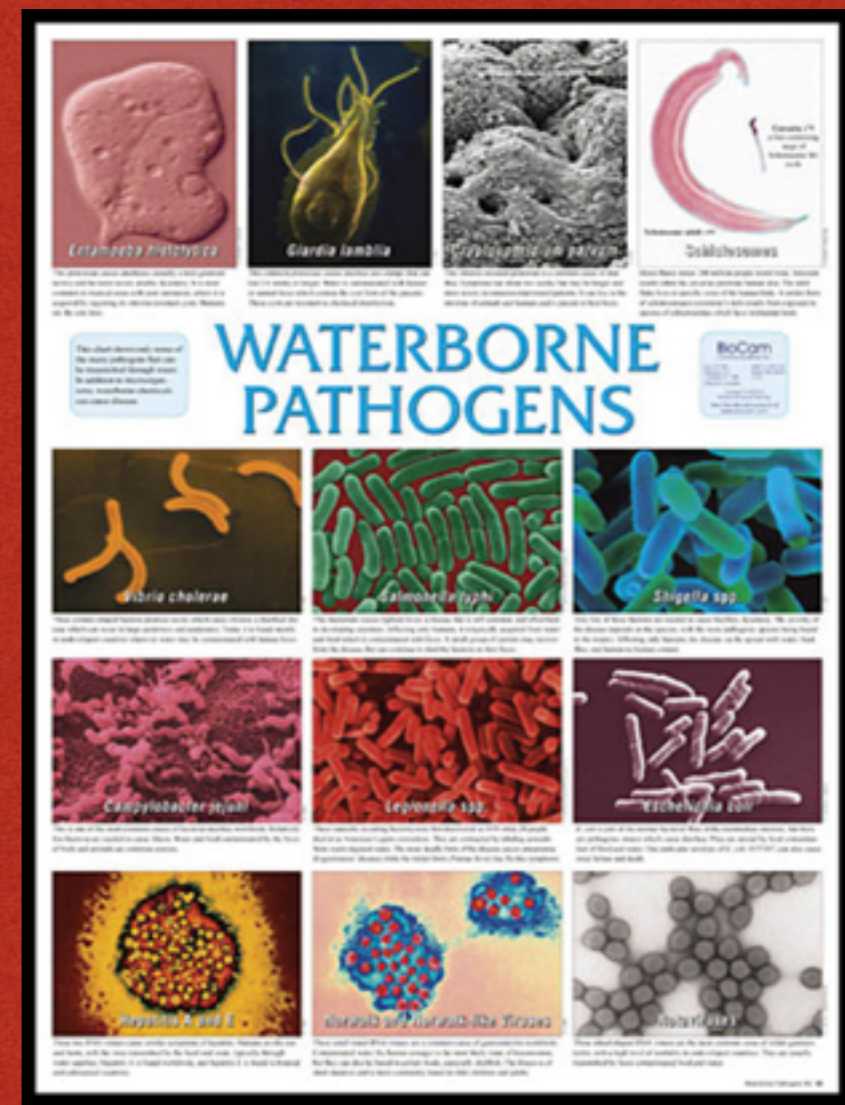
- 4. Sediments-

- Soil that runs off from erosion into water.
- Human activities cause most--road-building, farming, construction and logging.
- Increases water temperature, lowers oxygen & carries pathogens in water.



WHAT ARE THE COMMON SOURCES OF WATER POLLUTION?

- 5. Pathogens_
- Viruses and bacteria from human and animal waste (feces).
- Can spread deadly diseases via water.
- cholera, dysentery, eColi



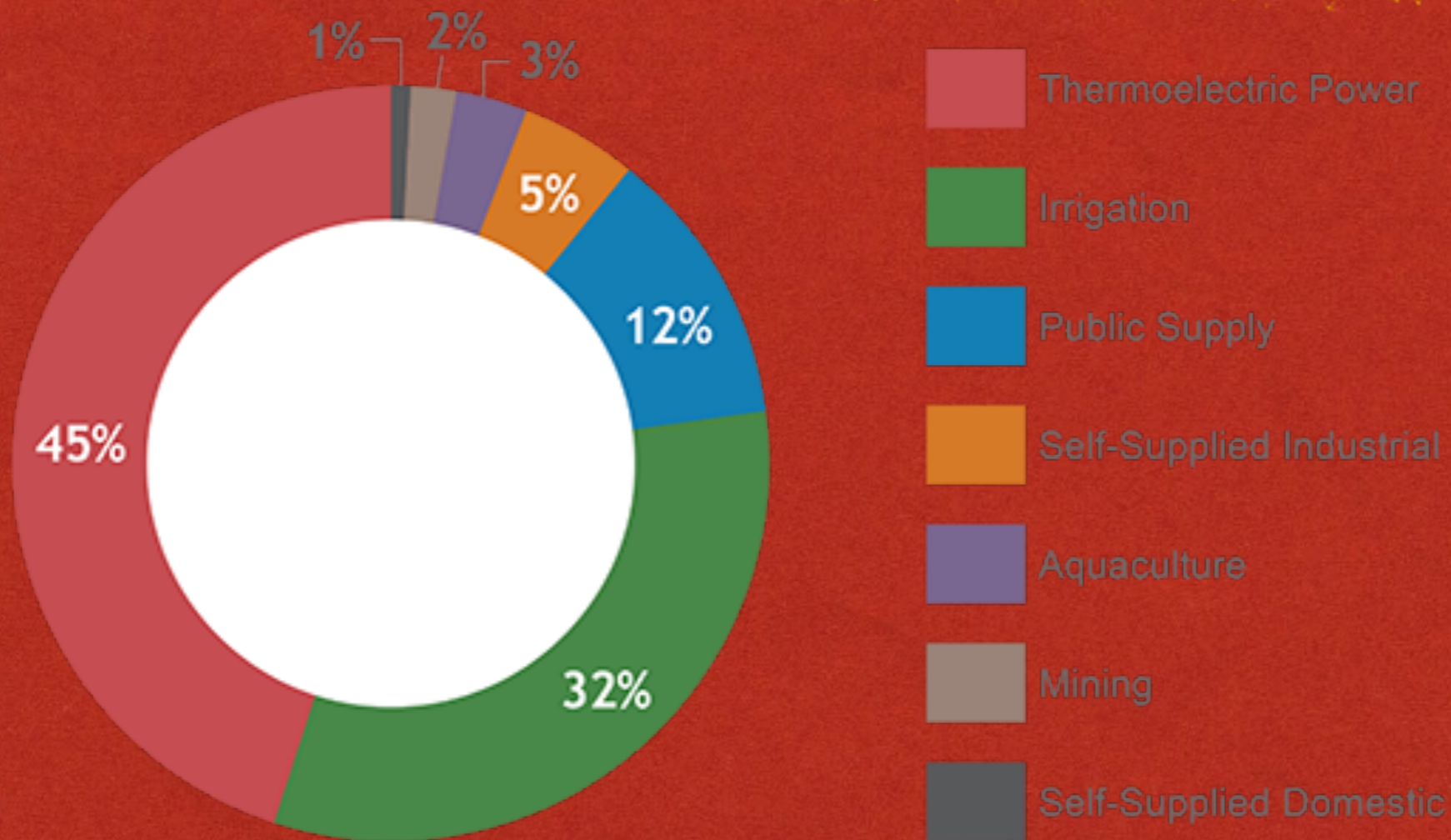
HOW MUCH WATER DOES YOUR FAMILY USE?

- Read the handout about water use in U.S. homes.
- Record FIVE take aways from the article (key points).
- How much water does a typical American household use? Write the total in your INB LEFT Side.

WHAT IS YOUR HOUSEHOLD WATER USE?

- Now use the water use calculator to see more-
<https://www.home-water-works.org/calculator>
- Reflect- What were your results? What surprised you? Write a ONE paragraph reflection in INB
- Search- “Home Water Works Water Calculator”

U.S. Freshwater Withdrawals (2010)



*Livestock is approximately less than 1% of total use and is not included.

*Data comes from Maupin, M.A., Kenny, J.F., Hutson, S.S., Lovelace, J.K., Barber, N.L., and Linsey, K.S., 2014, Estimated use of water in the United States in 2010: U.S. Geological Survey Circular 1405, 56 p., <http://dx.doi.org/10.3133/cir1405>.

MONDAY 3/2

- Finish Film - Water Pollution Overview; grade check-
Water Pollution Film Notes
- When did the CWA pass? What does it do? How does it work?
- Is the CWA effective?
- What is the Watershed Approach?

HOW MUCH WATER DO AMERICANS USE?

- The average American uses about 100 gallons of water per day.
- The average US Household uses about 300 gallons per day.

How Much Water Do We Use?



Source: Water Research Foundation, Residential End-Uses of Water, Version 2, 2016

WATER CRISIS IN THE U.S.

- Watch short film about water quality before the CWA
- <https://lawshelf.com/shortvideoscontentview/the-clean-water-act>
- Willamette River before the CWA - <https://oeconline.org/celebrating-45-years-of-clean-water/>

CELEBRATING 45 YEARS OF CLEAN WATER

- Film Clip- Look at pre CWA pollution from the Willamette River
- Article- Read it. Mark up FIVE specific improvements that the CWA has made on the water quality of the Willamette River
- Pair share with partner. Write up FIVE specific improvements to the Willamette that you two think are MOST important.

THE CLEAN WATER ACT WHEN?



- The Federal Water Pollution Control Act, 1948 (and others before it) existed first.
- The law was significantly updated and expanded in 1972 and became known as the Clean Water Act then.

THE CLEAN WATER ACT, 1972

WHAT DOES IT DO?

- The Clean Water Act (CWA)- Was designed to restore and maintain the nation's waters.
- It establishes rules to regulate ALL Point-Source pollutants discharged into U.S. navigable waters.
- The law also establishes water quality standards for surface waters.
- What are examples of surface water?



SURFACE WATERS & GROUNDWATER

- **SURFACE -**
All the flowing water above ground; we can see them.
30% of available fresh water.
 - *Rivers, streams, lakes and reservoirs
 - *Oceans, sounds
- **GROUNDWATER-**
70% of available fresh water
Stored in soils and aquifers under surface

CLEAN WATER ACT (CWA)

- “Prohibits the discharge of pollutants” from “a point source” into the nation’s “navigable waters.”
- What are Navigable waters?
 - Must be relatively permanent and NOT occasional or intermittent used for commerce / shipping
Interstate, intrastate lakes, rivers and streams.
 - Groundwater NOT included

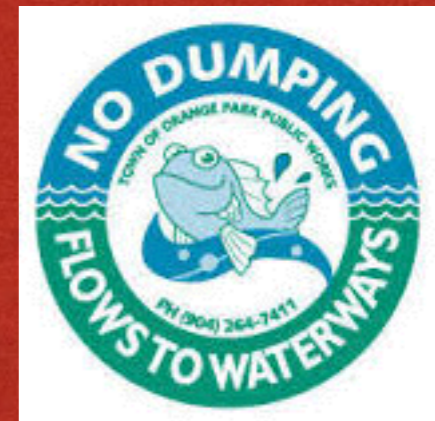
WHAT DOES THE CWA DO?

- The CWA made it unlawful to discharge any pollutant from a point source into FRESH waters without a permit and with limits by law.
- Under the CWA, the Environmental Protection Agency (EPA) enforces rules and regulations; inspects and fines.



WHAT ARE SOME OF THE RULES UNDER THE CWA?

- The CWA requires that states monitor and make lists of impaired waters--waters that are too polluted to meet water quality standards set by the law
- The law requires states to develop TMDL (Total Maximum Daily Loads) for these waters
- TMDLs are the max. amount of a pollutant that a water body can receive



WHAT ABOUT SEWAGE TREATMENT?

- One big problem with fresh water quality was human waste from untreated sewage dumped into water.
- CWA required building wastewater treatment plants to deal with urban sewage.
- All urban wastewater must be treated before it can be released back into local waters under the CWA.
- Eugene treats wastewater at a plant off River Road

WHAT IS WASTEWATER?

- **Wastewater-** The water used by humans from toilets, showers, washing machines and faucets. Any water that goes down the drain is wastewater.
- Wastewater is treated at the Lane Regional Wastewater Treatment Plant in North Eugene.
- After treatment, wastewater is released into the Willamette River.

HOW HAS THE CWA BEEN SUCCESSFUL?

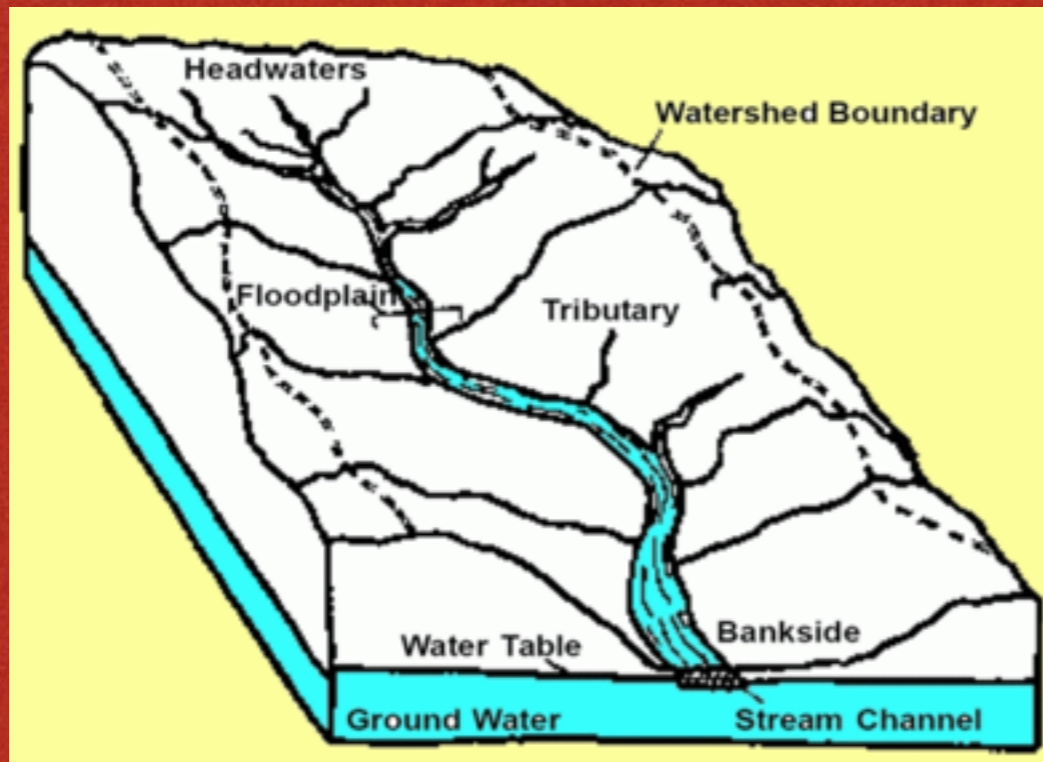
- What is the overall approach of the CWA?
 - To prevent pollution from point-source human activities from entering waterways
- How has it been successful? What problems remain?
 - It has significantly limited point-source but NOT non point-source pollution in waterways. Many problems remain.



TUESDAY 3/3

- What is the Watershed Approach to water quality management?
- In what ways is the CWA effective? What more should it / could it be doing? Evaluate the CWA.
- Intro special topic- Plastics Pollution

WHAT IS A WATERSHED?



- Watershed-
- Is a land area drained by, and named for, a large body of water.

WHAT IS OUR WATERSHED?

- Eugene residents are in the Willamette River watershed
- Also the Columbia River Watershed since the Willamette drains into the Columbia River.
- Sub watersheds- Amazon Creek, Long Tom River
- We are NOT in the McKenzie River Watershed; it drains into the Willamette River before reaching Eugene.

WHAT IS THE WATERSHED APPROACH TO POLLUTION?

- Watershed Approach- A strategy to address non-point source (NPS) pollution by anticipating water quality problems for watershed based on ecology & economy in the watershed.
- EXAMPLES- agriculture, urban runoff
- Includes working with local communities to reduce, restore & protect water quality in the region.

WHAT ARE WETLANDS?

- What are wetlands?
- How do they help improve water quality?
- Watch Wetlands Video-
<https://www.youtube.com/watch?v=B2evprNiyfl>

IS THE CLEAN WATER ACT SUCCESSFUL?

- Read the Article and record info in INB. Use link-
- [http://e360.yale.edu/features/
the_clean_water_act_at_40_theres_still_much_left_to_do](http://e360.yale.edu/features/the_clean_water_act_at_40_theres_still_much_left_to_do)

- **Is the CWA Effective?**

Make columns in INB Left side, create a grid and record info.

Successes

Problems

Next Steps

SWIMMING THROUGH GARBAGE

- Find and read the article and answer the questions in your INB. The article link is- <https://www.nytimes.com/2014/09/29/opinion/swimming-through-garbage.html>
- 1. Describe THREE things you read about in the article that concerned you.
- 2. Tell why each bothered you.
- 3. What could laws do to prevent or fix pollution problems in water? List TWO things.