# Current Issue

Total of 50 points

Sponsored by:

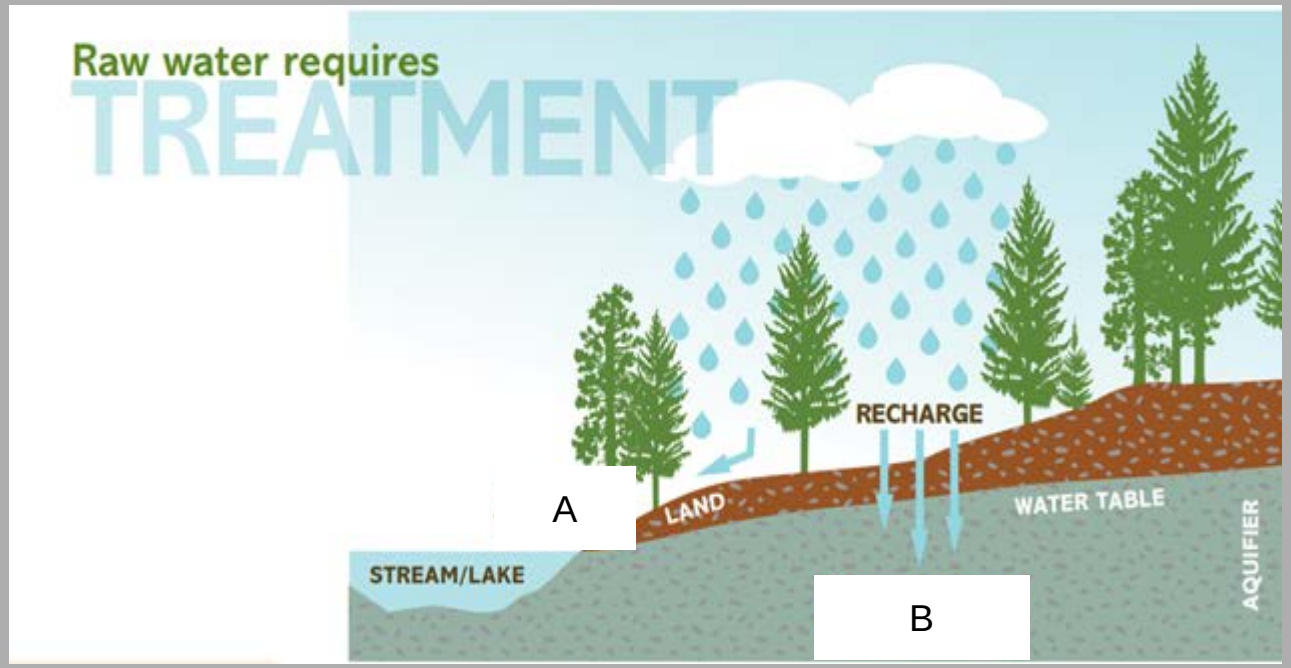
# Part 1: Trees to Tap

Resource Link: TREES TO TAP UNDERSTANDING THE EFFECTS OF FOREST MANAGEMENT ON SOURCE WATER

1. Correctly label the different types of water in this diagram. (2 points)

A. Surface water

A. Ground water



# Part 1: Trees to Tap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2. Identify three reasons why raw water requires treatment. (3 points)
Any of these would work:

A. Turbidity, hardness, color, oder, taste

A. Dissolved minerals, iron, etc. and organisms- bacteria, algae, virus, protozoa cysts.

A. Natural organic matter

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3. The Trees to Tap report identified that forested watersheds, whether managed or unmanaged, produce higher- quality source water than any other type of surface water source in Oregon. (1 point)

a. True

b. False

4. Which type of forest operations did the Trees to Tap study identify as having the potential to pose a risk to water-quality? (1 point)

a. Timber harvest

b. Forest roads

c. Chemical use

d. All of the above

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5. Timber harvest and forest road building have the potential to increase the sediment and turbidity in forest streams, but contemporary (newer) practices are much better than historic practices at protecting source drinking water. (1 point)

a. True

b. False

6. Name three laws or rules aimed at lessening forestry impacts on drinking water. (3 points)

Any of these would work:

A. OFPA, EPA Drinking water regulations
B. Clean water act, safe drinking water act

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7. What did the Trees to Tap report identify as the most common class of chemical used in forest management? (1 point)

a. Herbicides

b. Insecticides

c. Fertilizers

d. Fungicides

e. None of the above

# Part 1: Trees to Tap

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8. The Trees to Tap report identified six locations where water was sampled for the presence of chemicals linked to forest management activity. (1 point)

In general these studies found that:

a. Forest chemicals were found in the source drinking water at dangerously high levels.

b. Forest chemicals were found in the source drinking water at moderate levels.

c. Forest chemicals were found in the source drinking water at very low levels.

d. Forest chemicals were not found in the source drinking water.

9. The Trees to Tap study reported that the majority of compounds that present a documented threat to drinking water quality are associated with agricultural and urban land-use applications rather than forestry. (1 point)

a. True

b. False

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10. Which of the Trees to Tap case studies involved a city that gets its drinking water source from a watershed composed mainly of privately owned forest land managed by private companies? (1 point)

a. Ashland

b. Oceanside

c. Baker City

d. None of the above

# Part 1: Trees to Tap

Resource Link: TREES TO TAP UNDERSTANDING THE EFFECTS OF FOREST MANAGEMENT ON SOURCE WATER

11. Which of the Trees to Tap case studies involved an eastern Oregon city that gets its drinking water source from a watershed composed entirely of national forest land classified as a roadless area? (1 point)

a. Ashland

b. Oceanside

c. Baker City

d. None of the above

# Part 1: Trees to Tap

Resource Link: TREES TO TAP UNDERSTANDING THE EFFECTS OF FOREST MANAGEMENT ON SOURCE WATER

12. Which of the Trees to Tap case studies involved a city that gets its drinking water source from a watershed composed mainly of federally managed forestland in which a local collaborative group is working to reduce fire risk by thinning and prescribed fire? (1 point)

a. Ashland

b. Oceanside

c. Baker City

d. None of the above

# Part 2: Hydrology

Resource link: https://water.usgs.gov/edu/gallery/watercyclekids/earth-water-distribution.html

13. Of the freshwater on earth, what percentage is available or accessible for sustaining life? (1 point)

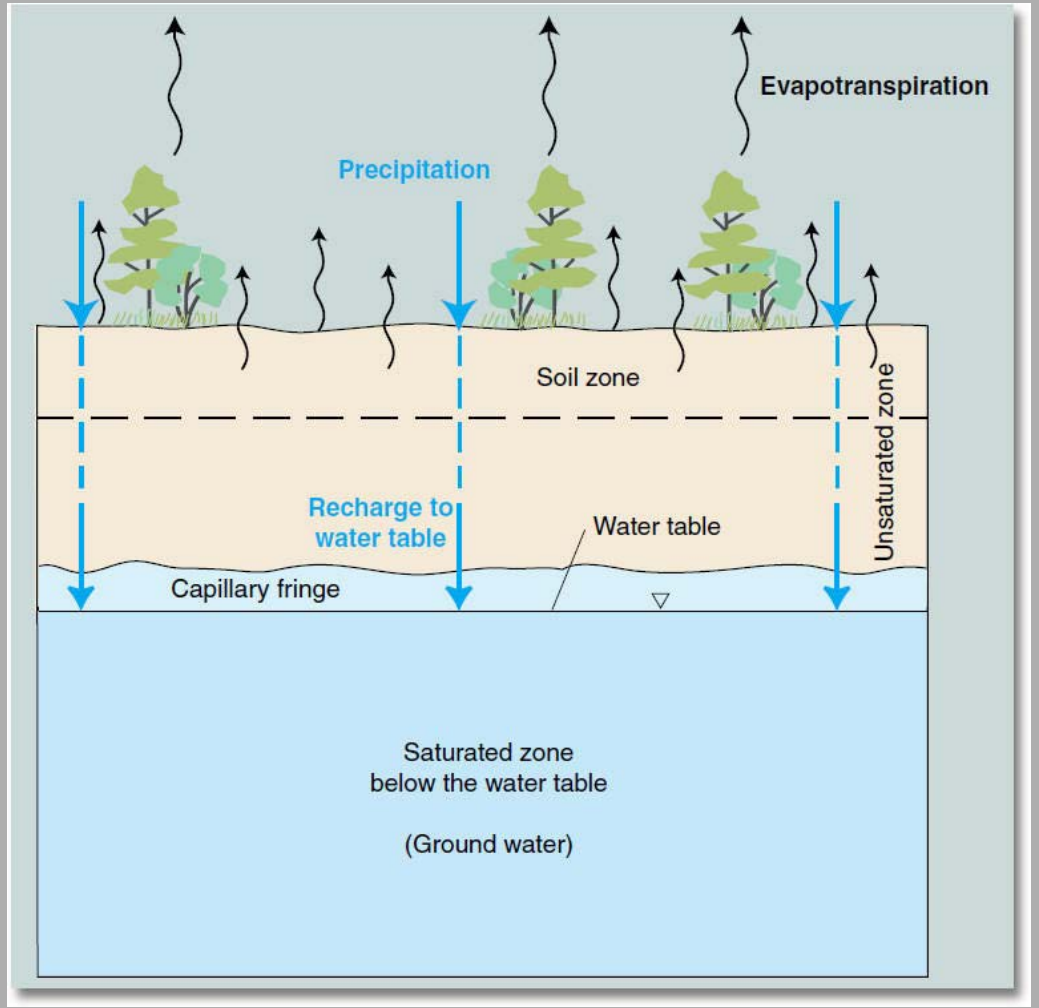
Answer: 1.3%

# Part 2: Hydrology

Resource link: https://www.usgs.gov/special-topic/water-science-school/science/groundwater-what-groundwater?qt-science_center_objects=0#qt-science_center_objects

14. Why is there groundwater? (2 points)

Answer: Gravity and cracks between the bedrock



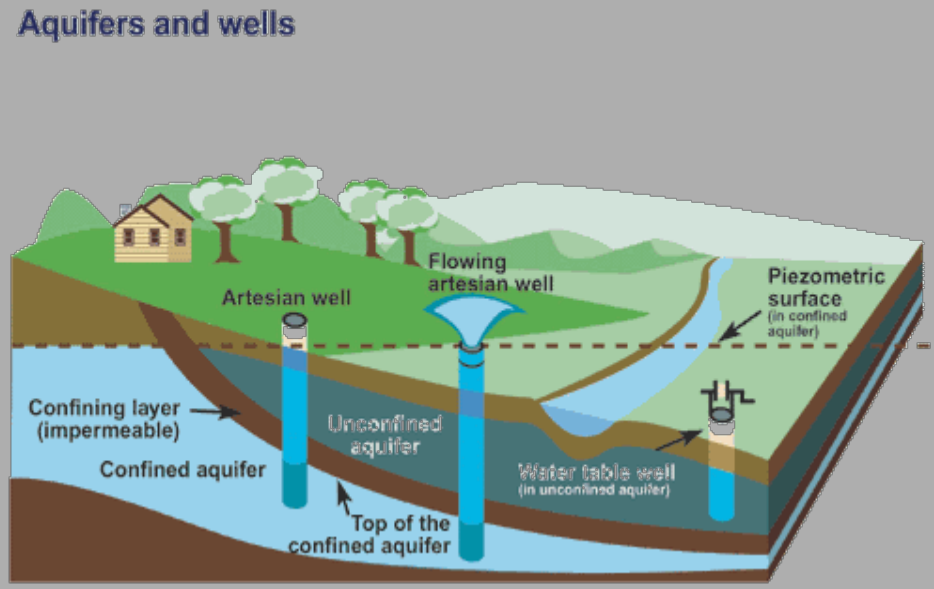
# Part 2: Hydrology

Resource link: Groundwater Resource Guide Page 9 of the document (page 14 of the PDF)

Groundwater occurs in several zones, and may be confined or semi-confined by geologic layers underground. Describe the difference between a unconfined aquifer and a confined aquifer and generally how susceptible they are to contamination. (4 points)

Unconfined Aquifer: no rock layers that prevent the downward movement of water from the surface, more susceptible to contamination.

Confined Aquifer: groundwater is overlain by an impermeable layer, generally less susceptible to contamination.



# Part 3: Oregon Water Systems

The Safe Drinking Water Act has required Oregon to develop source water assessments for all public water supply systems. One of the most important aspects of the source water assessment process was determining the "susceptibility" of each system to contamination. What are the three main factors that will determine if a drinking water system will get contaminated? (3 points)

Resource link:Groundwater Resource Guide page 12 of document (17 of PDF)

The occurrence of a land use/activity that releases contamination.

1. The location of the release.
2. The hydrologic and/or soil characteristics in the source area that allow the transport of the contaminants to the well.

# Part 3: Oregon Water Systems

In 2005, a review of all statewide source water assessment identified the top 5 categories for potential contaminants in public water systems served by groundwater. Identify these top five. (5 points)

Resource link:Groundwater Resource Guide page 14 of document (page 19 of PDF)

1. High density housing
2. Transportation corridors (highways)
3. Above ground tanks
4. Crops- irrigated
5. Underground storage tanks

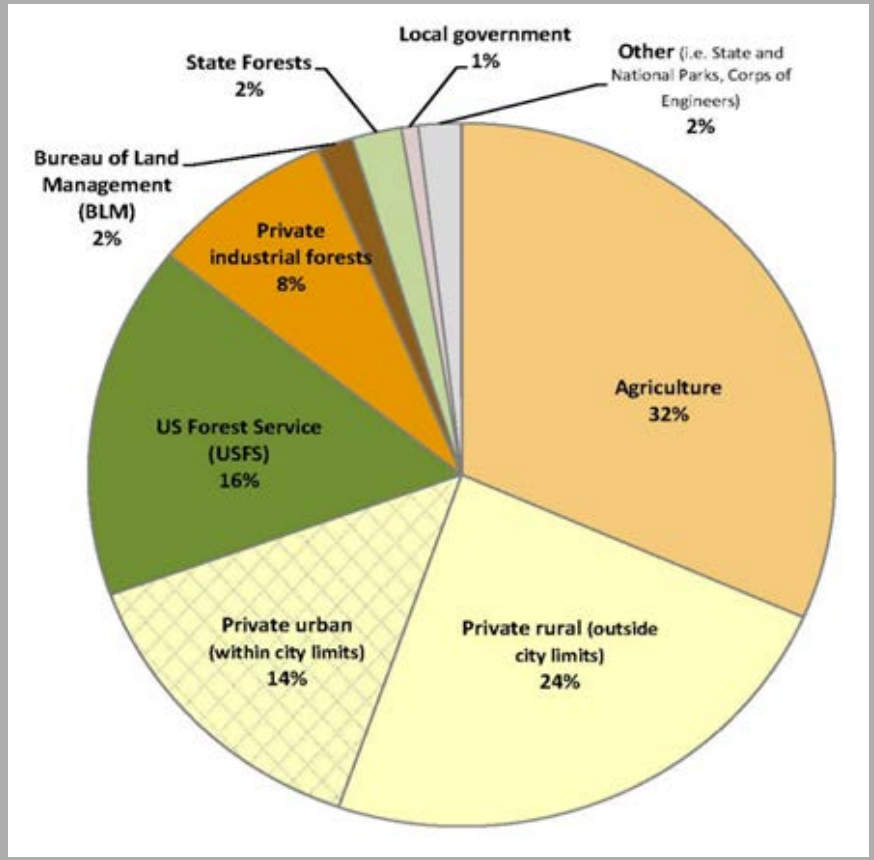
# Part 3: Oregon Water Systems

As part of the Drinking Water Source Monitoring Project, DEQ identified six potential sources of contaminants.

Resource link:Groundwater Resource Guide pages 18-19 of document (Page 23- 24 of PDF)

List three of the potential sources of contaminants identified in the Drinking Water Source Monitoring Project (3 points)

1. Microbes (E-coli)
2. Phthalates
3. Pesticides
4. Pharmaceuticals
5. Steroids and hormones
6. Metals



# Part 3: Oregon Water System

Nitrogen is considered a macro-nutrient and one of the most important nutrients necessary to support plant growth and the food system we depend on. Nitrate binds poorly to most soils and therefore is more susceptible to leach below the root zone and on into aquifers. Alternatively, nitrate can be mobilized as runoff during peak rain events and consequently pollute our lakes and rivers.

Resource link:Groundwater Resource Guide page 19-20 of document (24- 25 of PDF)

What is the maximum contaminant level for nitrogen in drinking water set by the EPA? (1 point)

Answer: EPA has set a maximum contaminant level of 10 ppm for nitrate ($NO_3$-N) for drinking water.

# Part 3: Oregon Water System

There are several sectors of development that contribute to the transport of nitrate to groundwater.

Resource link:Groundwater Resource Guide page 20 of document (Page 25 of PFD)

What are two of these sectors? (2 point)
Any of these answers:

1. These sectors include agriculture (e.g. fertilizer application, fertilizer manufacturing, composting operations, animal waste from livestock
2. nitrogen fixing crops), residential (e.g. septic systems, lawn and garden fertilizer, stormwater), and also some industrial sources

# Part 4: Placed based planning for source water

Drinking water protection involves identifying and working to reduce the highest risks that could potentially affect the public water system, rather than prohibiting specific uses in a watershed or groundwater recharge area.

Resource link:Groundwater Resource Guide page 52-53 of document (page 57-58 of PDF)

What are the six steps for developing a pollutant reduction or drinking water protection plan? (6 points)

1. Capacity building
2. Potential contaminations and source identification
3. Prioritize and assessment
4. Protection strategy
5. Funding
6. Implementation

# Part 4: Placed based planning for sourced water

The 2020 labor day fires burned thousand of acres of forestland in Oregon. Even though the flames are out, there will be a lasting effect on water quality. Resource link: Water Quality After Wildfire

Name six potential effects wildfires can have on municipal water supplies and downstream aquatic ecosystems. (6 points)

1.Changes in the magnitude and timing of snowmelt runoff, which influence filling of water-supply reservoirs

2. Increased sediment loading of water-supply reservoirs, shortened reservoir lifetime, and increased maintenance costs

3. Increased loading of streams with nutrients, dissolved organic carbon, major ions, and metals

4. Post-fire erosion and transport of sediment and debris to downstream water-treatment plants, water-supply reservoirs, and aquatic ecosystems

5. Increased turbidity (cloudiness caused by suspended material), or heightened iron and manganese concentrations, which may increase chemical treatment requirements and produce larger volumes of sludge, both of which would raise operating costs

6. Changes in source-water chemistry that can alter drinking-water treatment

# End of Current Issue Test!

Team Total _____/ 50 points

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