

**OREGON ENVIROTHON 2018**  
**AQUATIC ECOLOGY TEST**

TEAM: # \_\_\_\_\_

*Note to Teams: If you notice that the kits and specimens are being used by other teams, continue on to the next question and return to the problem later. If you notice that a kit is missing pieces, please notify one of the test administrators.*

**Collect a water sample and analyze with the test kits. Record the values you discover for the following parameters (5 points):**

- 1) Temperature: \_\_\_\_\_ **14 - 16**
- 2) pH: \_\_\_\_\_ **7.0 - 8.5**
- 3) Dissolved Oxygen: \_\_\_\_\_ **~6 mg/l**
- 4) Phosphate: \_\_\_\_\_ **3 - 5 mg/l**

**What is the water quality classification according to the Oregon Water Quality Standards for Salmon and Steelhead?**

**Class B or worse**

- 5) **Identify the macroinvertebrates in the samples before you. It is acceptable to use common names. For example, “mosquito larvae.” (3 points)**
  - a. \_\_\_\_\_ **Fall Caddis HBI 1**
  - b. \_\_\_\_\_ **Snails HBI 7**
  - c. \_\_\_\_\_ **Slate Winged Olive HBI 0**

- 6) **Based on your macroinvertebrate sample, what is the HBI pollution index of the stream water? (1 point)**

**0**

- 7) **Compare the chemical analysis with the biological inventory. Do you believe the biological sample came from a water source with comparable water quality, better water quality or poorer water quality?(1 point)**

**Better**

\_\_\_\_\_/10 points

8) A landowner has purchased property along a creek and is interested in using the land to graze cattle. She has contacted you to learn more about Best Management Practices she can implement on her land. Please name four actions she can take (1 point for each action), and provide rationale for how each action will protect or improve water quality in the stream on her property (1 point for each rationale). (8 points total)

1. Plant trees – will buffer runoff from field, keeping nitrates and phosphates low. Will create shade, keeping temperature low for fish. Will prevent soil erosion.
2. Install a fence – will keep animals out of creek, reducing E. coli/nitrate/phosphate pollution. Will prevent soil erosion.
3. Manage manure – will reduce nitrates/phosphates/eutrophication/turbidity
4. Remove invasive plants – will provide better habitat for other wildlife, prevent soil erosion.
5. Farm organically – will reduce nitrates/phosphates/chemicals in water.
6. Collect rainwater instead of using stream for irrigation – will maintain flow in creek.

**Any other correct answer will do.**

9) Please identify this plant. (1 point)



**Eurasian Watermilfoil.**

10) Name two ways you could prevent the spread of this plant. (2 points)

Don't purchase or collect it.

Digging out small infestations and properly disposing of them.

Thoroughly clean boats, trailers, fishing gear, and other recreational equipment.

\_\_\_\_\_/11 points

**11. What is the reason why urban areas have “flashy” (streams rising and receding quickly during and after a rain event) stream flows in the rainy season as compared to more rural areas? (1 point)**

- A. Rural areas have less impervious surfaces than urban areas. As a result, streams in rural areas are less “flashy.”
- B. Rural areas do not protect their wetlands so water is absorbed by the surrounding landscape, keeping streams from being “flashy.”
- C. Urban areas do not protect their wetlands so streams have less water when it rains.
- D. Urban areas have less impervious surfaces than rural areas so less water being channeled to streams.

**Answer: A**

**12. What does the presence of an aquatic biological indicator tell us? (1 point)**

- A. This species is a nuisance and must be removed from this ecosystem as soon as possible.
- B. This species needs certain conditions to survive, so if the species is here, we can make assumptions about the condition of the water.
- C. An indicator species is always protected under the Endangered Species Act.
- D. If there is a shortage of biological indicators, we know that there are pollutants in the water.

**Answer: B**

**13. Local resident Chuck loves to commune with animals at his local streamside park, especially the ducks. However, he’s been bringing bags of breadcrumbs to feed the ducks. Please give two reasons why Chuck’s actions could be harming the park’s water quality. (2 points)**

- 1) Increased E. coli in water from duck feces
- 2) Could artificially increase duck population beyond park’s carrying capacity
- 3) Breadcrumbs can increase organic matter content in the stream

\_\_\_\_\_/4 points

14. While he was at the park, Chuck saw one of these animals. He noticed it had a flattened upper shell and a large protruding snout. When he tried to pet it, it bit him and wouldn't let go. What is it? Is it native or invasive? (2 points)



1 point for identifying animal as a Snapping Turtle. 1 point for identifying that it is invasive.

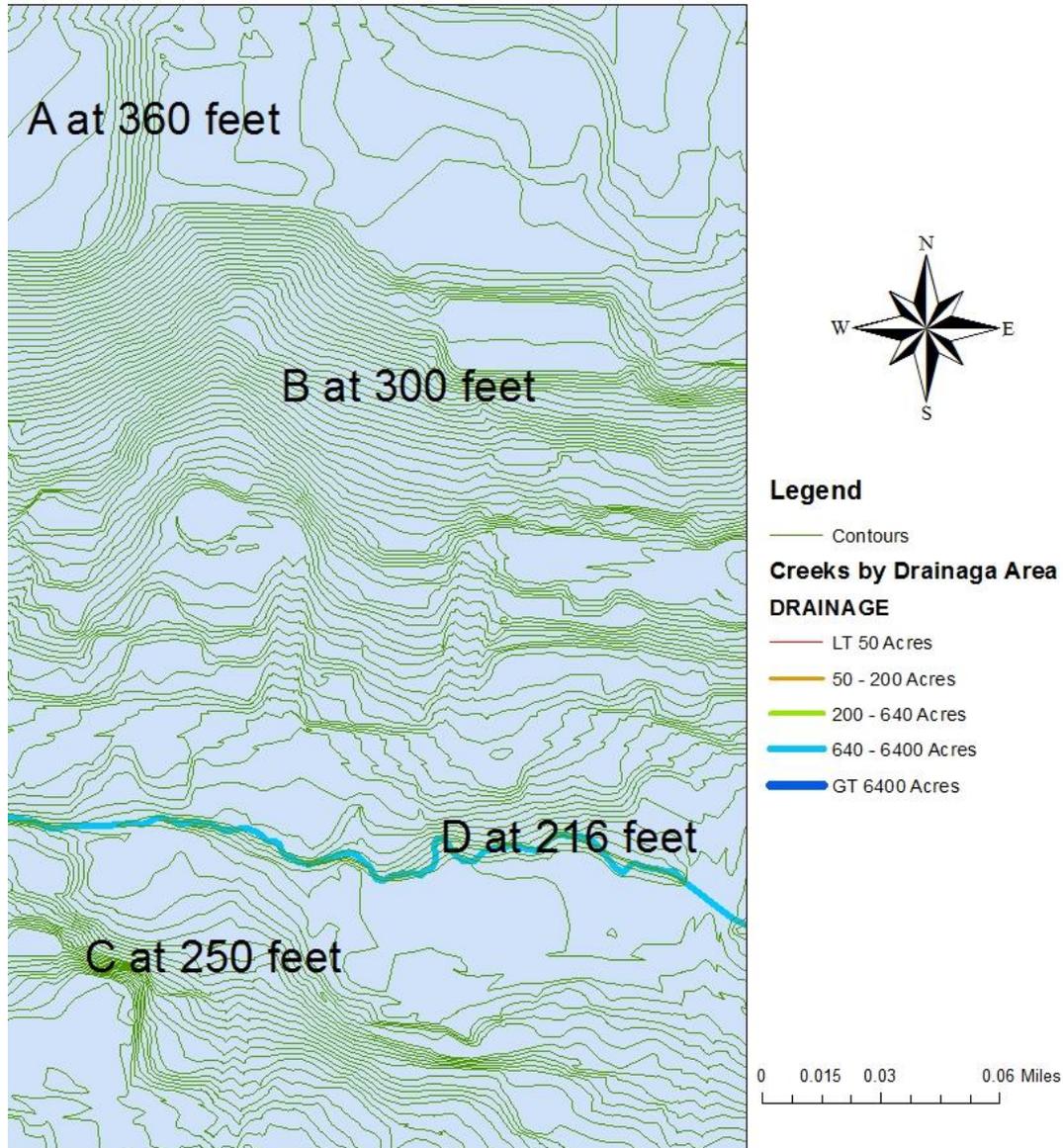
15. You and your teammates conducted four surveys to determine which of the following sites, if any meet the criteria for a wetland. Which of the surveyed areas is a wetland? Circle the column that has wetland characteristics (2 points).

Survey A	Survey B	Survey C	Survey D
Soil is aerobic, not hydric	Soil is anaerobic, hydric	Soil is aerobic, not hydric	Soil is anaerobic
Plants include blue-eyed grass and red flowering currant	Plants include rushes and sedges	Plants include bear grass	Plants include Oregon white oaks and Douglas firs
No standing water is present	Standing water is present	No standing water is present	Flowing water is present

16. Macroinvertebrates are a good indicator of stream health because (circle all that apply) (2points)?

- A. They are a critical part of the stream's food web
- B. Some are very intolerant of pollution
- C. They are affected by the physical, chemical, and biological conditions of the stream.
- D. They are relatively easy to sample and identify.

\_\_\_\_\_/7 points



17. Which point in the watershed notes the creek? A, B, C, or D (1 point)

D.

18. Which of the points is located in the flattest area? A, B, C, or D (1 point)

A.

19. Which point in the watershed is located on the steepest slope? A, B, C, or D (1 point)

C.

20. How many feet above the creek is point C? (1 point)

34 feet

21. What range of acres does the creek drain? (1 point)

640 – 6400 acres

\_\_\_\_\_ /5 points

**22. List three water pollutants that come from urban areas that are also found in rangelands. Answers may vary. (3 points)**

E. coli, Nutrients/fertilizer, Pesticides, Herbicides, Mud, other answers are acceptable.

**23. Water temperature and dissolved oxygen are \_\_\_\_\_ related to one another? (1 point)**

- A. exponentially
- B. inversely**
- C. not
- D. scientifically

**24. Which of the following can cause a drop in a river's dissolved oxygen levels? (1 point)**

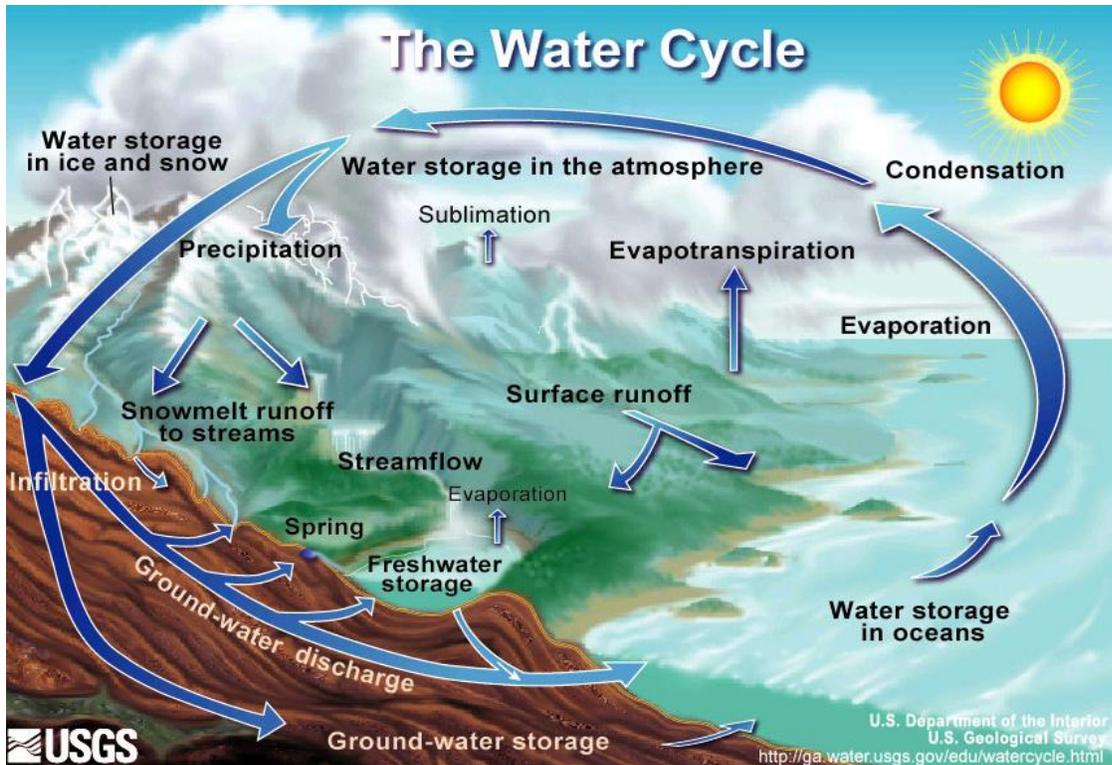
- A. rapids
- B. riffles
- C. nutrients**
- D. hydroxide ions

**25. How do harmful concentrations of lead generally get into drinking water? (1 point)**

- a) Lead occurs naturally in high concentrations in certain areas of the world.
- b) Lead is added to water to remove the chorine after chlorine has been added.
- c) Lead is leached from transmission pipes to your house from the drinking water facility.
- d) **Lead is leached from the pipes inside houses.**

**26. What three interacting processes characterize all stream systems? (3 points)**

- A. \_\_\_\_\_ **biological processes**
- B. \_\_\_\_\_ **geomorphic processes**
- C. \_\_\_\_\_ **hydrologic processes**



27. In what process of the water cycle do trees move water? (1 point)

- A. evapotranspiration
- B. groundwater storage
- C. precipitation
- D. sublimation

28. Which of the water cycle processes indicates that precipitation is not infiltrating? (1 point)

- A. evaporation
- B. groundwater storage
- C. spring flow
- D. surface runoff

29. Which process needs to occur to replenish aquifers? (1 point)

- A. condensation
- B. groundwater discharge
- C. infiltration
- D. surface runoff

30. \_\_\_\_\_ is the conversion of a solid to a gas without going through the liquid phase. (1 point)

- A. accumulation
- B. condensation
- C. evaporation
- D. sublimation