

OREGON ENVIROTHON 2013
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: _____ **17 - 19**
- 2) pH: _____ **8.0 - 9.0**
- 3) Dissolved Oxygen: _____ **6 - 8**
- 4) Phosphate: _____ **0.6 - 0.8**

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

Class B

- 5) **Identify the macroinvertebrates in the samples before you. It is acceptable to use common names. For example, “mosquito larvae.” (3 points)**
 - a. _____ **Little Stout Crawler Mayfly**
 - b. _____ **Golden Stonefly**
 - c. _____ **Pale Evening Dun**
- 6) **Based on your macroinvertebrate sample, what is the HBI pollution index of the stream water? (1 point)**

2.5

- 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. Name four ways to conserve water. (4 points)

Check sprinkler systems for waste.

Install water-efficient showerheads/toilets/etc. (NOTE: Multiple points not to be given for multiple answers related to installation of devices)

Use greywater

Don’t always flush the toilet.

Take shorter showers

Wash full loads of laundry

Water in the morning/evening or not during a windstorm

Don’t leave water running while it is heating up

Other correct answers will do as well.

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

_____/7 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.

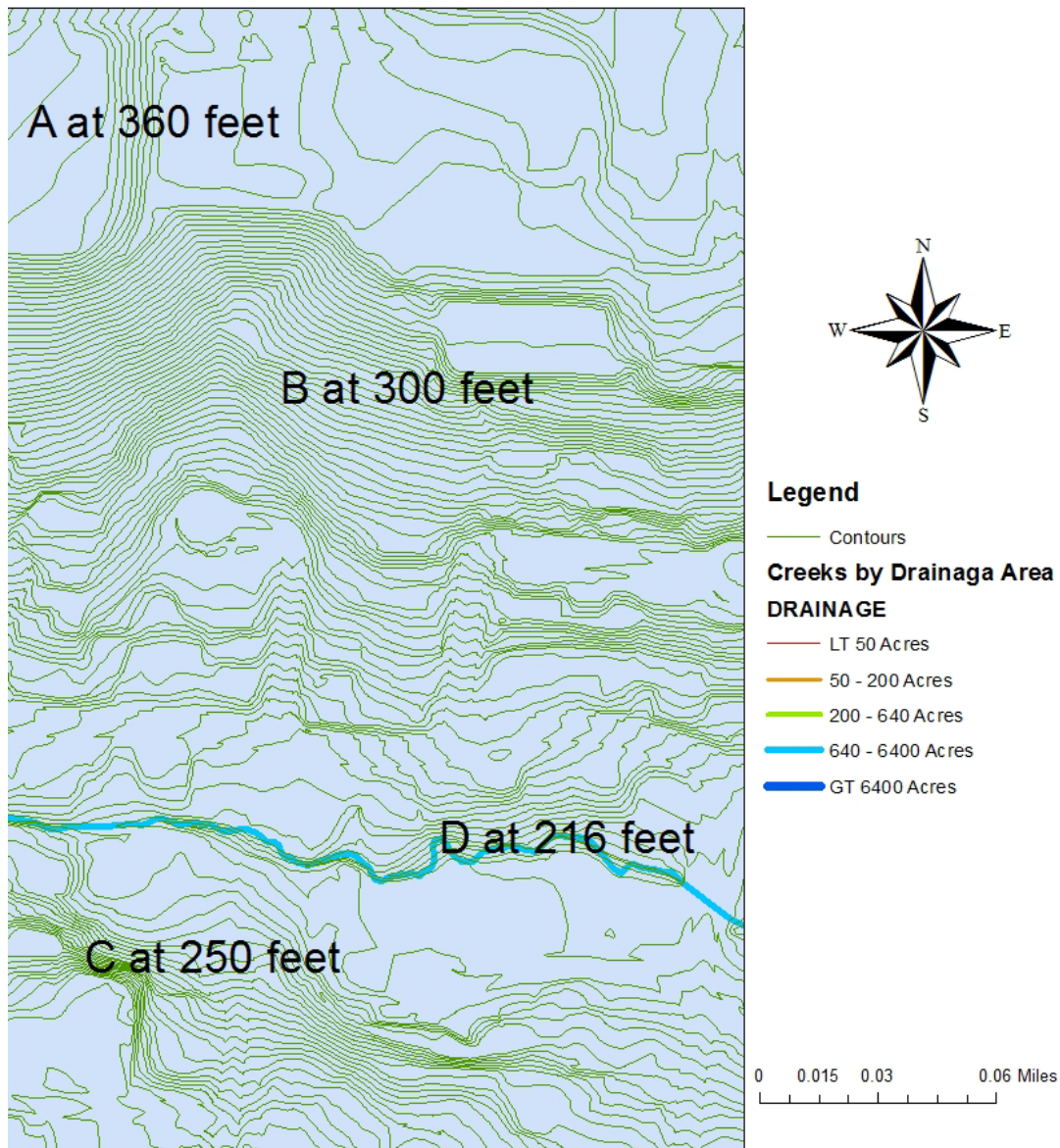
15. You and your teammates conducted four surveys to determine which of the following sites, if any meet the criteria for a wetland. Which of the surveyed areas is a wetland? Circle the column that has wetland characteristics (2 points).

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) (1 point)?

- 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.

_____/5 points



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

D.

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

A.

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

C.

18. How many feet above the creek is point C?

34 feet

19. What range of acres does the creek drain?

640 – 6400 acres

_____ /5 points

20. 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.

21. Water temperature and dissolved oxygen are _____ related to one another? (1 point)

A. exponentially

B. inversely

C. not

D. scientifically

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

A. rapids

B. riffles

C. nutrients

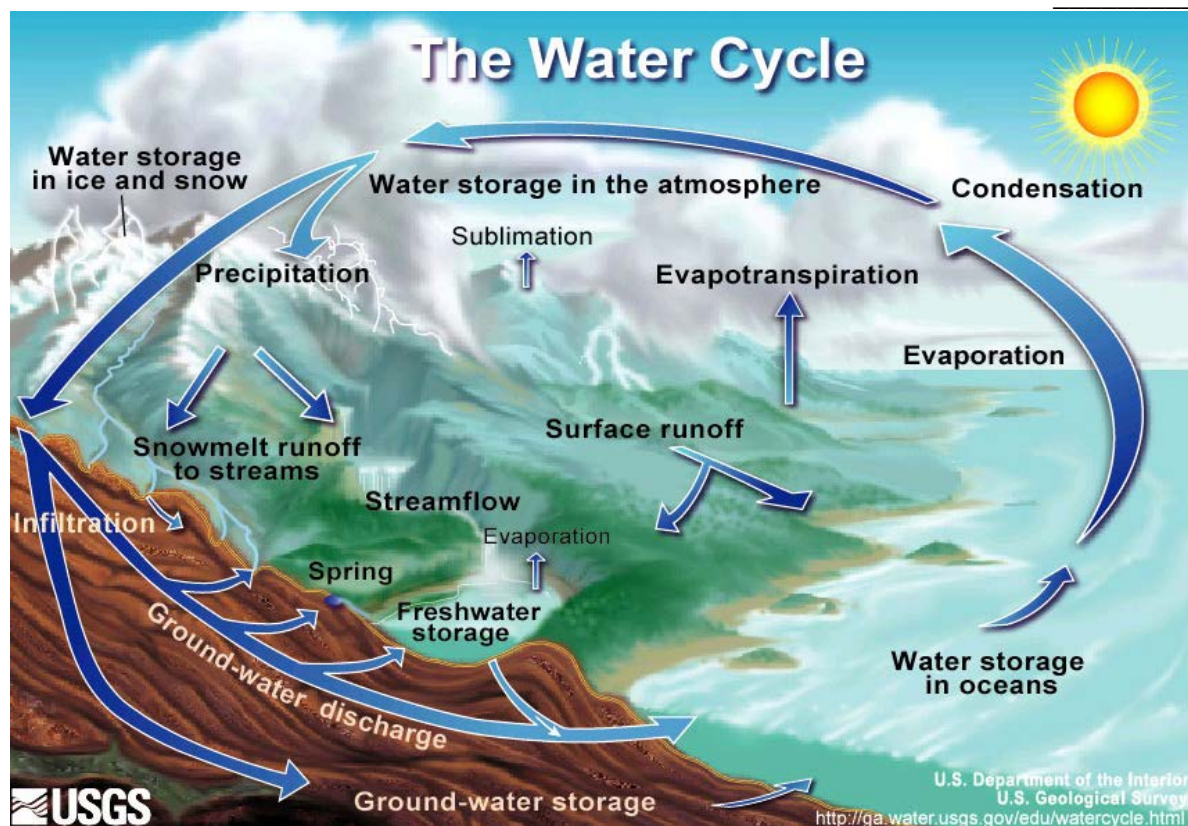
D. hydroxide ions

23. What is streamside erosion? (1 point)

Streamside erosion is the movement of soil off the stream bank and generally into the water body.

24. List two causes of streamside erosion, one of which comes from rangeland and one from a cityscape.(2 points)

Any plausible answer will do. One point for the rangeland and one from the city.



25. In what process of the water cycle do trees move water? (1 point)
- A. **evapotranspiration**
 - B. groundwater storage
 - C. precipitation
 - D. sublimation
26. 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**
27. Which process needs to occur to replenish aquifers? (1 point)
- A. condensation
 - B. groundwater discharge
 - C. **infiltration**
 - D. surface runoff
28. _____ is the conversion of a solid to a gas or a gas to a solid. (1 point)
- A. accumulation
 - B. condensation
 - C. evaporation

D. sublimation

_____ /4