

2021 CT Envirothon Aquatics Station Test

Hello everyone, and welcome to the 2021 CT Envirothon Aquatics Test! Please read the following before beginning the test.

This test was designed to be completed within one hour, and with no outside help besides the keys provided. The first part of the test is identification questions that are each worth 2 points. The second half is non-identification questions that are worth 2-3 points each. There are less identification questions this year, due to the online format.

There are supplemental ID Keys for this test. These materials are located in the Aquatics Station Test Assignment on your google classroom ("Partial ID Key" which includes an amphibian, fish, and macroinvert key, AND a "Invasive Aquatic Plants Key" for aquatic plants). You may open up these keys in another tab to reference when needed.

Please note: that if any images are blurry or hard to read, you may also right-click the image and "open image in new tab" to view the full-sized image.

Any questions, please email the aquatics station leader Kelsey Sudol at kelseys@nwcd.org, and cc ctenvirothon@gmail.com. They will be checking their emails regularly between 9AM-5PM, with less common checking after that.

I know I am the last exam, so thank you to everyone for sticking through until the end! Good Luck!

* Indicates required question

1. School name *

2. We pledge on my honor that we have not given or received any unauthorized assistance during this competition. We accept responsibility for my role in ensuring the integrity of the work submitted by the group in which we participated. *

Authorized assistance includes:

- any information provided within the Google Classroom ONLY, including keys and other handouts

Unauthorized assistance includes:

- use of information from the CT Envirothon study guides in aquatics, forestry, soils, wildlife and current issue
- use of the internet from any electronic device: tablet, smart phone, smart watch, laptop or desktop computer
- team advisor, parent or other person not part of the participating CT Envirothon team

Check all that apply.

- We have reviewed the above, and understand the rules.

Macroinvertebrate ID

3. 1. What is the family level Identification for this image?

2 points



Mark only one oval.

- a. Hydropsychidae
- b. Perlidae
- c. Philopotamidae
- d. Heptageniidae

4. 2. Your school takes a benthic macroinvertebrate sample by your local stream. In the sample, you find an abundance of the below pictured organism, along with a few other macroinvertebrates that are in the same sensitivity category. Using this information, what could you assume about your local stream? 2 points



Mark only one oval.

- a. Due to the high abundance of very or most sensitive organisms, the stream is likely unpolluted.
- b. Due to the high abundance of low or least sensitive organisms, the stream is likely unpolluted.
- c. Due to the high abundance of low or least sensitive organisms, the stream is likely polluted.
- d. This data tells you nothing about the stream

5. 3. What is the family level identification for this image?

2 points



Mark only one oval.

- a. Isonychiidae
- b. Hydropsychidae
- c. Tabanidae
- d. Psephenidae

Amphibians

6. 4. What species in the photo below?

2 points



Mark only one oval.

- a. Bufo fowleri
- b. Hyla versicolor
- c. Lithobates sylvaticus
- d. Rana pipiens

7. 5. What species is in the photo below?

2 points



Mark only one oval.

- a. *Bufo fowleri*
- b. *Hyla versicolor*
- c. *Lithobates sylvaticus*
- d. *Rana pipiens*

8. 6. What is the species in the photo below?

2 points



Mark only one oval.

- a. Necturus maculosus
- b. Notophthalmus viridescens
- c. Ambystoma laterale
- d. Ambystoma maculatum

Fish

9. 7. Identify the organism in the following photo.

2 points



Photo courtesy Mindy Gosselin

Mark only one oval.

- a. *Etheostoma olmstedi*
- b. *Pomatomus saltatrix*
- c. *Perca flavescens*
- d. *Lepomis gibbosus*

10. 8. What is the species in the following photo?

2 points



Photo courtesy Mindy Gosselin

Mark only one oval.

- a. Squalus sp
- b. Pomoxis nigromaculatus
- c. Anguilla rostrata
- d. Lepomis gibbosus

Aquatic Plants

11. 9. The Aquatic Plant pictured below is _____.

2 points



Mark only one oval.

- a. Native
- b. Introduced
- c. Invasive
- d. Naturalized

12. 10. Which of the following is the most effective way to prevent the spread of the aquatic plant pictured in question 9? 2 points

Mark only one oval.

- a. Herbicide your Lake every year
- b. Check trailers, boats and equipment for hitchhiking material
- c. Do not use any recreation waters. Ever again.
- d. Use of Benthic Barriers
- e. None of the above

13. 11. What is the most effective Management strategy if your lake has a large infestation of the plant in question 9? 2 points

Mark only one oval.

- a. Combination of Hand pulling and Suction Harvesting
- b. Combination of installing shoreline buffers and pesticides
- c. Reduce the nutrient inputs from the watershed
- d. Move to a different Lake.
- e. The plant from question 9 does not need to be removed.

14. 12. Which of the following is an impact from invasive aquatic plant infestations? 2 points

Mark only one oval.

- a. Reduction of recreation
- b. Promotion of native populations
- c. Increase of local property values
- d. Lower Management Costs

General Knowledge

15. 13. The Clean Water Act of 1972 initially required permitting for which type of pollutants 3 points

Mark only one oval.

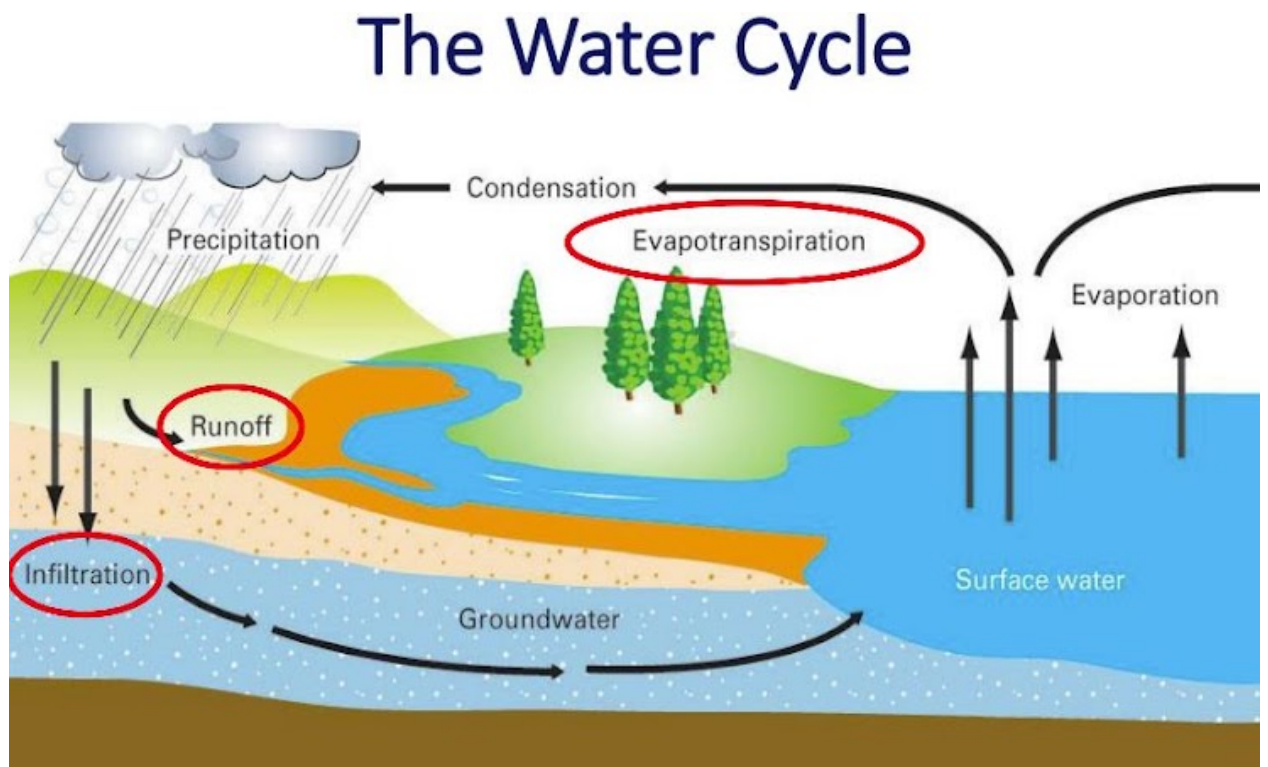
- a. Non-Point Source
- b. Point Source
- c. Elemental
- d. All of the above

16. 14. Which of the following is an example of pollution from a POINT source? 3 points

Mark only one oval.

- a. Large Farms
- b. Stormwater Runoff
- c. Industrial Fertilizer Plant
- d. Failing Septic Systems

17. 15. Reference the photo below. Typically as storm rainfall intensity increases, which of the following is true: 3 points



Mark only one oval.

- a. The amount of infiltration increases, while runoff decreases
- b. The amount of infiltration decreases, while runoff increases
- c. The amount of runoff decreases, while evapotranspiration increases
- d. The amount of runoff decreases, while evapotranspiration decreases

18. 16. Water quality can be impacted by agriculture through contamination of ground and surface water by 3 points

Mark only one oval.

- a. Pesticides
 b. Nitrates
 c. Salinization
 d. All of the above

19. 17. Which of the following is a major type of non-point source pollution: 3 points

Mark only one oval.

- a. Sediments
 b. Nutrients
 c. Pathogens
 d. All of the above are major types

20. 18. What is an example of a Wetland Function in an ecosystem? 3 points

Mark only one oval.

- a. Education
 b. Wildlife Habitat
 c. Recreation and tourism
 d. Reduction property damage from floods

21. 19. The accumulation of peat is a characteristic of what kind of wetland? 3 points

Mark only one oval.

- a. Vernal Pool
 b. Bog
 c. Marsh
 d. Riparian Zone

22. 20. The following are examples of activities everyone can do to aid in protecting water quality and shoreline stability EXCEPT: 3 points

Mark only one oval.

- a. When camping, wash directly into a waterbody to avoid disturbing the surrounding land.
 b. Minimize shoreline alterations and use best management practices around Lakes
 c. Increase the impervious area on a decks/patios to avoid increasing runoff
 d. Do not remove vegetation around docks

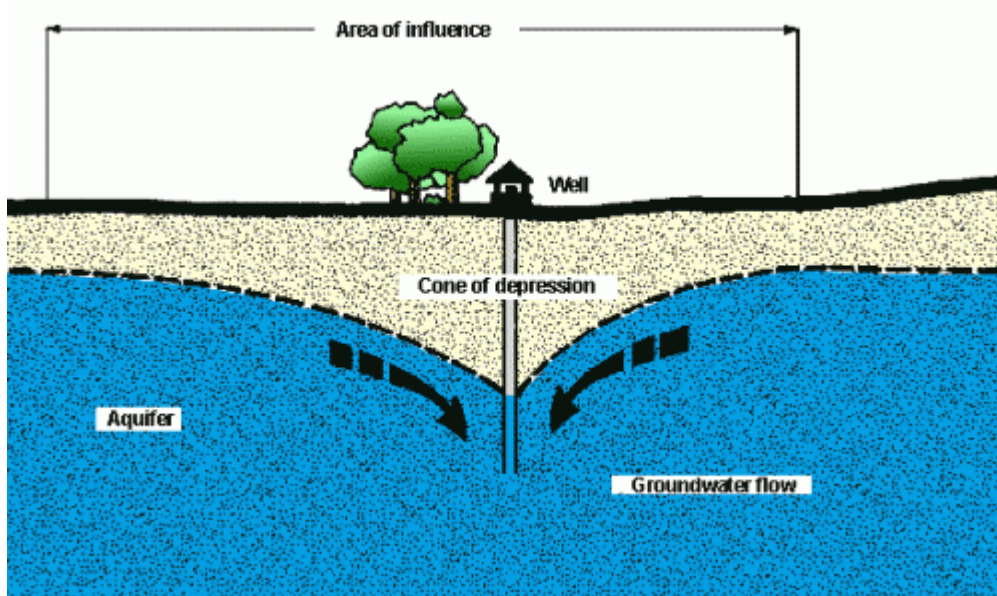
23. 21. The surface of water below the ground is the _____. 2 points

Mark only one oval.

- a. Water Table
 b. A-Horizon
 c. Unsaturated Zone
 d. Metalimnion

24. 22. A cone of depression occurs when

3 points

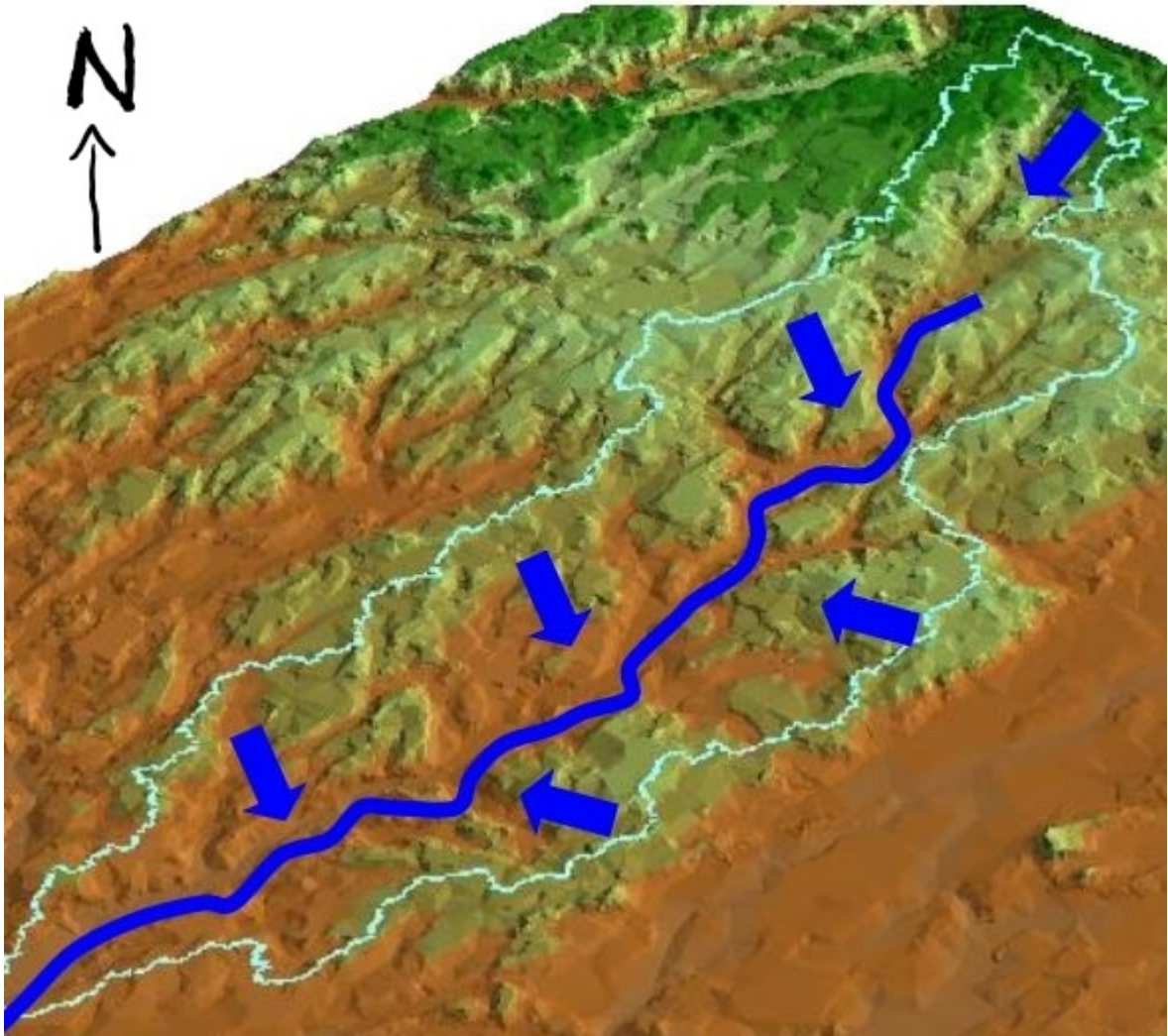


Mark only one oval.

- a. removing a well system
- b. cleaning a well system
- c. A well is pumped
- d. A well is no longer pumped

25. 23. In what direction does water flow in the following local watershed diagram? Assume North is as indicated, the top of the page.

3 points

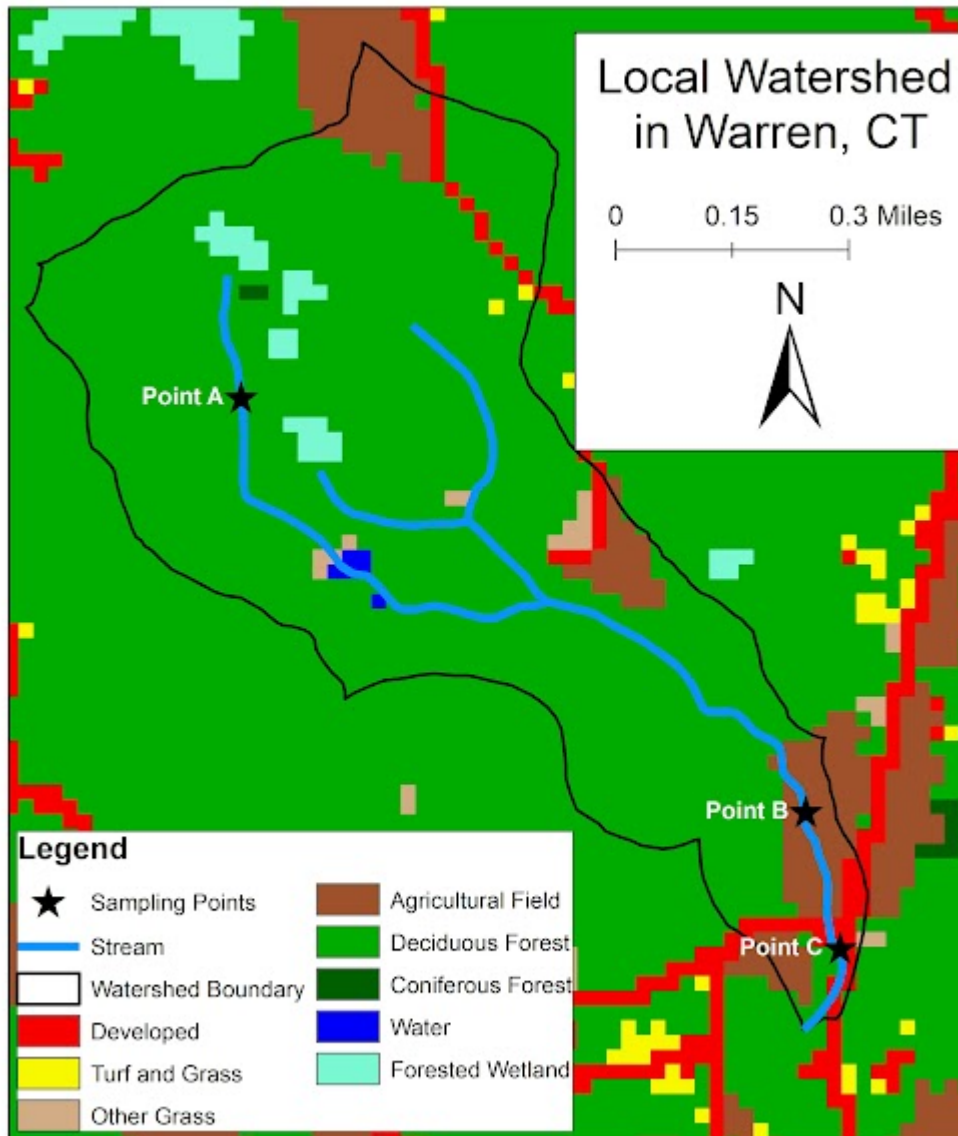


Mark only one oval.

- a. Southwest to Northwest
- b. Southwest to Southeast
- c. Northeast to Southwest
- d. Southwest to Northeast

26. 24. In the following map, which sampling point would most likely have the lowest levels of bacteria and nutrients?

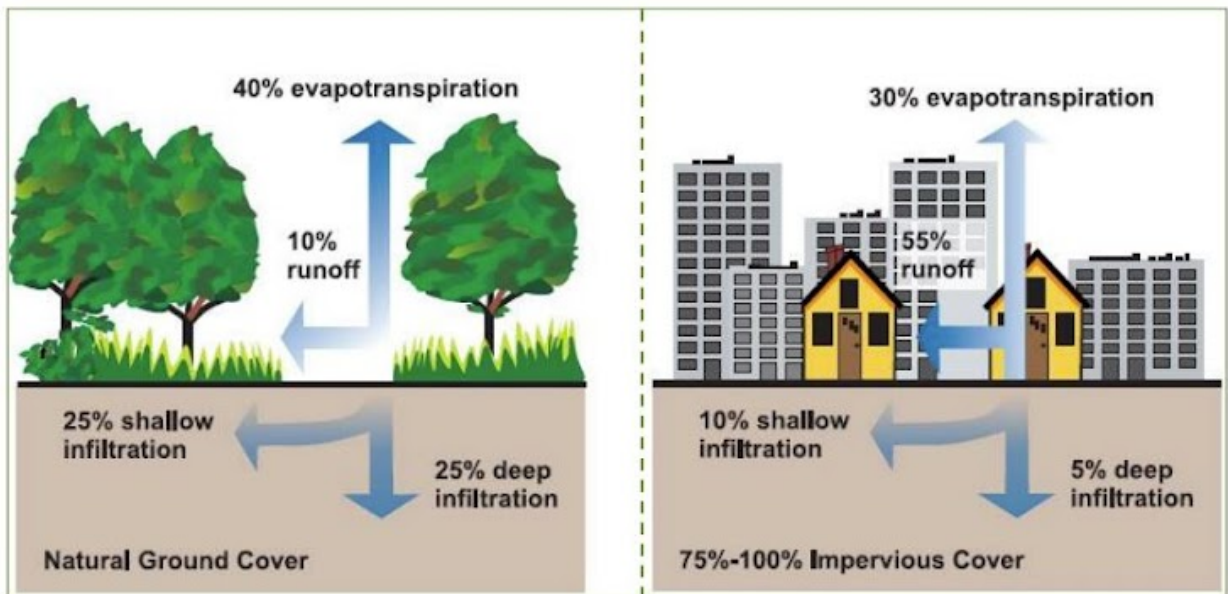
3 points



Mark only one oval.

- a. Point A
- b. Point B
- c. Point C
- d. They would all be the same

27. 25. Below are two hypothetical environments. In the scenario on the right, which 3 points of the following can be installed to better mimic the scenario on the left.



Mark only one oval.

- a. A stream or water course
- b. A Pervious Pavement system
- c. A Green Roof System
- d. combination of b and c
- e. There is nothing that can be done.

28. 26. The follow are examples of Low Impact Development Installations EXCEPT 3 points

Mark only one oval.

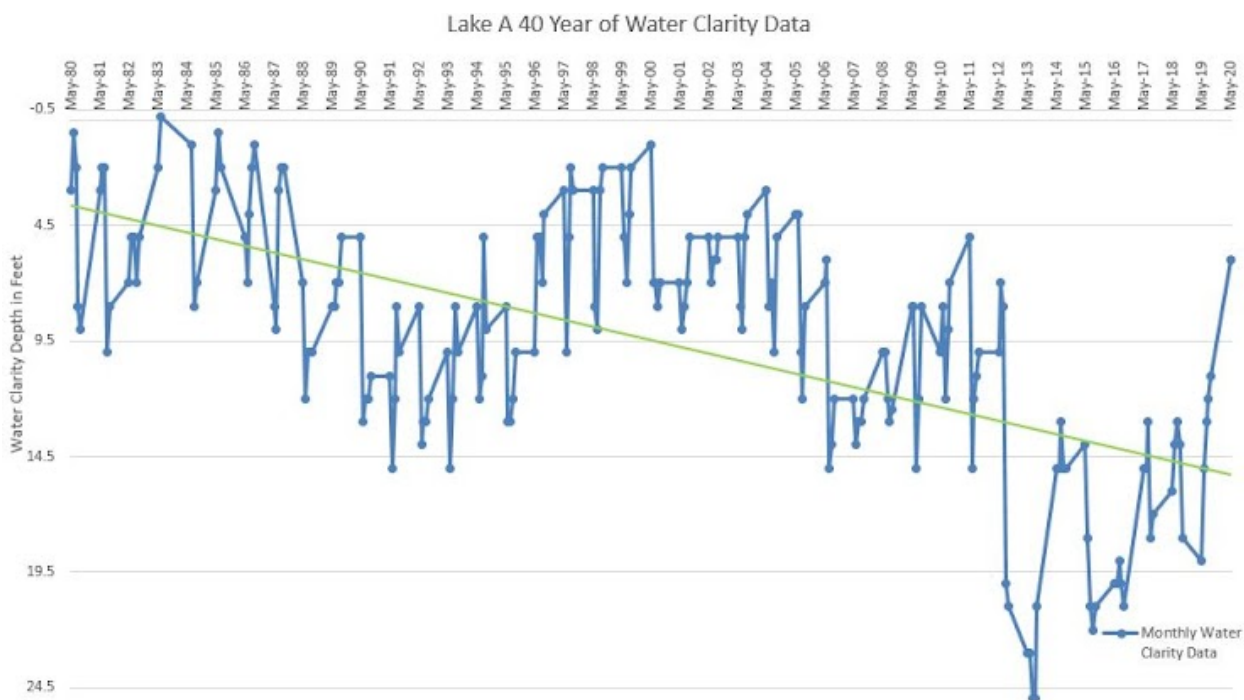
- a. Rain Gardens & Bioretention Basin
- b. Pervious Pavement System
- c. Green Roofs
- d. Catch Basin and Culvert Network

29. 27. Cyanobacteria or Blue-Green Algae can be found in what types of water bodies? 2 points

Mark only one oval.

- a. Wetlands
- b. Oceans
- c. Lakes
- d. Rivers
- e. All of the Above

30. 28. The following chart of 40 years of Lake data was taken using an instrument that measures light penetration in water. What does the data indicate overall? 3 points



Mark only one oval.

- a. An increase of water clarity
- b. A decrease of water clarity
- c. No change of water clarity

31. 29. Why are cyanobacteria blooms dangerous?

2 points

Mark only one oval.

- a. Cyanobacteria have evolved over a long period of time
- b. Cyanobacteria are newly evolved and are thus unknown
- c. Blooms can be toxic to humans in the short and long term
- d. Blooms are not a problem

32. 30. What predator does the Lake Waramaug Task Force add to Lake Waramaug to control Cyanobacteria?

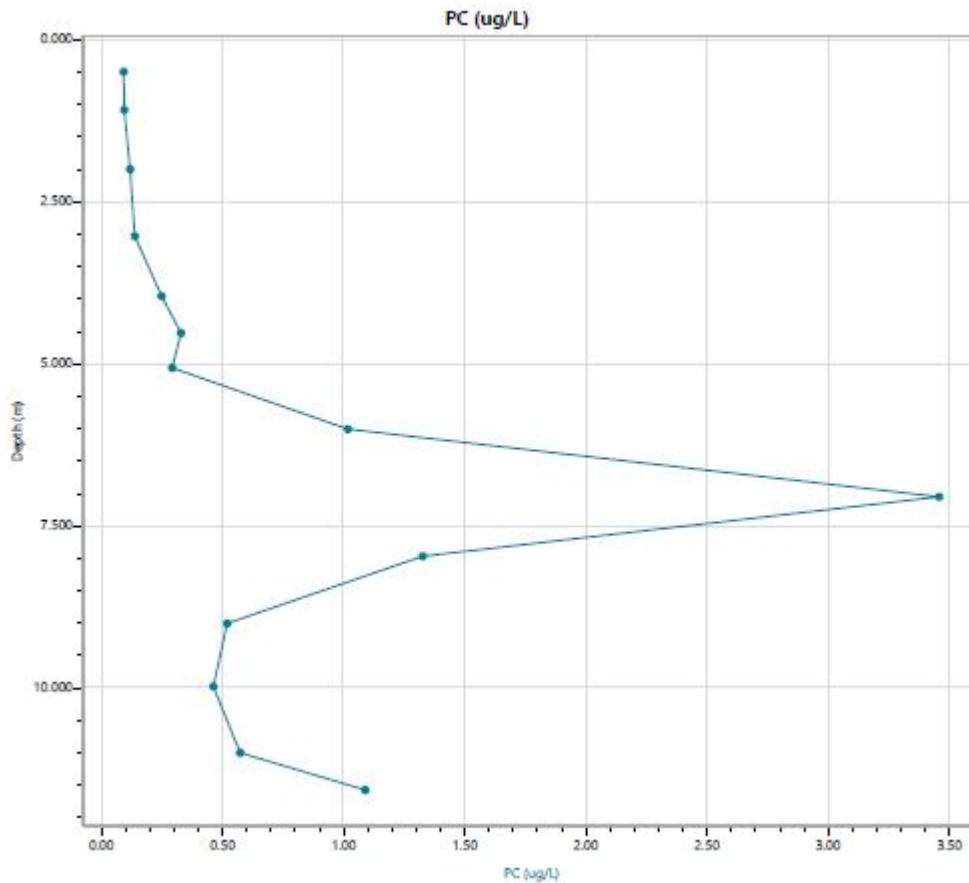
2 points

Mark only one oval.

- a. Zooplankton
- b. Alewife
- c. Blue-Green Algae
- d. Snails

33. 31. When sampling a Lake with a handheld fluorimeter, you receive the following data on the phycocyanin pigment data throughout the water column. Which of the following statements is most likely true:

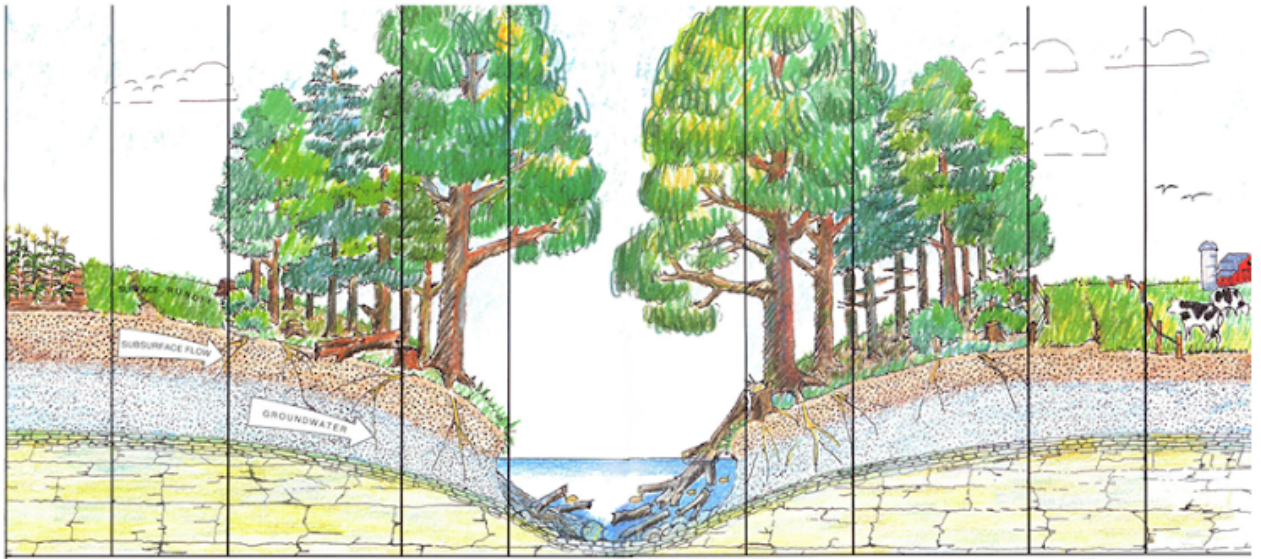
3 points



Mark only one oval.

- a. Your Lake has an increase of cyanobacteria in the metalimnion
- b. Your Lake has a decrease of cyanobacteria in the metalimnion
- c. Your Lake has an increase of cyanobacteria in the epilimnion
- d. Your Lake is homogenous throughout the water column for cyanobacteria

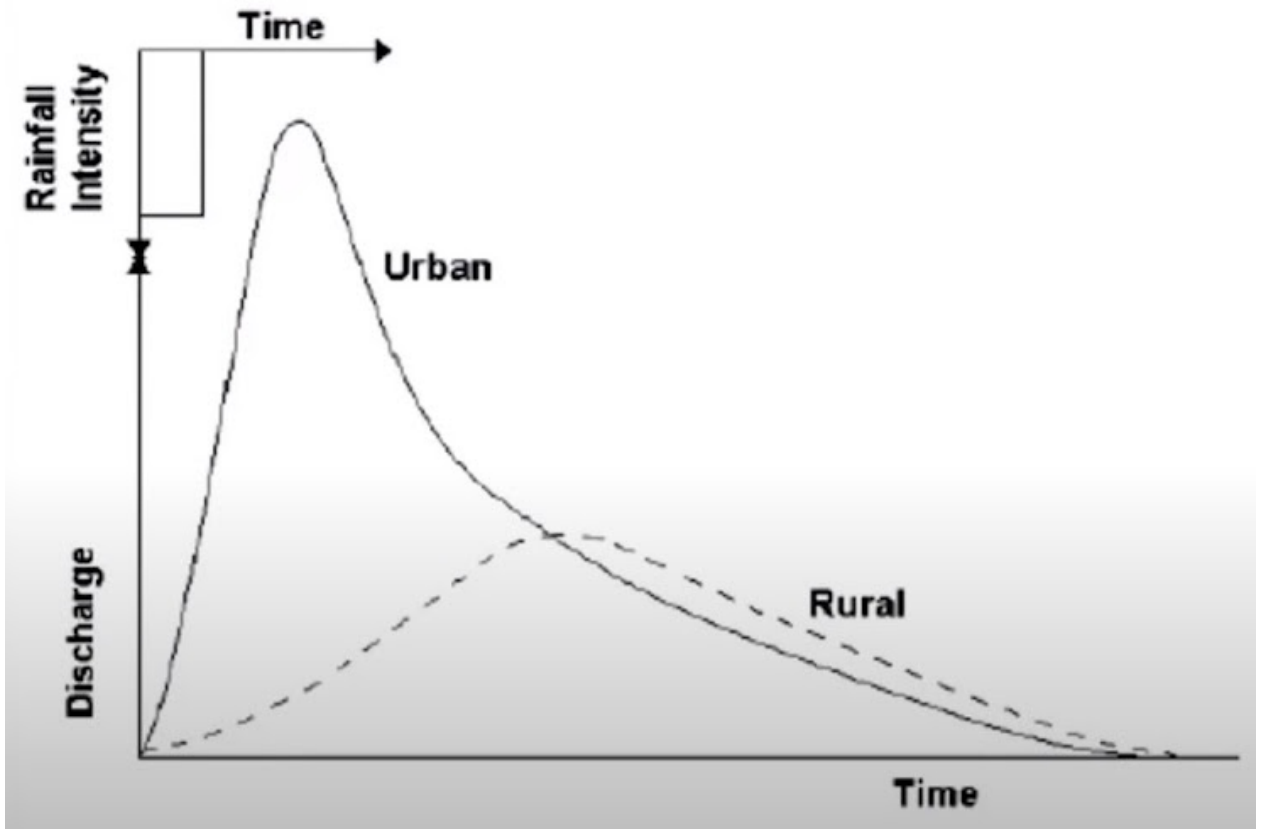
34. 32. The transition area in the photo below between upland areas and the stream channel is called the: 2 points
channel is called the:



Mark only one oval.

- a. Thalweg
- b. River Bed
- c. Riparian Zone
- d. River Bank

35. 33. The following _____ indicates that _____ typically has quicker and more intense stormwater dischargers compared to _____.



Mark only one oval.

- a. Phase Diagram, Rural, Urban
- b. Phase Diagram, Urban, Rural
- c. Hydrograph, Rural, Urban
- d. Hydrograph, Urban, Rural

36. 34. Which of the following is not a threat to stream ecosystems?

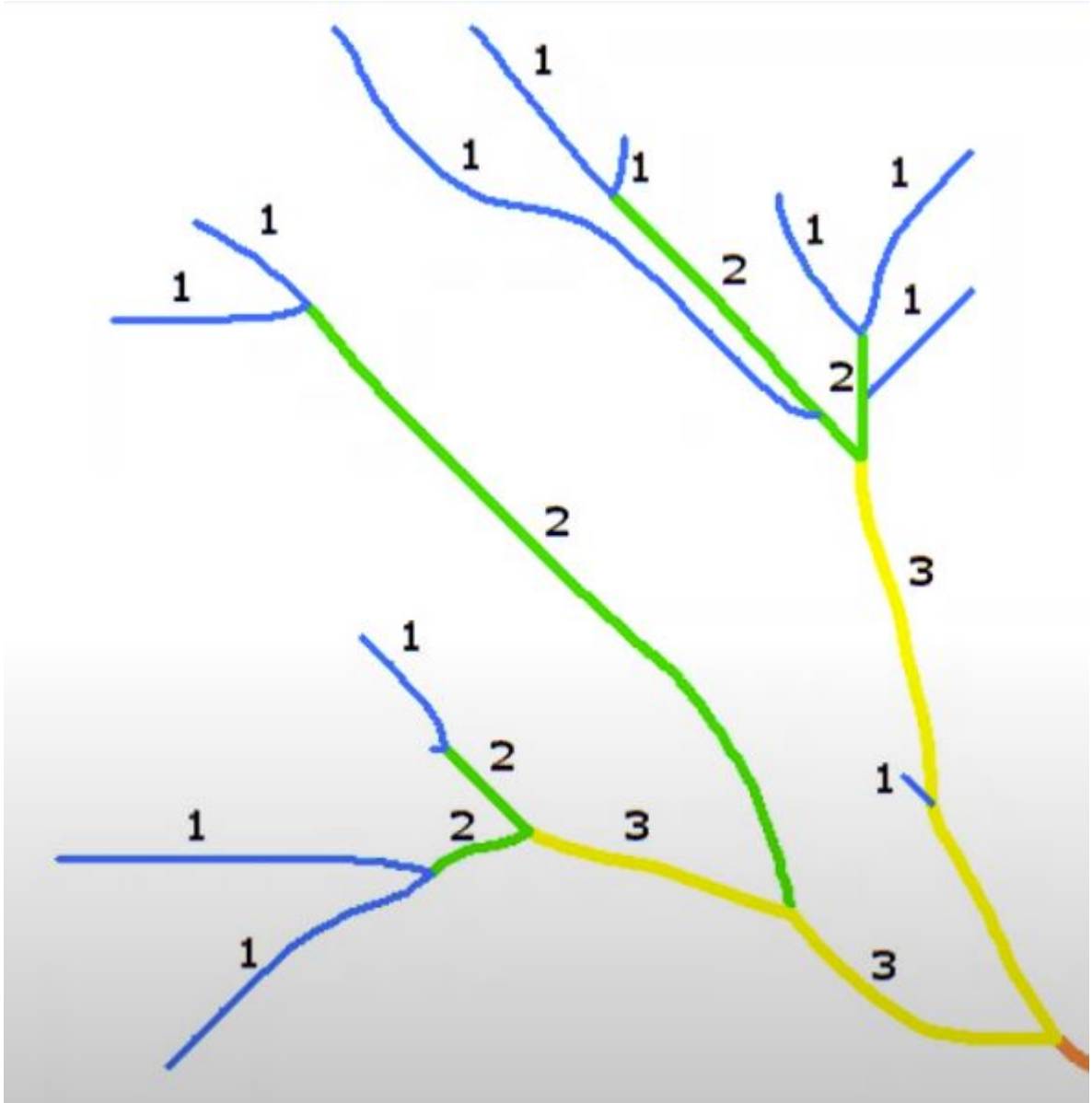
3 points

Mark only one oval.

- a. Increase of Connectivity
- b. Habitat Alteration
- c. Invasive Species
- d. Change to Land Use
- e. Climate Change

37. 35. The below figure represents what term?

3 points



Mark only one oval.

- a. Stream Flow
- b. Stream Height
- c. Stream Order
- d. Stream Width

38. 36. The following is true about Citizen Science EXCEPT:

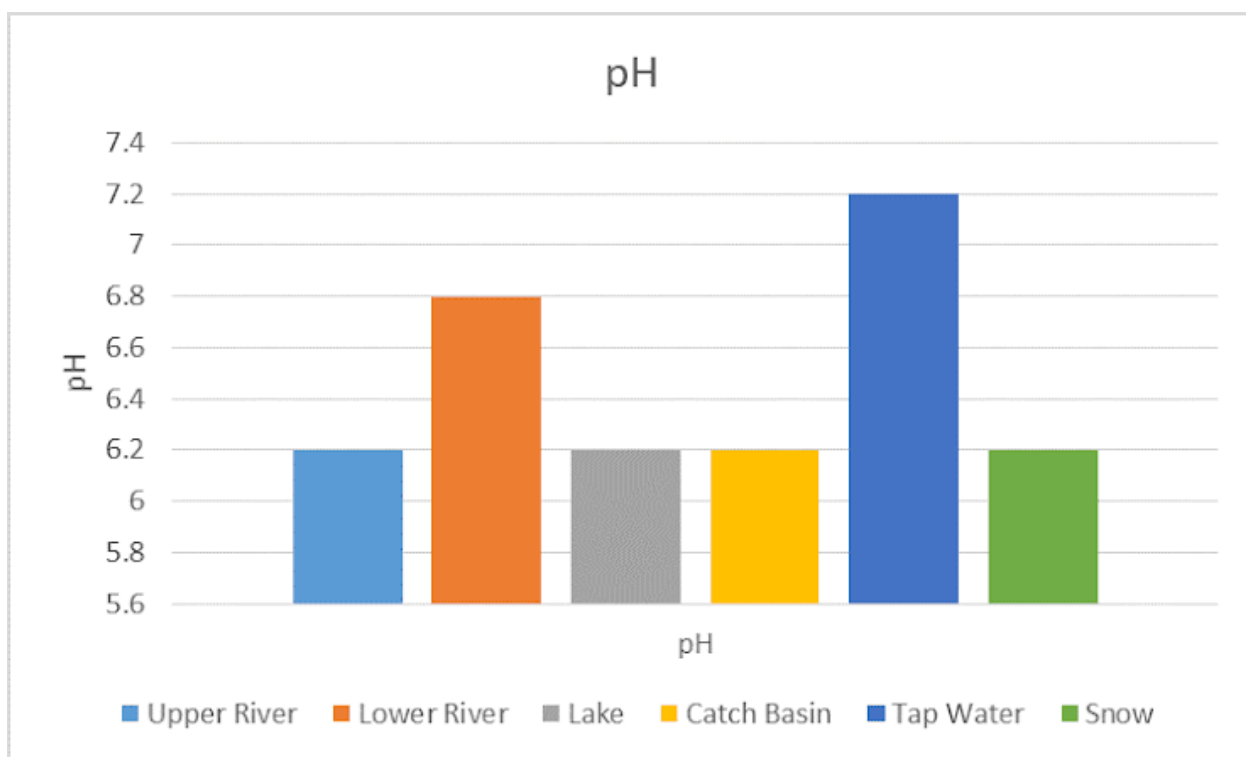
2 points

Mark only one oval.

- a. It allows the public to be involved in management of their resources
- b. It can create real change through large databases
- c. The data methods, such as water testing strips, are quick and easy to use.
- d. The data methods, such as water testing strips, are completely accurate.

39. 37. The below pH chart, as seen in the stormwater sampling video, is data from multiple locations within a designated watershed. Looking at this data, which of the following statements is true?

2 points



Mark only one oval.

- As the water travels from the Upper river to the Lower river, the water decreased in pH (became more acidic)
- As the water travels from the Upper river to the Lower river, the water increased in pH (became less acidic)
- The most acidic water tested was Tap Water
- The most acidic water tested was the Lake

40. 38. Which of the following is an example of a general climate change trend in New England? 2 points

Mark only one oval.

- Decreased annual precipitation
- Increased extreme wind/rain events
- Increased annual average wind speed
- None of the above

41. 39. Due to the changing climate, which season has the largest temperature change in New England? 2 points

Mark only one oval.

- Winter
- Spring
- Summer
- None of the above

42. 40. This structure, which used to be part of the river, is called

2 points



Mark only one oval.

- A tributary
- An ephemeral stream
- A fire pond
- An oxbow

Extra Credit

This section is worth 2 extra points.

43. What is your favorite aquatic or semi-aquatic organism(s)?

2 points
