

# Aquatics 2020 Exam

Hello everyone, and welcome to the CT Envirothon Aquatics Exam! Please read the following before beginning the exam.

This exam was designed to be completed within one hour, and with no outside help. The first half of the exam is identification questions that are each worth 2 points. The second half is non-identification questions that are worth 3 points each. All material allowed to be used on this exam is located within this Google Classroom, under the classroom section - specifically in the folder Keys, Handouts and More. If you have difficulty with some of the images, there is a companion pdf also in this folder with all of the images in this test.

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

Good Luck!

1. 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

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

2 points



Image courtesy of CT DEEP RBV guide and Jake Renkert of the Marvelwood School

*Mark only one oval.*

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

3. 2. What is the feeding group of the invertebrate pictured above?

2 points

*Mark only one oval.*

- a. Scraper
- b. Predator
- c. Collector-Gatherer
- d. Collector-Filterer

4. 3. What is the family level identification of the organism in the following image?

2 points



Image courtesy of CT DEEP RBV guide and Joshua Fusaro of the Marvelwood School

Mark only one oval.

- a. Perlidae  
 b. Pteronarcyidae  
 c. Aeshnidae  
 d. Hydropsychidae

5. 4. What is the pollution tolerance of the above pictured organism?

2 points

Mark only one oval.

- a. 9  
 b. 10  
 c. invincible  
 d. 1

Amphibians

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

2 points



courtesy of Yale Peabody Museum of Natural History

*Mark only one oval.*

- a. Bufo fowleri
- b. Rana sylvatica
- c. Rana palustris
- d. Rana pipiens

7. 6. The juvenile form of the species from question 5, seen in the photo below, 2 points  
can be found exclusively in what environments?



courtesy of Yale Peabody Museum of  
Natural History

*Mark only one oval.*

- a. Freshwater
- b. Saltwater
- c. Terrestrial
- d. All of the above

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

2 points



courtesy of Yale Peabody Museum of Natural History

Mark only one oval.

- a. Necturus maculosus
- b. Plethodon glutinosus
- c. Ambystoma laterale
- d. Ambystoma maculatum

9. 8. In what environment can the organism pictured in Question 7 be found?

2 points

Mark only one oval.

- a. Vernal Pools
- b. Coastal Marshes
- c. Streams
- d. Forests

10. 9. What is the species of the organism in the photo below?

2 points



courtesy of Yale Peabody Museum of Natural History

Mark only one oval.

- a. Plethodon glutinosus
- b. Plethodon cinereus
- c. Rana palustris
- d. Ambystoma opacum

11. 10. What is the primary food source of the organism in question 9?

2 points

Mark only one oval.

- a. Vegetation
- b. Invertebrates
- c. Fish
- d. All of the above

Fish

12. 11. Identify the organism in the following photo.

2 points



courtesy of Yale Peabody Museum of Natural History

Mark only one oval.

- a. *Etheostoma olmstedii*
- b. *Pomatomus saltatrix*
- c. *Perca flavescens*
- d. *Esox niger*



13. 12. What type of scales does the organism in the photo below have?

2 points



courtesy of Yale Peabody Museum of Natural History

*Mark only one oval.*

- a. Ganoid
- b. Cycloid
- c. Placoid
- d. Has no scales

14. 13. What is the species in the following photo?

2 points



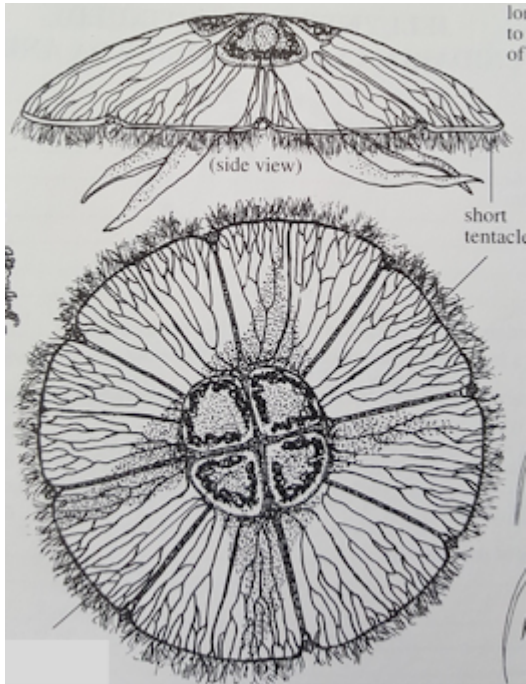
*Mark only one oval.*

- a. Squalus sp
- b. Dorosoma cepedianum
- c. Cyprinus carpio
- d. Alosa pseudoharengus

Freshwater Mussels and Benthic Marine

15. 14. What is the following species of aquatic Invertebrate?

2 points



Mark only one oval.

- a. Aurelia aurita
- b. Asterias forbesi
- c. Limulus Polyphemus
- d. Crassostrea virginica

16. 15. What visitor to Long Island Sound will make dinner out of the invertebrate pictured in question 14?

2 points

Mark only one oval.

- a. Argopecten irradians
- b. Crepidula fornicata
- c. Dermochelys coriacea
- d. Cyanea capillata

17. 16. What is the name of the saltwater invertebrate pictured below?

2 points



Image courtesy of Chesapeake Bay Foundation

Mark only one oval.

- a. *Argopecten irradians*
- b. *Mercenaria mercenaria*
- c. *Titanus Gojira*
- d. *Asterias forbesi*

18. 17. What is a common predator of the invertebrate in question 17?

2 points

Mark only one oval.

- a. *Canis Familiaris*
- b. *Homo Sapiens*
- c. *Mantis religiosa*
- d. *Mercenaria mercenaria*

Aquatic Plants

19. 18. Please identify this aquatic plant species.

2 points



Mark only one oval.

- a. Najas Minor
- b. Potamogeton crispus
- c. Trapa natans
- d. Najas flexilis

20. 19. What is the lasagna-looking aquatic plant pictured below?

2 points



Mark only one oval.

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

21. 20. Which of the following is an effective way to prevent the spread of the aquatic plant pictured in question 19?

2 points

Mark only one oval.

- a. Check trailers, boats and equipment for hitchhiking material
- b. Herbicide your Lake every year
- c. Do not use any recreation waters. Ever again.
- d. Do not use recreation waters in the Fall

Non-Identification

22. 21. The following are all examples of out-of-stream uses or need EXCEPT: 3 points

*Mark only one oval.*

- a. irrigation
- b. drinking water
- c. agriculture
- d. industrial
- e. recreation

23. 22. All of the following factors affect stream flow EXCEPT: 3 points

*Mark only one oval.*

- a. land Cover/ ratio of impervious cover
- b. soil type
- c. climate
- d. water chemistry
- e. water table

24. 23. Rate Adjustment Mechanisms allow water utilities to save money when encouraging water conservation by: 3 points

*Mark only one oval.*

- a. Allowing companies to increase per unit rate when customers use more water
- b. Allowing companies to decrease per unit rate when customers use less water
- c. Allowing companies to increase per unit rate when customers use less water
- d. Allowing companies to make water free for all

25. 24. In the following photo, what is this Lake Group staff member most likely testing for? 3 points  
testing for?



*Mark only one oval.*

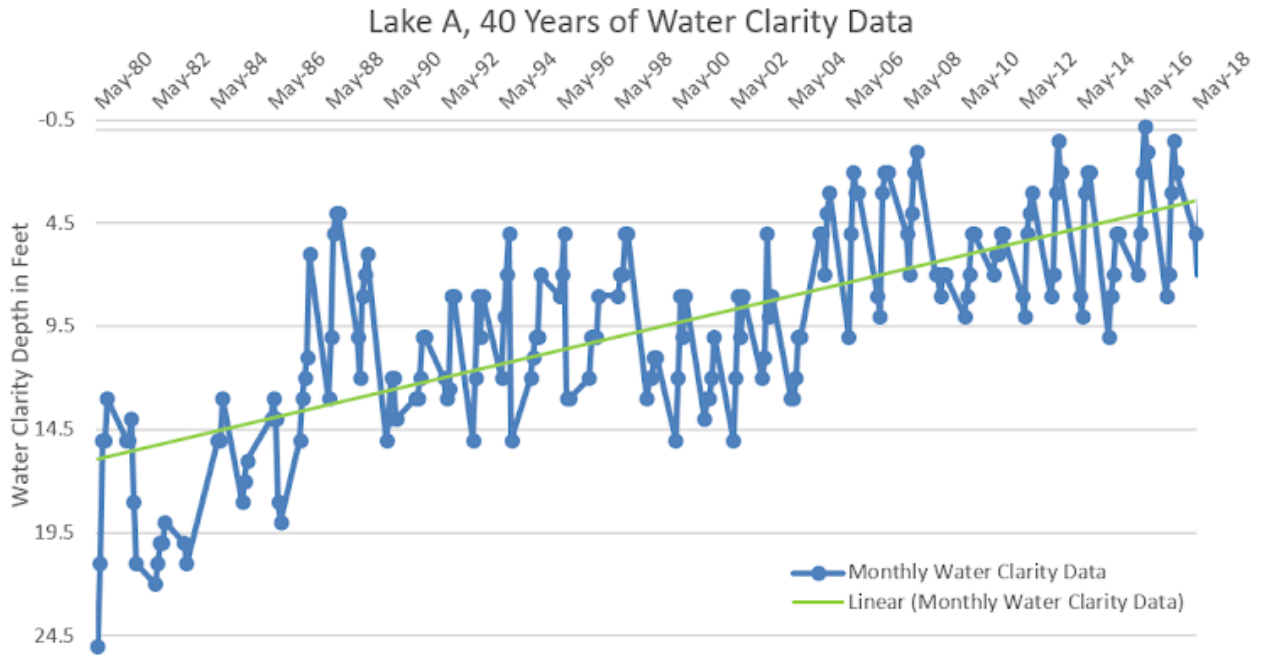
- a. Dissolved Oxygen
- b. Phosphorus
- c. Temperature
- d. Zinc
26. 25. This federal law, passed in 1972, originally focused on cleaning up discharge from industries and sewage treatment plants (point source pollution). 3 points

*Mark only one oval.*

- a. Safe Water Act
- b. Clean Water Act
- c. Montreal Protocol
- d. Safe Drinking Water Act



27. 26. 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

28. 27. Which of the following is an example of pollution from a non-point source? 3 points

Mark only one oval.

- a. Sewage Treatment Plants
- b. Food Processing Plants
- c. Large Farms
- d. Paper Mills

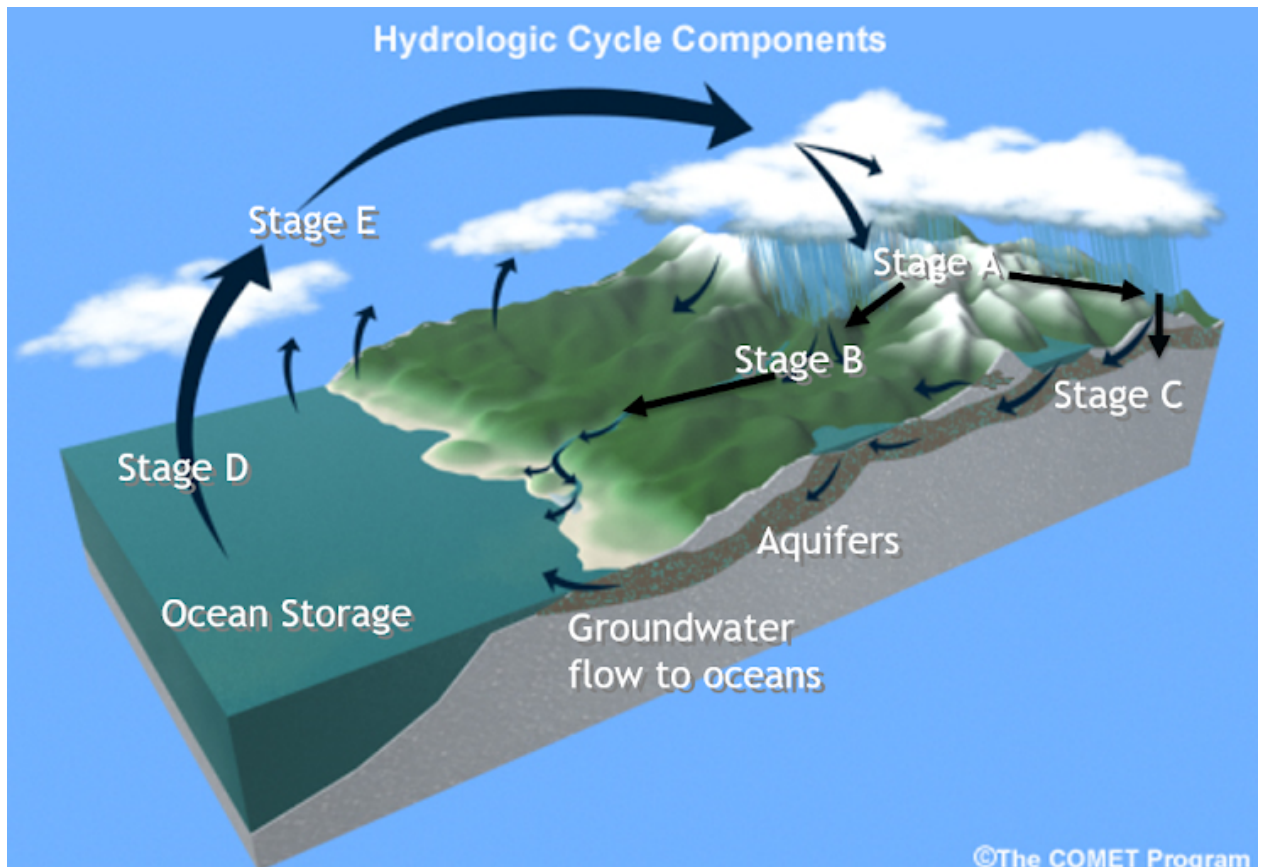
29. 28. Which of the following is a method that can be used to reduce the non-point source pollution discussed in number 27? 3 points

*Mark only one oval.*

- a. Adding extra layers of water filters
- b. Move the processing plant away from the water source
- c. Keeping animals in only 1 field
- d. Fencing along waterways to block animal access

30. 29. In the following photo, how would the relationship between Stage B and Stage C change if there was an increase of impervious surface on land?

3 points



Mark only one oval.

- a. Stage B will decrease, while Stage C will increase
- b. Stage B will increase, while Stage C will decrease
- c. Stage B will increase, and Stage C will increase
- d. Stage B and C will remain the same

31. 30. Which of the following is not a benefit of wetlands?

3 points

Mark only one oval.

- a. Habitat for wildlife
- b. Help moderate the temperature of the surroundings
- c. Increase flood protection
- d. All of the above

32. 31. Loss of habitat around streams from anthropogenic use can result in which of the following: 3 points

*Mark only one oval.*

- a. Increase in stream peak flow
- b. Increase in stream temperature
- c. Decrease in base stream flow
- d. All of the above

### Word Bank for Questions 32-35

Use the following Word Bank to answer questions 32-35. NOTE: Copy EXACTLY as written below, including capitalization. Any other spelling will be marked as incorrect:

Bog, Swamp, Lake, Riparian Zone, Pond, River, Rain Garden, Vernal Pool

33. 32. This type of wetland is characterized by grasses and the accumulation of peat. 3 points

Bog

---

34. 33. A contained basin that typically holds water for only 2-3 months during the year. 3 points

Vernal Pool

---

35. 34. A management technique to clean runoff in residential areas. 3 points
- Rain Garden
- 

36. 35. An area between a stream channel or near shore portion of a lake and the furthest upland extent of the aquatic system's influence. 3 points

Riparian Zone

---

37. 36. 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. Remove vegetation around docks that is blocking waves from reaching the shoreline
- b. Minimize shoreline alterations and use best management practices around Lakes
- c. Minimize the amount of ground covered with decks/patios to avoid increasing runoff
- d. When camping, never wash directly into a waterbody - wash at least 150 ft away from the water's edge

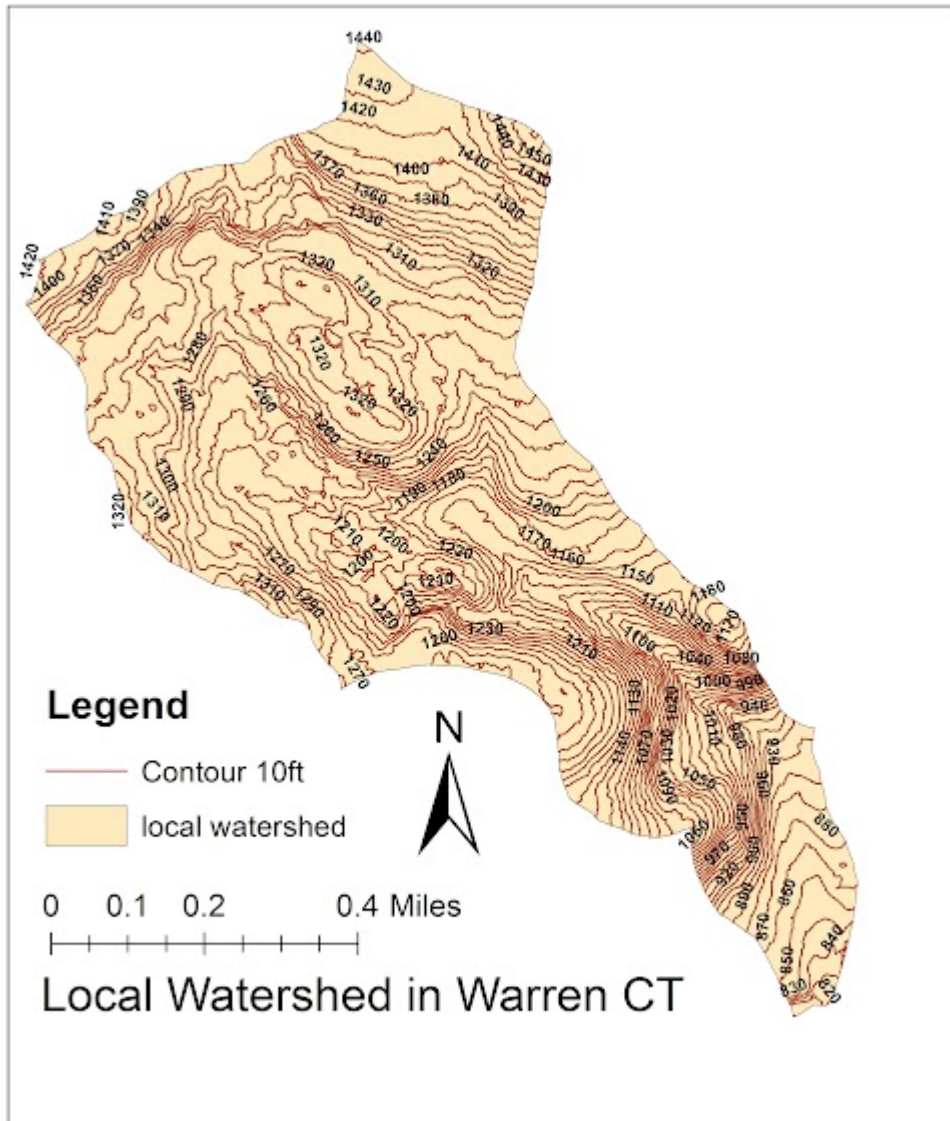
38. 37. What term defines the inverted zone shaped area around a well caused by the pumping of water from the water table? 3 points

*Mark only one oval.*

- Well Recharge Area
- Wellhead Protection Area
- Cone of Filtration
- Cone of Depression

39. 38. In what direction does water flow in the following local watershed diagram?

3 points

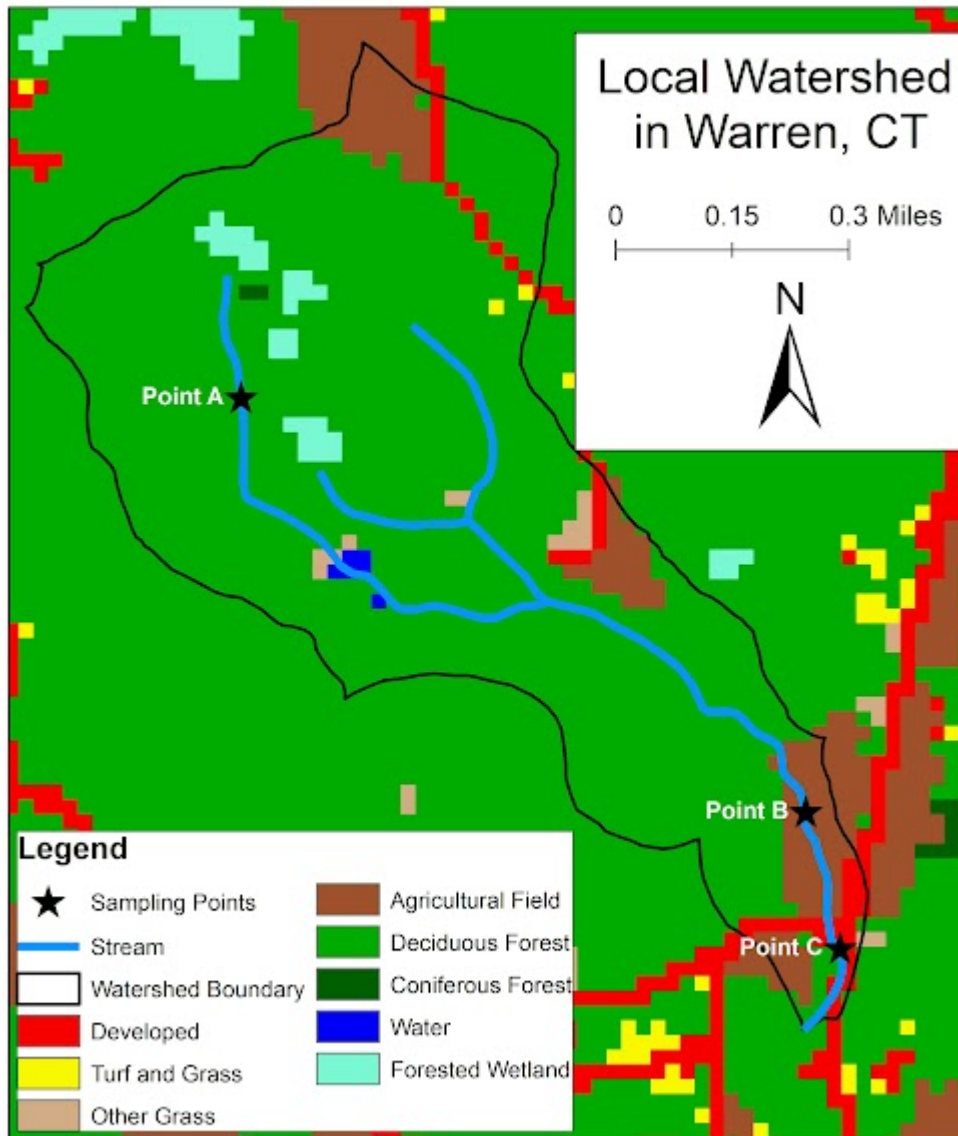


Mark only one oval.

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

40. 39. In the following map, which sampling point would most likely have the highest levels of bacteria and nutrients?

3 points

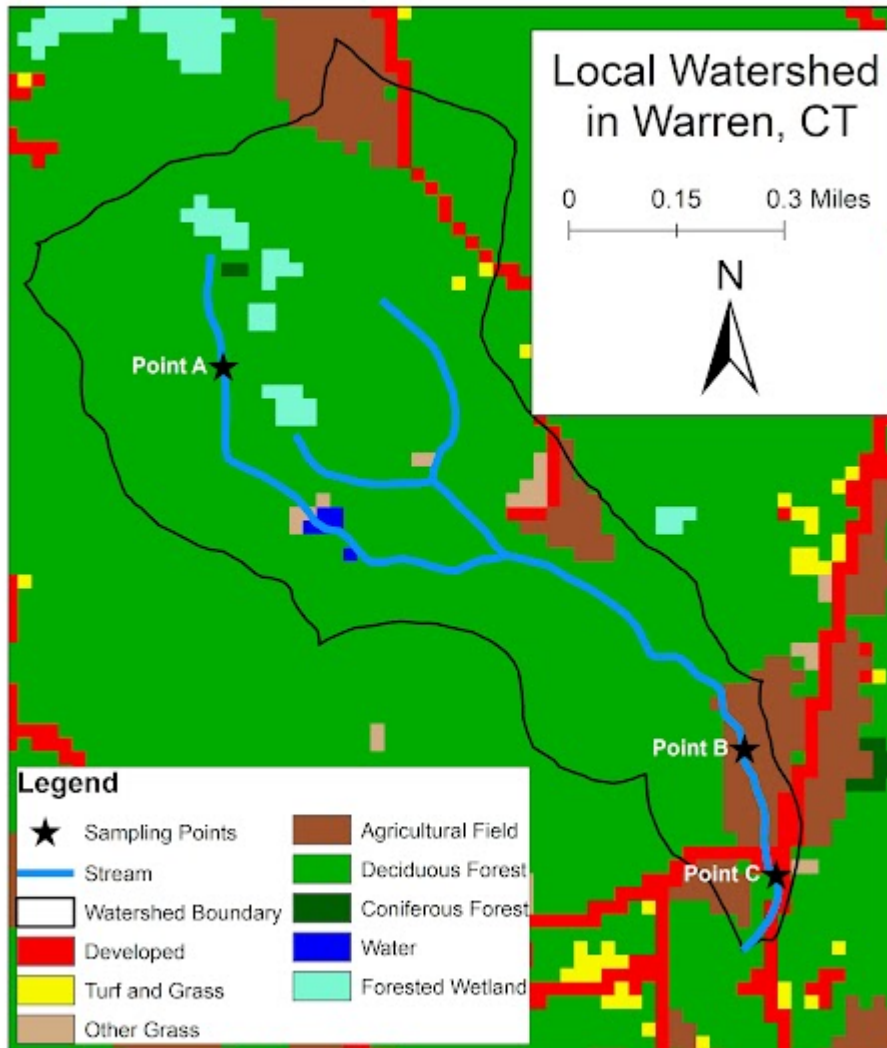


Mark only one oval.

- Point A
- Point B
- Point C
- They would all be the same

41. 40. In the following landuse map, what sampling point most likely has the largest number of Most Wanted taxa of freshwater macroinvertebrates?

3 points



Mark only one oval.

- Point A
- Point B
- Point C
- They would all be the same