AREA 2

Envirothon Questions for **Aquatics** Station

May 3, 2017 (Questions 1 thru 5 are Site Specific)

(Site Specific)

1. As you observe the shoreline of this pond, you will likely notice significant shoreline erosion. There are a number of potential explanations for why the shoreline is eroding, select the best answer from the following list.
   A. The dam has altered water flow and the lack of vegetation has eliminated a stable root mat thus exposing loose soils.
   B. Soils along the bank are loose leading to easy weathering and erosion.
   C. Muskrat activity has led to burrows being constructed in the banks, compromising their stability.
   D. The stream channel has become entrenched thus exacerbating erosion troubles.

(Site Specific)

2. If you were to conduct an aquatic chemical assessment of this area, at which location are you likely to find the highest dissolved oxygen level?
   A. Hypolimnion of the pond
   B. Epilimnion of the pond
   C. Riffle
   D. Downstream pool

(Site Specific)

3. The property owner is considering removal of this small dam, as they no longer have a need for it on the property. A consultant determined that dam removal may produce all of the following outcomes except for:
   A. Reduce preferred habitat of nuisance geese on property.
   B. A marked increase in recreational opportunities.
   C. A decrease in largemouth bass populations.
   D. Reduction of shoreline erosion upstream from the dam.

(Site Specific)

4. At which flagged location are you most likely to encounter a Stonefly nymph?
   A. Riffle
   B. Stream Pool
   C. Stream Pond
   D. Boulders
   E. None of the Above

(Site Specific)

5. At which flagged location are you most likely to encounter a Johnny Darter?
   A. Riffle
   B. Stream Pool
   C. Stream Pond
   D. Boulders
   E. None of the Above

6. This common aquatic macroinvertebrate (Exhibit A) is in the order:
   A. Ephemeroptera
   B. Trichoptera
   C. Plecoptera
   D. Odonata

7. This common fish species (Exhibit B) is a:
   A. Blacknose Dace
   B. Johnny Darter
   C. Common Carp
   D. White Sucker

8. As a scientist, you would lower this device just until it visibly disappeared in order to get an initial measurement then raise it just until it was visible again and take a second measurement. The average of these two measurements is a measure of water clarity.
   A. Secchi Disk
   B. Flow Meter
   C. Meter Stick
   D. Ekman Dredge

9. In which zone of a lake are you most likely to find invasive Eurasian Watermilfoil growing?
   A. Limnetic Zone
   B. Littoral Zone
   C. Benthic Zone
   D. Eurasian Watermilfoil is terrestrial, growing near water

10. Your team is concerned about a new utility plant that has recently opened upstream from a high-quality sample site. After a few weeks you begin a chemical test of water downstream from the plant and notice a significant increase in temperature. What might you expect to happen to the dissolved oxygen levels as a result?
   A. Dissolved Oxygen would also increase
   B. Dissolved Oxygen would decrease
   C. Dissolved Oxygen would remain the same
   D. None of the above.

11. Upon completion of initial chemical monitoring protocol of a new stream acquisition, you find that the temperature of the stream is 48°F in July. What species might you expect to find as you begin your biological assessment?
   A. Trout
   B. Bass
   C. Catfish
   D. Bluegill
   E. None of the Above

12. Winter fish kills in ponds or lakes are often the result of:
   A. Excess nutrients allowing excessive growth of algae and submersed plants throughout the winter months
   B. Excess nutrients allowing excessive growth of algae and submersed plants throughout the summer months
   C. Oxygen depletion resulting from a thick or opaque layer of ice and snow that prevents photosynthesis
   D. Thermal stratification resulting from a thick or opaque layer of ice and snow that prevents mixing
   E. B and C

13. Define the acronym ANS and select the answer which best lists species which ANS may pertain to:
    A. Aquatic Native Species: Snuffbox Mussel, Quagga Mussel
    B. Aquatic Nuisance Species: Fanshell Mussel, Zebra Mussel
    C. Aquatic Native Species: Hydrilla, Quagga Mussel
    D. Aquatic Nuisance Species: Quagga Mussel, Zebra Mussel

14. What is the optimal range for most aquatic organisms and what can happen if the pH levels become too low or too high?
    A. The optimal pH range pH 7.1 to pH 9.8. A pH outside of this range can cause an overabundance of species to present within the ecosystem, due to an overabundant growth of resources.
    B. The optimal pH range is pH 5.5 to pH 9.0. A pH outside of this range can impact survivability of not only young, but also food sources and habitat for mature adults.
    C. The optimal pH range is pH 6.5 to pH 8.2. A pH outside of this range can impact survivability of not only young, but also food sources and habitat for mature adults.
    D. None of the above are true, the pH can fluctuate without having significant impacts upon the ecosystem as a whole.

15. After conducting a biological assessment of a stream, your team determines that the stream is likely polluted with toxic chemicals. Which of the following summaries of your stream supports this claim:
    A. A variety of macroinvertebrates are present and there is an abundance of each species.
    B. There is little variety in macroinvertebrate species, but there is an abundance of each species.
    C. There is a variety of macroinvertebrates, but there are few of each species, or there are no macroinvertebrates, but the stream appears clean.
    D. There are few macroinvertebrates and the streambed is covered with sediment.

16. Select the best answer. A eutrophic body of water:
    A. May be impacted by human actions.
    B. Lacks sufficient nutrients, sediment, and organic matter.
    C. Has an excess of nutrients, sediment, and organic matter.
    D. A and B
    E. A and C

17. You are completing a biological assessment of a stream and find the following macroinvertebrates, which would indicate the best water quality:
    A. Mayfly nymph, pouch snail, crayfish
    B. Stonefly nymph, aquatic worm, leech
    C. Caddisfly nymph, stonefly nymph, water penny
    D. Midge larvae, fingernail clam, alderfly larvae

18. Which of the following characteristics best describes a bog wetland
    A. Low nutrient wetland with low pH
    B. Mineral rich wetland with high pH
    C. Brackish wetland with emergent vegetation
    D. Seasonally inundated, forested wetland

19. A biological assessment has just been completed in a stream behind a local nature center. Using the following data collected from the assessment, make inferences about the health of this stream. All of the following are true, except:

A. The data indicates that there have likely not been any significant pollution events.
B. The data indicates that there is a high diversity of a large number of species, meaning that there is a fairly complete food web and stable balance amongst species.
C. The data indicates that the chemical quality of the water is likely higher and will likely reflect in cooler temperatures and higher dissolved oxygen levels.
D. The data indicates that this stream is likely a larger, slower moving stream, with fewer riffles, and ample space for the vast diversity of species.

THE HEADWATER MACROINVERTEBRATE FIELD EVALUATION INDEX (HMFEI) SCORING SHEET

Indicate Abundance of Each Taxa Above each White Box.
Record HMFEI Scoring Value Points Within each Box.
For EPT taxa, also indicate the different taxa present.

Key: V = Very Abundant (> 50); A = Abundant (10 -50); C = Common (3 -9); R = Rare (< 3)

Sessile Animals (Porifera, Cnidaria, Bryozoa) (HMFEI pts = 1): Ø [0]	Crayfish (Decapoda) (HMFEI pts = 2): C [2]	Fishfly Larvae (Corydalidae) (HMFEI pts = 3): R [3]
Aquatic Worms (Turbellaria, Hirudinea, Oligochaeta) (HMFEI pts = 1): R [1]	Dragonfly Nymphs (Anisoptera) (HMFEI pts = 2): C [2]	Water Penny Beetles (Psephenidae) (HMFEI pts = 3): Ø [0]
Sow Bugs (Isopoda) (HMFEI pts = 1): Ø [0]	Riffle Beetles (Dryopidae, Elmidae, Ptilodactylidae) (HMFEI pts = 2): A [2]	Cranefly Larvae (Tipulidae) (HMFEI pts = 3): C [3]
Scuds (Amphipoda) (HMFEI pts = 1): C [1]	Larvae of other Flies (enter name in comments) (Diptera): (HMFEI pts = 1): C [1]	EPT TAXA* Total No. EPT Taxa = 7 [21]
Water Mites (Hydracarina) (HMFEI pts = 1): Ø [0]	Midges (Chironomidae) (HMFEI pts = 1): C [1]	Mayfly Nymphs (Ephemeroptera) Taxa Present: 2 HMFEI pts = 6 No. Taxa (x) 3] [6]
Damselfly Nymphs (Zygoptera) (HMFEI pts = 1): C [1]	Snails (Gastropoda) (HMFEI pts = 1): C [1]	
Alderfly Larvae (Sialidae) (HMFEI pts = 1): R [1]	Clams (Bivalvia) (HMFEI pts = 1): R [1]	Stonefly Nymphs (Plecoptera) Taxa Present: 2 HMFEI pts = 6 No. Taxa (x) 3] [6]
Other Beetles (Coleoptera) (HMFEI pts = 1): C [1]	Other Taxa :	
Other Taxa:	Other Taxa:	Caddisfly Larvae (Trichoptera) Taxa Present: 3 HMFEI pts = 9 No. Taxa (x) 3] [9]
Other Taxa:	Other Taxa	

Voucher Sample ID: None

*Note: EPT identification based upon Family or Genus level of taxonomy

Time Spent (minutes): 60

Notes on Macroinvertebrates: (Predominant Organisms; Other Common Organisms; Diversity Estimate)

Final HMFEI Calculated Score (Sum of All White Box Scores) = [42]

IF Final HMFEI Score is > 19, Then CLASS III PHWH STREAM
IF Final HMFEI Score is 7 to 19, Then CLASS II PHWH STREAM
IF Final HMFEI Score is < 7, Then CLASS I PHWH STREAM

20. Which type of aquifer best describes where you would expect to find an artesian well?
    A. Unconfined Aquifer
    B. Confined Aquifer
    C. Alluvial Aquifer
    D. Perched Aquifer

21. A forested riparian zone along streams helps protect waterways by:
    A. Providing shade to thermally insulate waters from rapid changes in temperature
    B. Filtering and slowing stormwater as it makes its way into the stream
    C. Resisting erosion with deep root systems that help hold soil in place
    D. Providing an energy source for the base of a complex food web and diverse biological Community
    E. All of the above

22. Which environmental disaster is generally credited as the catalyst for the National Environmental Protection Act which helped establish the EPA and ultimately the Clean Water Act of 1972?
    A. Exxon Valdez oil spill in Alaska
    B. Three Mile Island partial nuclear meltdown in Pennsylvania
    C. Cuyahoga River fire in Ohio
    D. Deep Water Horizon oil spill in the Gulf of Mexico

23. Construction of the lake at Hubbard Valley Park was completed by the Army Corp of Engineers in 1980. This summer the lake was closed for the first time due to elevated toxin levels produced by a bloom of cyanobacteria in the water. Which of the following factors may have contributed to the growth of the cyanobacteria in this "harmful algal bloom."
    A. Manure was spread on adjacent fields immediately prior to a significant rain event
    B. There is little to no riparian buffer surrounding small tributaries upstream of the lake
    C. Large areas of Wadsworth silt loam, and other hydric soil types upstream of the lake have been tiled and drained over the years
    D. A and B
    E. All of the above

24. Which of the following water uses are least likely to be in direct conflict: A-irrigation for crops, B-recreation, C-hydraulic fracturing, D-wildlife/ecosystem function, E-municipal/drinking, F-hydroelectric energy production
    A. A and D
    B. C and D
    C. C and E
    D. B and D
    E. D and F

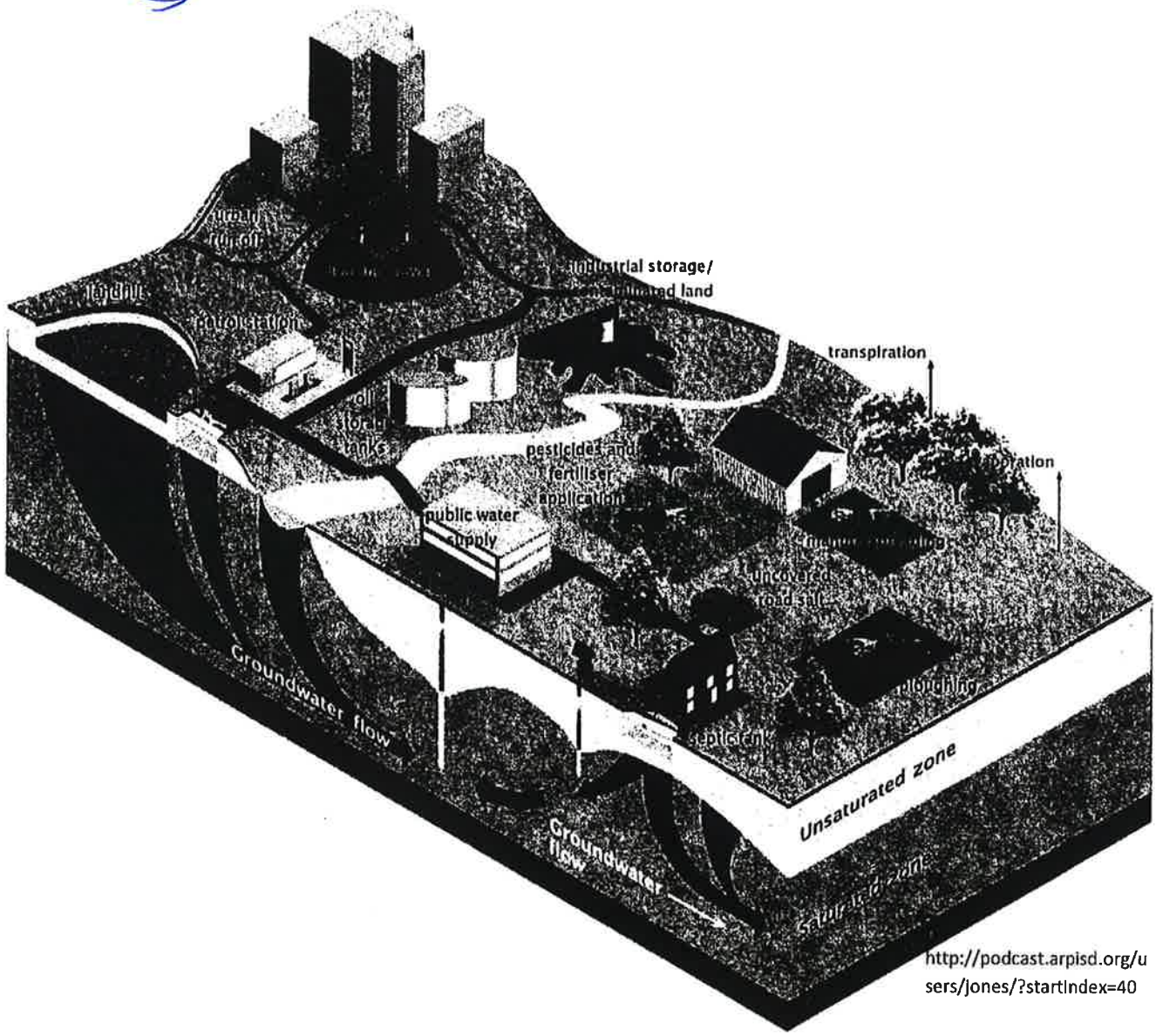
25. The Chippewa Subdistrict of the Muskingum Watershed Conservancy District manages eight dams in Wayne and Medina Counties, and of those eight, four of these, including the one here at Hubbard Valley Park, are maintained as "wet dams." The reservoir behind this impoundment is intended to serve all of the following purposes except which choice below.
    A. Recreation
    B. Silt management
    C. Water Conservation
    D. Flood Control

26. The introduction of Zebra Mussels into the Great Lakes in 1986 has since resulted in all of the following except:

A. Annual expenses exceeding $30 million to monitor and control Great Lakes populations
B. Partial to complete elimination of some native mussel populations
C. Damage to recreation equipment, like boat engines, by blocking cooling systems
D. Decreasing presence of toxic "harmful algal blooms"
E. The clogging of water intake valves and pipes that lead to power plants and water treatment Plants

27. Explore this watershed to determine what sources of nonpoint source pollution may be affecting local water quality.

A. Uncovered Road Salt and Manure Spreading
B. Plowing, Manure Spreading, and Pesticides and Fertilizer Application
C. Oil Storage Tanks and Petrol Station
D. A and C
E. A and B



http://podcast.arpisd.org/users/jones/?startIndex=40

28. Providing the prospective pond site has suitable soils, the amount of watershed acres is the next important consideration before beginning construction. Complete the statement. Watershed acres are determined by…

A. Rainfall amounts
B. Surface water quality
C. Local topography
D. Climate change

29. Good land management after pond construction is important to ensure a healthy environment for life in and near the pond. Choose the best management practice to keep sediments from building up in the pond.

A. Correctly sized overflow pipes for proper surface water flow during rain events
B. Tree plantings on the dam to use up subsurface water and prevent dam failure
C. Filter strips to reduce flow and trap sediments
D. Shallow pond depths at the point of water in-flow

30. Some ponds have a subsurface water supply, often referred to as artesian springs. Choose the soil material that is usually encountered in these areas.

A. Loamy glacial till
B. Gravelly outwash deposits
C. Silty lake floor sediments
D. Inter bedded colluvium deposits