



2009 Wisconsin Envirothon **KEY**

Aquatic Resources Exam

Answers that are correct but differ strongly from answer key must be initialized by Station Captain as an approved answer prior to delivery to score stewards.

1. This winter the water in the Big Eau Pleine Flowage has become essentially anoxic. The conditions are not caused by agricultural run-off or industrial wastewater discharges. What is the most probable cause of low dissolved oxygen (DO) levels? (2pts)
 - a. Decaying wood
 - b. Plant respiration
 - c. **Sediment oxygen demand**
 - d. Too many fish

2. Which of the following is considered an exotic species in Wisconsin? (2pts)
 - a. **Rainbow trout**
 - b. Walleye
 - c. Whitefish
 - d. Yellow perch

3. What is the greatest contributor of exotic species in the Great Lakes? (2pts)
 - a. **Discharge of ballast water from ships**
 - b. Dumping of fishing bait
 - c. Intentional introduction by state and federal agencies
 - d. Natural movement to the lakes from the St. Lawrence Seaway

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Running Total: 6

4. Which of the following are considered invasive species in the Great Lakes? Circle all that apply: (4 pts, 1 pt for each, -1 for incorrect answers)

- a. Brown Trout
- b. Common Carp
- c. Sea lamprey
- d. Spiny Water Flea
- e. Zebra Mussel

5. Use the Biotic Index provided. How healthy is the stream that the biota in the bucket came from. (8 pts)

- a. Excellent health
- b. Fair health
- c. Good health
- d. Poor health

6. Which of the following activities would most impact the biodiversity of a lake? (2pts)

- a. Deep snow cover
- b. Installation of an aerator
- c. Shoreline development
- d. The construction of a dam on an upstream minor tributary

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Running Total: 20

7. Identify each specimen as a Wisconsin Native or Exotic: (20pts, 1 pt each)

Specimen	Native	Exotic
a. Alewife		X
b. Bladderwort	X	
c. Blazing Star	X	
d. Brown Trout		X
e. Chestnut Lamprey	X	
f. Common Carp		X
g. Coontail	X	
h. Curly Leaf Pondweed		X
i. Eurasian Milfoil		X
j. Fireweed	X	
k. Glass Shrimp	X	
l. Northern Water-Milfoil	X	
m. Purple Loosestrife		X
n. Lake Trout	X	
o. Ruffe		X
p. Rusty Crayfish		X
q. Sea Lamprey		X
r. Spiny Water Flea		X
s. Swamp Loosestrife	X	
t. Zebra Mussel		X

____/20

Running Total: 40

8. With no runoff, when would you expect DO levels in a 24-hour period to be the lowest and why? (4 pts, 2 pts for time of day, 2 pts for why)

DO levels will be lowest in the early morning hours between midnight and 4am because respiration will peak about this time and no photosynthesis is occurring.

9. What are four factors that can influence DO levels in lakes? (4 pts, 1 pt each)

Aquatic plants, Algae, Snow/ice cover, Season, Time of day, Water temperature, Organic loading from the watershed, Wind (mixing)

10. Which Hilsenhoff Biotic Index (HBI) score is most characteristic of excellent water quality?(2 pts)

- a. 1
- b. 5
- c. 10
- d. 100

11. What is the difference between an exotic and an invasive species? Give an example of each. (4 pts, 2 pts for determining the difference, 2 pts for each example)

Exotic is a species not native to a particular area. Invasive is a species that is over abundant in a particular area. Wisconsin Brown Trout are considered exotic (nonnative) in WI, but not invasive. Likewise, Coontail is a native plant to WI, but can become invasive (over abundant). There are many examples

12. What are two characteristics of a eutrophic freshwater system? Is the Lions Camp Lake a eutrophic water body? (4 pts)

Nuisance aquatic plant growth (both algae and macrophytes)

High amounts of production (typically phosphorus)-very fertile

Turbid water column

Dominated by invasive species

Lions camp lake is not eutrophic

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Running Total: 58

13. Do cold water streams have less, more or the same amount of diversity than warm water streams? (2 pts)

Less

14. What kinds of problems are rusty crayfish causing in WI lakes? (3 pts, 1 for each problem)

Wipe out aquatic plants; eat fish eggs; out complete native crayfish

15. What nutrient most limits primary production in water? (2pts)

- a. Iron
- b. Nitrogen
- c. Phosphorus
- d. Potassium

16. Winter runoff events can carry massive amounts of sediment and nutrients into lakes and rivers. What are the immediate, expected results in the receiving water? What are the expected long term results? Please provide three reasons for your answer. (5 pts, 1 pt for each result, 1 pt for each reason why)

DO levels will typically increase due to the fact that runoff in winter is cold water and it is usually at or very near saturation. The sediment and nutrients in the winter runoff rarely exert themselves right away due to the high amounts of DO in the runoff.

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Running Total: 70

17. Use the pH paper provided to test each of the three samples. Then answer each of the following questions about your results. (6 pts, 3 pts for (a), 1pt for (b) and (c))

- a. What is the value and pH description (Acidic, Basic, Neutral) of each sample?

Sample A: Will be around 5.5- Acidic

Sample B: Will be around 7- Neutral

Sample C: Will be around 8.5- Basic

- b. Which sample would you expect to cause elevated levels of lead and copper in a drinking water system?

Sample A

- c. If you started with a pH 7 and you aerate the sample, which sample would likely be the result?

Sample C

- d. Chlorine would be most affective for disinfection at which sample?

Sample A

18. When responding to a manure related runoff event, which of the following set of water chemistry parameters best documents that a water quality impact has occurred? (2pts)

- a. Ammonia, BOD5, water temp
- b. BOD5, ammonia, bacteria**
- c. COD, Iron and Sulfates
- d. Iron, chlorides and potassium

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Running Total: 78

19. Identify one positive and one negative aspect associated with planting trees in parking lots and along roadways with regard to water quality and aquatic life. (4pts, 2 pts for each aspect)

Positive-Trees shade impervious surfaces thereby moderating the thermal impacts of runoff to receiving waters. They also intercept rainfall. Negative-trees drop leaves and needles and other organic matter onto impervious surfaces and runoff delivers it to surface water where it can cause nutrient loading, leading to nuisance plant growth.

20. What are 2 functional values of wetlands? (2pts)

Aesthetics, water quality protection, flood storage, wildlife habitat, shoreline erosion protection and groundwater recharge

21. Which three factors are evaluated to determine whether an area is a wetland? (2pts)

- a. Animals, vegetation, soils
- b. Soils, topography, insects
- c. **Vegetation, soils, and hydrology**
- d. Water levels, water quality, slopes

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Running Total: 86

22. Last summer the earthen levee containing eutrophic Lake Delton was breached and almost the entire volume of the lake was emptied into the Wisconsin River. Not counting the immediate aftermath, will there be a long-term positive or negative impact on the diversity of plant, insect and fish communities in the lake? Give 2 reasons why. (4pts, 2 pts for determining the impact, 1 pt for each reason why)

There will be a positive impact. Typically an impoundment responds very favorably to a drawdown or withdrawal as it allows sediments to consolidate more rooted plant species to emerge as habitat. Nutrients are also sequestered and fish assemblages respond favorable to the new habitat provided.

23. In October 2008, President Bush signed the Great Lakes Compact. What is the main point of this compact? (2pts)

- a. Each state will transfer at least 5% of its water to those in need.
- b. **The banning of new diversions of water, with limited exceptions.**
- c. To spell out the protective measures to be taken for native species in the lakes.
- d. Setting prices to charge for different activities, such as transportation, recreation, industry, on the lakes.

24. Identify the following aquatic insects: (8 pts)

	Family	Common Name
a. Organism 1		
b. Organism 2		
c. Organism 3		
d. Organism 4		

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Running Total: 100

TIE BREAKER

Where does the Lion's Camp get its drinking water?

- a. Alto-Cambrian Aquifer
- b. Groundwater Well
- c. Lion's Camp Lake
- d. Village of Rosholt Waterworks