

ENVIROTHON AQUATICS SAMPLE TEST

Habitat Assessment

Perform a visual assessment (habitat assessment) of Coalburn Creek within the designated area (100 meter reach). You will be provided with the habitat survey sheet to do this. You may separate this part from the test and decide who on your team will work on this while the remaining members of the team complete the rest of the test. What is the stream's total habitat score? _____

What is the stream's habitat integrity rating (e.g. optimal, sub-optimal, marginal, or poor)?

| | | | |
|---------|------------|-----------|------|
| Optimal | Suboptimal | Marginal | Poor |
| > 80 | 80 - 65 | 64.9 - 50 | < 50 |

You began doing a stream visual assessment and noticed that the stream's sediments have an orange or somewhat yellowish coloration. What could this indicate about the stream's condition?

Stream Chemistry

You will collect a water sample from the designated area on the stream and assess the following chemical parameters. Record your results in the spaces below.

1. Dissolved oxygen (mg/L) _____
2. Alkalinity (ppm/CaCO₃) _____

Identifying Aquatic Macroinvertebrates

There will be 10 (preserved or alive) aquatic insect specimens from which you will choose and identify FIVE (5). Write down the scientific name of the species using the provided keys. No common names will be accepted.

What stream habitat is best to choose when collecting a macroinvertebrate sample?

- A. Thalweg
- B. Calm, straight reach
- C. Near a gravel bar
- D. Riffle
- E. Backwater area

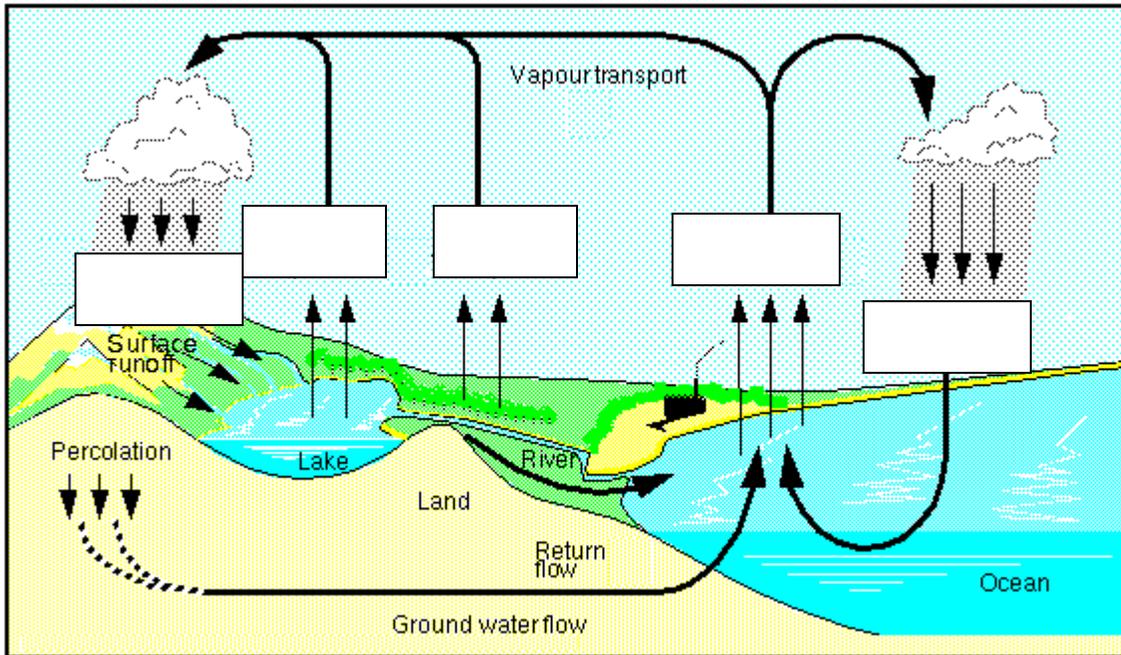
You have collected a benthic macroinvertebrate sample from the lower portion of Which Creek and sorted a sub-sample of 100 organisms. The results are as follows:

- 1 Pternarcydae stonefly
- 16 Heptagenidae mayflies
- 37 Hydropsychidae caddisflies
- 1 Corydalidae fishfly
- 45 Chironomidae midge larvae

What is the probable cause of this type of population distribution? (Hint: keep in mind how most of the above organisms feed.)

Water Cycle and Water Properties

Label the missing parts of the hydrologic cycle. Fill in the boxes.



Courtesy Erich Roeckner, Max Planck Institute for Meteorology

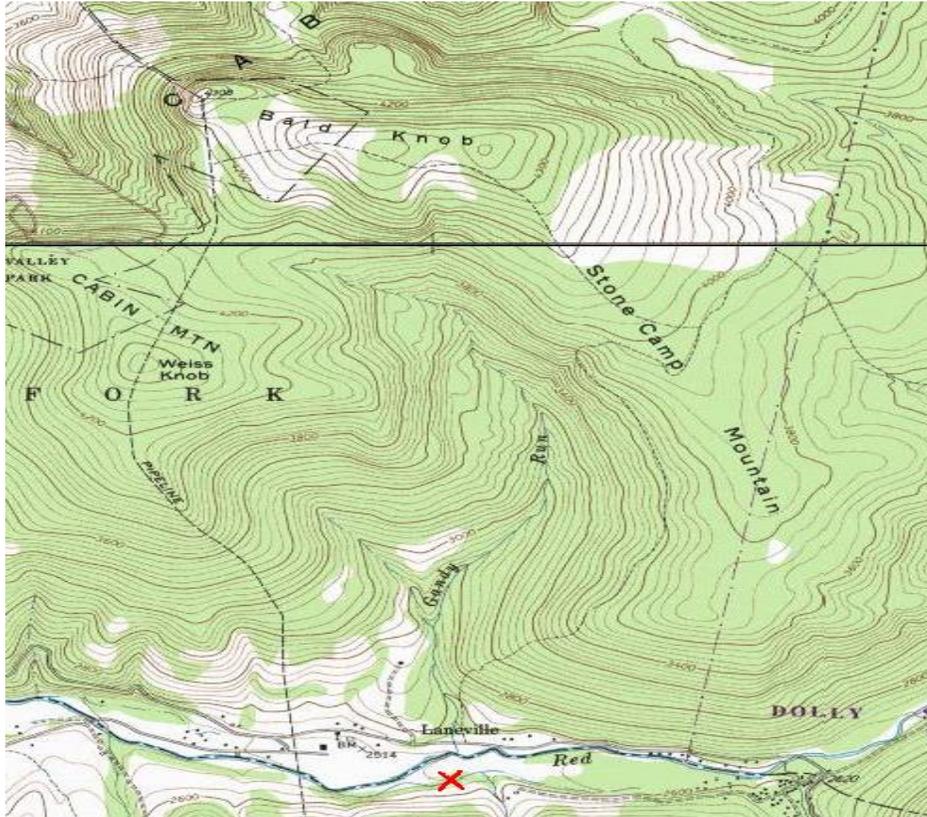
Water has both physical and chemical characteristics. Match the characteristics with their proper term.

- A. Temperature _____
- B. Iron salts in boggy areas _____
- C. Turbidity _____
- D. Ice _____
- E. Plant nutrient salts _____

- 1 = Physical
- 2 = Chemical
- 3 = Neither

Delineate a Watershed

Using the topographic map delineate the watershed boundary of Gandy Run , then determine the stream order and record it in the space below. The mouth of the watershed is indicated by the **X**.



Pollution and Best Management Practices

If there was a timber harvest at your site, describe 2 best management practices you would use to prevent sediments from getting into the stream.

Define point source and non-point sources pollution and give 2 examples of each that you can find at your site. If you cannot find examples at your site, give other examples.

Point Source Pollution _____

Examples: _____

Non-Point Source Pollution _____

Examples: _____

Pond/Lake Ecology

The phenomenon where the lower layer of the lake mixes with the upper layer of water in a relatively short period of time is called _____.

In lakes and ponds, water forms layers. The sun warms the top layer, called the _____. The bottom heavy layer, called the _____, sometimes has very little oxygen. There can also be a middle layer, called the _____, which can be narrow and contains a thermocline.

Describe one reason why understanding the water layers is important to fish.

Riparian Buffers

Riparian forest buffers function as a filter, a transformer, a sink, and a source. Pick 2 of these 4 functions and explain what they mean.

If the stream were being polluted by animal waste, what would you do to control it? Give 2 examples.

Wetlands – Value and Function

Wetlands vary widely, yet they generally include three distinguishing features. Briefly describe each of these features.

Wetlands contribute to the vitality and safety of both urban and rural environments. Describe three of these contributions.

Invasive Species and Aquatic Nuisance Species

According to the United States Geological Survey, the Rusty Crayfish is native to streams in Ohio, Kentucky, and Tennessee. The Rusty Crayfish has been introduced to southern West Virginia, and thrives in nutrient-rich streams. Is the Rusty Crawfish an invasive species, and why or why not? Circle the correct answer(s).

- A. Invasive Species – Destroys aquatic plant beds, forces native species from daytime hiding places, and assumes a claws-up defensive posture, which reduces predation.
- B. Noninvasive Species – Provides a more stable aquatic environment by slow reproduction and decreasing water turbidity.

- C. Invasive Species – Removes nitrates from streams, preys on other crayfish, and lays over 1000 eggs per year, forcing other crayfish species into extinction.
- D. Noninvasive Species – Introduced into streams, lakes, and ponds for sports fishermen. Widely considered the premiere bait and are still considered a rare find if located in the wild.

Recent field and laboratory studies report that two major factors determine the growth and reproductive success of zebra mussels. What are these factors? Circle the answer.

- A. Calcium and alkalinity
- B. pH and acidity
- C. Temperature and acidity
- D. Turbidity and alkalinity

Controlling the movement of contaminated boats appears to be the only significant means of preventing, or at least slowing the spread of zebra mussels from infested waters. What is the most effective and least environmentally damaging method of removing or cleaning zebra mussels from a boat? Circle the correct answer(s).

- A. Chemically treat the hulls of boats with a mild acid solution.
- B. Drain the boat thoroughly and let it dry for several days.
- C. Coat the hulls of boats with a concentrated molluscicide.
- D. Wire hulls of boats to produce an electronic field around the boat to repel zebra mussels.

The red-eared slider is not native to West Virginia, but has been recorded in the state by the United State Geological Survey.

- A. What type of reptile is the red-eared slider? _____
- B. How did the red-eared slider get introduced? _____
- C. What are the documented negative impacts of red-eared sliders outside their native range?

Eurasian Watermilfoil originates from Europe and Asia and was introduced to North America years ago and is now found over much of the United States. Milfoil reproduces extremely rapidly and can infest an entire lake within two years. Which of the following negative impacts of this aquatic plant are correct? Circle the correct answer(s).

- A. Stagnant mats of milfoil can create good habitat for mosquitoes.
- B. Milfoil mats can rob oxygen from the water.
- C. Milfoil mats can absorb all the water out of a lake.
- D. Milfoil starts spring growth sooner than native aquatic plants and can shade out beneficial plants.
- E. Milfoil is poisonous if eaten by fish or other aquatic animals.
- F. Milfoil can cause an allergic skin reaction, similar to poison ivy, whenever it is touched.
- G. Whenever milfoil invades a new territory, typically the species diversity of aquatic plants declines.
- H. Milfoil reproduces by formation of plant fragments and reproduces rapidly.

What are the impacts of introductions of non-native species? Circle the correct answer(s).

- A. Could negatively impact gene pools.
- B. Introduces competition that could impact other native species.
- C. Introduces diseases to native species.
- D. All of the above.
- E. B and C

Laws and Current Events

What is the main goal of the Federal Clean Water Act?

Water pollution laws are implemented and enforced in West Virginia by the:

- A. US Environmental Protection Agency
- B. WV Division of Environmental Protection
- C. WV Division of Natural Resources
- D. US Fish and Wildlife Service
- E. WV Soil Conservation Agency

If there is a State or National event with a water issue, there will be a question about it on the test. For example: There was a water crisis in Detroit a couple years ago. What caused it?

Water Conservation

As urban populations continue to grow, water consumption will also increase. Many communities and neighborhoods are developing ways to conserve water. Give 2 examples of things you might do around your house to conserve water.