

Team Number: _____

**Station Two (Upland)
Aquatic Ecology
May 2005**

A-4 (6). Explain how the upland woods protect the surrounding water systems. Describe three (3) impacts that would occur if these systems were lost.

Explanation (3 pts), and describing 3 impacts (3 pts).

**Trap nutrients – uptake
Protects from erosion**

**Loss of habitat
Thermal pollution**

A-5 (2). Explain the difference between alkalinity and pH and how they are related to water quality.

**pH = measure of degree of acid & base
Alkalinity = ability to resist change in pH**

A-6 (3). (Sign) Identify the species shown on the sign that may be present in the woodland habitat and give at least one special adaptation that each has to survive in these environmental conditions. **(0.5 points/correct species & 0.5 points/correct adaptation)**

	Species	Adaptation
A.	Wood Frog	can live away from water source, ability to climb vertically
B.	Eastern Box Turtle	eats berries & worms, colors mix with leaf colors, close shell for protection
C.	Brown Snake	eats worms, coloration of camouflage

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Station Two (Upland)

Energy

May 2005

E-11 (3). What kind of electrical current travels with less line loss?

- A. AC
- B. DC
- C. QC
- D. TC
- E. FCC

E-12 (3). Which component in the stand alone or off-grid system is not needed in a grid intertie system?

- A. Battery**
- B. Voltmeter
- C. Amp meter
- D. Inverter

E-13 (3). How much oil does the U.S. import today to help meet our energy needs?

- A. 28%
- B. 54%
- C. 45%**
- D. 70%
- E. 100%

E-14 (3). Where does all energy ultimately come from?

- A. Earth
- B. Moon
- C. Fossil Fuels
- D. Sun**
- E. Water

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**Station Two (Upland)
Forestry
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May 2005**

F-5 (8). When managing forestland there are four harvesting systems that could be utilized, they are *Selection, Clearcut, Seed Tree, and Shelterwood*. Please describe two of these systems.

4 points for each correct answer

Selection- Removal of a single tree or group of trees, this system favors shade tolerant species. Group selection is required for species such as oak, cherry, ash (intermediate tolerance). The opening in the canopy needs to be larger so that it does not fill in too quickly.

Clearcut- Removal of all trees in the stand, effective for red pine, spruce, aspen, and oaks. These species are intolerant and are best managed as even-aged stands. Aspen will sprout readily after a clearcut.

Seed Tree- An even-aged system where nearly all of the trees are harvested at one time. Mature, seed producing trees of good quality are left scattered throughout the stand as a seed source. Once seedlings / saplings become established the seed trees are removed, leaving an even-aged stand.

Shelterwood- An even-aged system where one or two cuts are used prior to the final harvest. The first two cuts stimulate and establish advanced regeneration before the final harvest cut.

F-6 (6). At this site, which of the above systems would be best to use to maintain the current cover type and why? Please be sure to describe how the current stand make up (species, density, tree size and species requirements for reproducing) aids in the determination of choosing a management system.

Current cover type/species composition: black cherry, red oak (dominant), red maple (understory)

Harvesting system = Selection

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Forestry

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May 2005

F-7 (24). (Signs) Identify the trees indicated by the signs by using complete common names without the use of a key. Then, using the instruments available at the site, please provide the following information for the trees indicated. **Place signs by four different species of tree. 2 points for each correct answer.**

	<u>Name</u>	<u>Height</u>	<u>DBH</u>
A.	Red Oak	78'	28.5"
B.	Red Cedar	21'	3.8"
C.	Black Cherry	54'	9.8"
D.	Red Maple	38'	4.7"

Tree Height should be within + or – 5.0 feet

Tree Diameter should be within + or – 0.5 inches

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Station Two (Upland)

Soils/Geology

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May 2005

SG-7 (3). (Sign) The texture of the surface layer is:

- A. Coarse (sand)
- B. Moderately coarse (loamy sand, sandy loam)**
- C. Medium (loam, silt loam)
- D. Fine (clay loam, silty clay loam, sandy clay loam, clay, silty clay, sandy clay)
- E. Organic (muck, peat)

SG-8 (3). (Sign) The texture of the marked layer is:

- A. Coarse (Sand)
- B. Moderately coarse (loamy sand, sandy loam)
- C. Medium (loam, silt loam)**
- D. Fine (clay loam, silty clay loam, sandy clay loam, clay, silty clay, sandy clay)
- E. Organic (muck, peat)

SG-9 (3). (Sign) As you go deeper in the profile this soil becomes lighter in color. What is the factor that causes this to happen?

- A. Earthworms cleaning the sand grains
- B. Plant roots taking up all the minerals & organic matter for plant use
- C. Movement of minerals and organic matter, forming the layer immediately below
- D. The soil was this light color when the glacier laid it down**

SG-10 (3). (Sign) The "Red or Orange" color in this subsoil comes from what mineral(s)?

Iron and/or Organic Matter

SG-11 (3). Why are surface layers typically thin (less than 4 inches thick) in wooded conditions?

- A. Lacks sunlight to break down organic matter
- B. The amount of sand is greater in forested conditions
- C. The amount of organic mass from trees is less than in grasslands**
- D. The lower numbers of organisms living in the soil to mix the organic matter into the soil

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Soils/Geology

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May 2005

SG-12 (3). (Sign) Using the Abney level or Clinometer, what is the slope between the 2 marked points?

- A. 0-6 percent
- B. 6-12 percent
- C. 12-18 percent**
- D. 18-25 percent
- E. Greater than 25 percent

SG-13 (3). List three (3) of the glacial advances that covered Michigan.

Wisconsin, Illinoisan, Kansan, Nebrakan

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Station Two (Upland)
Sustainable Agriculture
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May 2005

SA-4 (6). The emerald ash borer is an imported insect pest that is spreading rapidly through Michigan, destroying native ash trees in its wake. The most environmentally sustainable approach to managing this new pest would be:

- A. Developing a new broad spectrum insecticide against the beetle and spraying it over all infested areas
- B. Introducing a fungal pathogen that attacks only the ash borer**
- C. Halting the spread of the beetle by cutting down all of the ash trees around areas of infestation and selling the lumber to local saw mills
- D. Waiting out the infestation until the insect comes into balance with the Michigan forest ecosystem
- E. All of the above are part of a sustainable pest management approach to the ash borer

SA-5 (3). A farmer who harvests trees from his own woodlot, mills the wood on his own portable sawmill, and uses the resulting lumber to manufacture lawn furniture during the winter months which he then sells at a roadside stand would be applying what well-known sustainability principle?

- A. “Cradle to grave” sustainability
- B. “Earthsmart” resource management
- C. “Bioremediation”
- D. “Value-added product” production**

SA-6 (6). Which of the following organisms are decomposers and important in the formation of soil in this ecosystem and as well as all agricultural ecosystems? Circle three (3) that apply.

- A. Heterotrophic bacteria**
- B. Plant pathogenic fungi
- C. Free-living fungi**
- D. Earthworms**
- E. Rotifers

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**Station Two (Upland)
Sustainable Agriculture**

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May 2005

SA-7 (4). Climate, a combination of temperature and moisture, ultimately determines the type of plants that can grow in any given area on Earth. Given the climate conditions in Michigan, which plant(s) in the list below could be raised by Michigan farmers? Circle all that apply.

- A. Canola**
- B. Peppermint**
- C. Celery**
- D. Sugar cane
- E. Woody shrubs**
- F. Sunflowers**
- G. Sugar beets**
- H. Cotton
- I. Flax**
- J. Peanuts
- K. Onions**

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Station Two (Upland)

Wildlife

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May 2005

W-5 (3). (Sign) Part A: Identify this bird from its feather and track. It regularly uses the habitat found at this site. (1 pt.)

Wild Turkey

(Sign) Part B: What is item B and where is it found? (2 pts.)

Turkey beard / found on the turkey's breast

W-6 (2). Which of the following species is not on the Federal or State Threatened or Endangered List in Michigan?

- A. Gray Wolf
- B. Karner Blue Butterfly
- C. Kirtland's Warbler
- D. Piping Plover
- E. **Sandhill Crane**

W-7 (2). Which of the following is not a member of the Order Rodentia?

- A. Beaver
- B. Fox Squirrel
- C. **Mink**
- D. White-footed Deer Mouse
- E. Woodchuck

W-8 (5). (Sign) Listen to this tape and identify five (5) of the eight bird species by its call or song. These are all species that could be found in this habitat.

Ovenbird, Scarlet Tanager, Wood Thrush, Northern Oriole, Barred Owl, Screech Owl, Black-capped Chickadee, Pileated Woodpecker

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Wildlife

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May 2005

W-9 (5). The Eastern Box Turtle is a resident of the Fort Custer property. Which one (1) of the following statements about this turtle is false? Correct the statement to make it a true one. *(2pts for the correct false statement and 3 pts for corrected statement. If they do more than 1 with the correct answer half credit will be awarded)*

- A. This is Michigan's only truly terrestrial turtle. It avoids deep water and does not swim well.
- B. Box turtles eat insects, worms, mushrooms, berries, and fruit.
- C. The Eastern Box Turtle is considered to be a species of special concern by the Michigan Department of Natural Resources.
- D. The Box Turtle's shell is much like a Snapping Turtle because it does not fully protect its body, being too small for it to tuck its head, legs, and tail into.
False- The box turtle has a plastral hinge allowing it to close the shell tightly while completely hiding its head, legs, and tail.
- E. Box Turtles are found in the southern and western Lower Peninsula of Michigan.

W-10 (2). Snags are of high value to a wide variety of many birds and mammals. Find a snag at the testing site and list a mammal species that you would expect to find here.

(bats, raccoons, squirrels, flying squirrel, mouse, gray fox, skunk, weasel, porcupine)

W-11 (4). Many wildlife species depend on forests for survival. Of the four choices listed below, choose the one (1) reason which you believe to be the most important factor in preserving wildlife diversity at this site and then explain your answer.

- A. There are several different habitat types that exist in the surrounding area
- B. The surrounding hardwood forest has various species and ages of trees, multiple plant species with various food sources (berries, seeds, nuts)
- C. With increasing amounts of rural development, forestland preservation is very important
- D. This is valuable habitat for rare species like the Easter Box Turtle

Explanation:

Total: _____ /23