

14 Sept 2014



**LAKE ECOLOGY EDUCATION PROGRAM (L.E.E.P.)
ECO-EDUCATION
FALL OUTDOOR LAB MANUAL**

NAME: _____ **HOUR** _____

<u>LAB MODULE NAME</u>	<u>PAGE</u>	<u>POINTS</u>
Critical Habitat	2-3	_____ (55)
Water Quality	4-5	_____ (40)
Aquatic Plants	6	_____ (50)
Plankton Module	7	_____ (45)
Canoeing Safety/Skills		_____ (10)
	TOTAL	_____ (200)

INSTRUCTOR COMMENTS:

OUTDOOR CRITICAL HABITAT MODULE LAB

Team Members:

Materials: Get the following materials from your instructor/assistant:

- Printed Map previously made in computer lab session
- Laminated photo guide of critical habitat designations
- Canoes with two paddles
- Aqua View tube (one per team of four)
- Clip board, plastic bag, pencil and lab sheet (one per team of two)
- Camera (one per team of four)
- Proper fitting life jackets and keep it on for the entire activity

Directions- After getting the equipment:

- Assemble on dock for canoe assignment and instruction
- Pair up in canoes and follow map and canoe to the marker buoys
- Survey each Critical Habitat area to determine type
- Take a photo of each area and marker buoy
- Mark lab sheet with types of critical habitat (some have multiple types)
- Paddle to other selected areas and repeat tasks
- Return to canoe dock when complete
- Clean out canoe and return equipment
- Clean and dry Aqua View Tube and other equipment
- Fill in lab sheets and check for completeness and sign your names
- Turn in lab sheet, map, camera and other supplies

Describe your contributions to your groups work?(This may be used after the field trip by the instructor) (5 pts)_____

Short Essay Questions:

1. How did this activity impact you and your attitude toward how you will use the lakes in the future? (5 pts)_____

2. Your thoughts on why critical habitat designations are “Critical”? (5 pts)_____

**OUTDOOR CRITICAL HABITAT
SELECTION ANALYSIS MODULE LAB**

Directions:

Paddle to critical habitat area, look on and into the water between the marker buoys using the Aqua View Tube for different types of habitat. For each site, select the proper description options (A,B,C,D) and mark in the ID space. (there can be more than one). Take a picture of each of your sites.

<u>CRITICAL HABITAT DESIGNATION DISCRIPTIONS</u>	<u>SITE NUMBER</u>	<u>ID</u>
(Use the laminated photo sheet for examples)		
A) Submerged Aquatic Vegetation (under water vegetation)	Bony #1	_____ (5 pts)_____
B) Emergent and Floating Vegetation (vegetation that is growing through the surface or floating)	Bony #2	_____ (5 pts)_____
C) Rush Beds (reed or grass like growing up from bottom usually clusters of brown spikelets)	Bony #3	_____ (5pts)_____
D) Woody Habitat (Fishsticks, submerged trees)	Bony #4	_____ (5pts)_____

Name the Creatures who Depend on Critical Habitat:

List the Names of 2; Mammals, Amphibians, Insects, Fish, Reptile or Birds that would be found in each of the 4 Critical Habitat Types: (Do not use more that once)

Critical Habitat Description Types (listed above)

<u>C H TYPE:</u>	<u>Creatures Listed</u>	
A.		(5 pts)_____
B.		(5 pts)_____
C.		(5 pts)_____
D.		(5 pts)_____

TOTAL CRITAL HABITAT POINTS (55 pts)_____

<u>WATER QUALITY FACTORS</u>			
FACTOR	DEFINITION	IMPORTANCE	ACCEPTABLE
Turbidity	Water clarity soil/algae/plankton/ Microbes	Affects water temperature/ oxygen/photosynthesis/ clog fish gills/spawning	50 NTU
Dissolved Oxygen	Oxygen in water More in cold, shade, Running water	For fish to breathe	4-5 mg/L
Phosphorus Phosphate	Plant growth fertilizer, animal Wastes	Cause eutrophication and fish kills	Less than .1 mg/L
Acidity	pH 1-6 range 7-neutral-water	Affects oxygen use by organisms	5.5- 7.5- most fish 6.5- 8.2- optimal
Alkalinity (Base)	pH 8-14 range 7-neutral-water In rocks/soils	Buffers (neutralizes) acids	100-200 mg/l- best
Nitrate	In fertilizers Septic systems	Cause eutrophication fish kills	Unpolluted water < 1 mg/L
Temperature	Certain species can't tolerate warm water		Most fish: 35-65 degrees F

pH Color Code



EFFECTS OF ACIDITY ON FISH SPECIES (Olszyk 1980)	
pH	Effects
6.5	Walleye spawning inhibited
5.8	Lake trout spawning inhibited
5.5	Smallmouth bass disappear
5.2	Walleye, burbot, lake trout disappear
5.0	Spawning inhibited in many fish
4.7	Northern pike, white sucker, brown bullhead, pumpkinseed, sunfish and rock bass disappear
4.5	Perch spawning inhibited
3.5	Perch disappear
3.0	Toxic to all fish

OUTDOOR WATER QUALITY MODULE LAB

Team Members:

Materials: Get the following materials from your instructor before you get on the pontoon boat and return in good order when the lab is completed:

- Proper fitting life preserver
- This lab/pencil/clip board/camera
- Oxygen/temperature meter
- Secchi disc
- Ph paper
- Cup to collect water sample
- Aquatic Chemical Factors Sheet

Directions: *Keep the life preserver on at all times when aboard the boat/canoe and keep close to your partner! Stay seated anytime the boat is moving and always in the canoe!* Use the above equipment to gather data as directed by your instructor and as you learned during the indoor session.

Use the meter to determine the temperature and dissolved oxygen at 5 foot increments:

Oxygen (10 pts) _____
Surface 5 ft. 10ft. 15ft. 20ft. 25ft. 30ft. 35ft. 40ft. 45ft. bottom

Temperature (10 pts) _____
Surface 5 ft. 10ft. 15ft. 20ft. 25ft. 30ft. 35ft. 40ft. 45ft. bottom

Acidity/Alkalinity: take a small sample of water in your cup and test with pH paper
What was the pH? _____ (5 pts) _____

Is it an acidic/alkaline/neutral? _____ (5 pts) _____

Turbidity/clarity: Use the secci disc to determine turbidity/clarity (how clear the water is): Holding on to the cord, drop the disc into the water on the shady side of the boat until you can not see the secci disc. Retrieve the disc and determine how many feet down it was. *Be sure to not lose the disc!*

What was the water clarity in feet? _____ (10 pts) _____

TOTAL WATER QUALITY PIONTS (40 pts) _____

1. Provided other factors are okay, what do you think of the water quality of this lake?

OUTDOOR AQUATIC PLANT MODULE LAB

Team Members:

Materials: Get the following materials from your instructor/assistant:

- Clip board/pencil
- Resource book *Through the Looking Glass* and *Lake Plants You Should Know*

Directions:

1. Take one of the sample plants from the “bucket” or raked from the shore as requested by the instructor/assistant
2. Look at samples and through the resource books and identify the plant
3. Also tell what type of plant you have (emergent (E)/ free floating (FF)/ submersed (S)/ floating leaf (FL) and if native (N) or invasive (I)
4. Identify your plant and show it to your instructor/assistant. You will receive a “sticker” for your name tag/lab if correct.
5. Return the plant to the “alternate bucket” and select the next plant until you have completed all the samples/as many as time will permit.
6. If you correctly identify 8 plants the instructor may ask you to collect and identify a plant/s from the lake with the rake.

SAMPLE	PLANT NAME (From Text)	TYPE (E/FF/S/FL)	NATIVE/INVASIVE (N/I)	(pts)
1.	_____	_____	_____	(5 pts)
2.	_____	_____	_____	(5 pts)
3.	_____	_____	_____	(5 pts)
4.	_____	_____	_____	(5 pts)
5.	_____	_____	_____	(5 pts)
6.	_____	_____	_____	(5 pts)
7.	_____	_____	_____	(5 pts)
8.	_____	_____	_____	(5 pts)
9.	_____	_____	_____	(5 pts)
10.	_____	_____	_____	(5 pts)
TOTAL AQUATIC PLANTS POINTS (50 pts)				_____

Assessment: Write below or on back what you think the major problems are with an invasive aquatic plant species and how we can prevent their spreading to other lakes. Explain what YOU can do to prevent the spread of aquatic invasive species.

PLANKTON MODULE, Fall field trip

Date:

Team Members

Background: *Plankton* are minute aquatic organisms that drift with water movements.

Phytoplankton (plants) comprise mainly **green algae** and **diatoms**, carry out photosynthesis (“primary producers”) and form the base of aquatic food-chains.

Zooplankton (animals) feed on phytoplankton and include small microcrustaceans (**Copepods and Daphnia**) and protozoans (one celled animals). These are barely visible with the naked eye but seen better with the magnifying lens and “dissecting” stereo microscope with low power objective.

Materials:

1. Plankton net (one per two person mini-team, as soon as you empty collection vial, give net to other team member)- rinse clean and share
2. Clear plastic glass, plastic bulb pipettes, microscope slides (one plain with cover slip, one with central depression but no coverslip}.

Directions:

1. Collect plankton while on pontoon: Straighten the net out and tightly attach the collection bottle at the end of the net. The net is expensive, so attach the lanyard loop to wrist.
 2. Place the net in the water at side of pontoon, drag under the surface of the water toward and around front end and back other side.
 3. Remove net from the water. You should be able to see minute living things in the collection bottle with the magnifying glass. If none present, collect again without emptying collection bottle.
 4. When some visible particles are present, carefully remove the collection bottle and our bottle contents into separate covered container.
 5. Rinse collection bottle and give to next teamAt shorelend plankton station, use plastic pipette, to transfer a drop of sample to depression on slide. Observe with dissection microscope, low power. Look for large **copepods** and possibly **Daphnia**
 6. Place another small drop on plain flat slide, cover with cover sip, examine through the other microscopes, observe **algae** and **diatoms**.
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After each of your identifications, get confirmation from teacher

	Teacher Initials	Points
1. Safely, cooperatively helped collect plankton off pontoon with net (5 pt)	_____	_____
2. At microscope identify a COPEPOD and DAPHNIA (zooplankton) .		
___ Copepod (10 pt)	_____	_____
___ Daphnia or other “water flea” (10 pt)	_____	_____
3. Identify ALGAE , tiny light <i>green</i> particles with microscope, phytoplankton (10 pt)		
___None ___Few ___Many	_____	_____
4. Identify DIATOMS , tiny geometric shaped algae, phytoplankton(10 pt)	_____	_____
___None ___Few ___Many		

Comments?

TOTAL PLANKTON MODULE POINTS (45 maximum) _____