

Field Surveys of the Water Way

*This is lesson #2 in a series of 3 lessons developed by 1000 Herons 501(c)(3)
and adapted for use with the Maine heron tracking project.*

Overview

We all rely on the productivity of ecosystems. Modern life in the United States fools us into believing we are not connected to the air, soil, fungi, water, plants and animals (let alone all the people) around us. In urban environments natural or wild places are few and far between. In rural America open space is more common, but most habitats are managed to some extent. Here learners will begin exploring and naming natural features near their school or home. We have two goals 1) to become familiar with the ecosystem of the water body that was mapped during the last exercise, and 2) identify the location(s) most often used by herons.

Grades

3-12th

Objectives

Learners will:

- Use a map to navigate a natural area
- Identify different types of substrate
- Measure water temperature
- Describe water color, turbidity, waves
- Identify plants
- Identify birds
- Keep records

Materials

Plant flash cards (1 per student or pair)
Bird flash cards (1 per student or pair)
Binoculars (1 per student or as budget allows)
Map of area (1 per student)
Plant field guide (1 per student, grade appropriate)
Bird field guide (1 per student, grade appropriate)
Thermometer (combined for air and water or one each)
Anemometer
Compass

Group size

In class or home, students can learn plants and birds alone or with a partner with their flash cards. In the field, the leader should guide the entire class so long as it is not larger than 12 people. Larger groups in the field should have 2 or more leaders. When making unsupervised observations at the water body, students in the field should always, at a minimum, be in pairs.

Background

We are surrounded by life. Even in urban environments birds, mice and rats are common. With patience, a careful and calm observer can discover many things that the majority of people ignore. The first step in this process is the ability to name things. Ours surroundings exist in many forms. Water can

be clear, turbid, greenish, and rough. We walk on rocks, cobble, gravel, sand or mud. Likewise, plants can be non-vascular, vascular, non-flowering, flowering, etc. Birds, as well, come in many forms. Our goal is to trap a great blue heron and fit it with a GPS/GSM transmitter. But as we do this, we must be able to speak to others about the area in which we are working. Herons live in the same environment we do (although we occupy different habitats). So our knowledge of them requires us to learn about the habitats they use. Here we will begin that process.

Activities

In class or home

1. Begin by flipping through the flash cards to see the plant names and appearances. Take the flash cards three at a time. Look at each picture and guess the name. Repeat this until you can identify the first three plants on the cards three times without making a mistake.
2. Move on to the next 3 plants. Repeat.
3. As you learn more plants, quiz yourself on all the plants you have learned. Have your parents and friends quiz you until you know all the plant names.
4. Repeat the procedure with the bird flash cards.
5. During your free time, flip through the plant and bird field guides.

In the field

1. Take a map of the area (use the map made in the previous exercise, or use a map provided or use a smart phone app).
2. As you approach the pond look to see if a heron (s) is (are) present. If so, record its (their) location before it (they) flies away.
3. Begin by recording start time, date, and sheet number (for studies that repeat visits to the water body), and people present.
4. Take a leaf or tiny piece of paper.
5. Drop it and record the wind direction with your compass. Record the direction **from which** the wind is blowing.
6. Point the anemometer in that direction and record the high and low readings. Average these to get wind speed.
7. Determine % clouds (100%= no breaks in the clouds; totally cloudy). Ask 5 students to estimate this number and keep it in their heads without blurting it out. Once everyone has a number, write these down and average them for % clouds.
8. Hold the thermometer in the shade and measure air temperature.
9. Measure the water temperature at the shoreline in 3 places. Average these for water temp.
10. Describe the water. Is it clear (can you see the bottom?) or turbid (you can't see the bottom)? Does the water have a color (brown, green, milky)? Are there any waves? If so, estimate their height. Record this information.
11. Next, walk along the shoreline, if you can, and observe the substrate found in shallow water. It will vary from solid rock to boulders, cobble, gravel, sand, silt, or clay (or a mixture of these) (Figure 1). The bottom may have growing plants or plant debris. Record and map what you see.

TABLE 3.3 The classification of mineral substrates by particle size, according to the Wentworth Scale (After Cummins, 1962; Minshall, 1984)

<i>Size Category</i>	<i>Particle Diameter (range in mm)</i>	<i>Phi (φ) Value (-log₂ smallest diameter)</i>
Boulder	> 256	≤ -8
Cobble		
Large	128-256	-7
Small	64-128	-6
Pebble		
Large	32-64	-5
Small	16-32	-4
Gravel		
Coarse	8-16	-3
Medium	4-8	-2
Fine	2-4	-1
Sand		
Very coarse	1-2	0
Coarse	0.5-1	1
Medium	0.25-0.5	2
Fine	0.125-0.25	3
Very fine	0.063-0.125	4
Silt	< 0.063	≥ 5

Figure 1. Wentworth scale for particle size classification

12. It is beyond the scope of this exercise to measure the particle size of the various substrates you encounter, but this scale is the accepted standard.
13. Draw the substrates on your map until you have walked the entire study area.
14. As you walk opportunistically observe and identify the birds you see around you. Record where you see these birds on your map.
15. Do the same for the plants.
16. Before departing, record the departure time.

Recording data independently

1. Whenever a leader or student passes by the water way, record the date, time of day, people in your group, heron(s) present or absent. If a heron is not present, it is important to write this down. A blank page is a lack of information. If no heron is present write "no heron present."
2. You may sit quietly 100 m or more from the water body and make observations (taking notes on the map or in your field notebook).
3. If a heron lands while you are there record its arrival time and location on the map, and the direction from which it came. You can use lines with arrows (for flights) and dots (for locations). If it departs, record its departure time, where it was in the water body when it departed, and its direction. Write next to the lines or dots.
4. Describe what the heron does while you watch it? What is its posture (neck extended or retracted)? Is it walking? Running? Striking at prey? If it strikes at prey, is it successful? How large are its food items relative to the length of its bill (full bill length, 1/2 bill length, 1/3 bill length? Too small to see? Can you tell if the bird swallows its prey? If so, how? Does the heron chase other birds away? Does it get chased by another bird?
5. You may sit as long as you like, but be sure to record your departure time.
6. Be sure to take the map back to your leader to keep on file in class.

As a class

1. Compile all the heron locations onto a master map. Where do heron(s) spend most of their time?