Assignment 4

The exercises for Weeks 7 and 8 cover the essential skills: (1) wildlife (mammal) surveys and observation, (2) stream measurements for fish habitat, (3) fish inventory, and (4) fish identification. These exercises are presented below by week. All of the exercises are mandatory to fulfill the requirements of certification for the Environmental Field Skills program.

In the interest of time, and to avoid spending too much time traveling rather than doing the activities, the activities described below are best done in the same general area and in one trip if you can make that work. The time spent in the field is not onerous as there is some work to be done at home as well as part of these activities.

Wildlife Surveys and Observations, and Stream Measurements for Fish Habitat

Wildlife (mammal) Surveys and Observation

Field Work:

The wildlife observation field activities are comprised of two short exercises: a non-linear transect and a block survey. These are best done when wildlife is active, which is early morning or in the hours before sunset. If you have the time to do these then, rather than mid-day, you will likely see more.

(1) Non-linear Transect

Select a nearby trail; if you do not have one easily available old little-used roads or abandoned railway lines are also excellent. You'll be going for a slow walk looking for wildlife and sign. At the start of the walk on the trail, record the time and, if you have a GPS, the coordinates of your starting point. Slowly walk along the trail looking for live animals (birds, squirrels, mice, etc.) as well as sign (tracks, scat, cavities, nests, etc.). Walk at least 30 minutes, slowly, continually looking around. Stop often and listen. Record all wildlife or sign you see and photograph sign. At the end of the non-linear transect, record the time and estimate distance walked. Record location if you have a GPS with you. If you can, start or end at a prominent landmark (e.g., parking lot; bridge over a stream) so another person would know where you started or ended.

Enhancing our observation skills is critical in all environmental work, and so also with wildlife study. To practice enhancing these skills to notice things, during either this non-linear transect, at the end of the following block survey, or the walk back to your car, select an item to sketch in your notebook – a leaf, a branch, track, bone, … something that catches your eye. Spend five minutes drawing it in your notebook. Really look deeply and carefully at it. Note shape, color, imperfections. Create a detailed drawing of that object to the best of your ability.

Once you have walked trail and ended your transect, complete a block survey (below).

(2) Block Survey

At the end of your transect, walk a short distance (20–50 m) into the forest. Find a comfortable place to sit quietly. Set the timer on your phone to sit quietly for at least 30 minutes. Sit and watch and listen. Do any squirrels or birds come around to check you out? While sitting there, observe your surroundings. Are there any nests or cavities? Unusual marks on trees? Use all of your senses to watch, listen, and smell what's occurring around you as you sit for 30 minutes or more. After half an hour, quietly leave the forest and return to your car.

Advanced Block Survey (optional)

To be most effective, block surveys are conducted when the animals are most active (that is, at dawn and dusk). If you want to conduct a better block survey, go to a local area with long and clear sightlines (e.g., overlooking a farmer's field, a lakeshore or river's edge, a meadow or clearcut) either in the final hour of daylight at end of day or for

the first hour after sunrise. Sit motionless with binoculars for an hour or so and watch the edges between forest and opening. Record location, start and end time, and any observations.

Stream Measurements for Fish Habitat

Not all students may have access to streams with running water as they may live in an arid environment, such as the Southwest or areas without nearby flowing water. Therefore, dependent upon the nature of the channels in the area you live, you'll be doing a field exercise either in a wetted channel (one with water flowing in it) or a dry channel (lacking water). The exercises are described below for each of these situations.

Field Work:

Prior to going into the field, create the following table in your field notebook. You will be filling this out as you complete the stream measurements.

Data Table 1: Data from stream measurement exercise

Stream Name	
The channel is: (circle the appropriate answer)	Wetted (water in it) Dry (no water in it)
Site Location	
Site Length	
Bankfull width	
Wetted width	
Stream gradient (%)	
Substrate	
% fines	
% gravel	
% cobble	
% boulder	
% bedrock	
Total area of site	
Area of each habitat type	
Pool	
Riffle	
Glide (run)	
Pool:riffle ratio (if applicable)	

Riparian Habitat (describe): _____
_____
_____
_____
_____

Wetted Channel

Go to a local small stream or brook near your area. Even if the stream is only half a meter wide, that's okay. Even a ditch with water flowing in it will be useful. We're just looking for a channel with water.

Once you get to your stream, if you can, walk on one side of the stream along the bank for a hundred meters or so, just looking and observing the channel. This will give you a sense of the stream before we focus in on specific areas. Does the stream change? Is it similar throughout the 100 meters? Does it meander? Is it straight? Are there multiple habitat types or is it all one? Are there debris jams? bridges? culverts? etc. The idea is to do a reconnaissance of a larger area to get a 'flavor' of the stream before focusing down on location. If you feel it's appropriate, draw a quick sketch map of the 100-m section that you walked (note, this is optional, not required).

Within that 100 metres, select, if available, a short site that has a few habitat types: the pool, the riffle, and the glide. If your entire stream is one habitat type, that's okay and we can still do the work with that. We are looking to choose a length of stream (called the 'site') in which to do our focused work.

Estimate the bankfull width of the channel at the point you're at and record in your notes. Now multiply that number by 10. That will be your site length. For example, if my channel is 3 m bankfull width, my site would be 30 m long. Ideally this site length will include multiple habitat types (pools, riffles, glides); even if it's all one type (e.g., glide), that's okay.

- Start by drawing a sketch map of the site. Draw the channel banks and habitat units (if you have more than one habitat unit in your site) to scale as best you can. Once you have this base map, add the following information to it:
  - ◊ Estimate the length and width of each habitat unit and include these dimensions on the map for each unit
  - ◊ Estimate the wetted width of the channel. Is wetted width equal to bankfull width or is it less?
- Using your clinometer, determine the gradient (slope) of the stream. To measure a slope gradient of a stream, the observer stands straight up with their foot right at the water surface and they shoot on their partner, at the appropriate level to be their eye height above the ground (as emphasized in Week 4). The partner is also standing with their feet right at the water surface. This ensures that you're measuring the gradient of the water surface. It's critical that each observer be standing with their feet at the water surface. If you're working by yourself, hang a piece of masking tape or something you'll be able to see on a branch at your eye level to replace your partner, then walk a ways upstream or downstream and shoot on the object you left at eye level. This will give you the gradient of the stream.
- Describe the stream bottom (what we call the 'substrate'). Is it 'fines' of sands, silts, and clays? Is it primarily gravel? Is it boulder? We can use the following guidelines to determine size of material on the streambed.

Particle	Size range	Examples
Fines (clay, silt and sand)	Sand size and smaller	
Gravel	Larger than sand but smaller than your fist	
Cobble	Larger than your fist but smaller than your head	
Boulder	Larger than your head but smaller than a VW bug (beetle)	
Bedrock	Larger than a VW bug (beetle)	

- From this table, can you estimate the percentage of: (1) fines, (2) gravel, (3) cobble, (4) boulder, and (5) bedrock in the streambed of your site? To do this, visually estimate the percentage of the streambed composed of each of these classes. They must add up to 100%. Not all size classes may be present. For example, your site may not have boulder or bedrock, in which case the fines, gravel, and cobble together must add up to 100%. Estimate this and record in Data Table 1.
- Photograph your site. Standard site photographs in stream work are four per site. From the middle of the site, photograph upstream, downstream, left bank, and right bank.

Dry Channel

If you live in an arid environment without available running water easily available to you, by using a dry ditch or a wash we can still collect much of the same information, even in the absence of water. With a dry ditch collect the following information using the methods described above:

- Site length
- Bankfull width
- Riparian habitat
- Channel gradient
- Substrate composition (% fines, gravel, cobble, boulder, bedrock)
- Total area of site
- Photograph site

Riparian documentation (to be recorded freeform at bottom of Data Table 1)

The riparian condition alongside a waterway (stream, lake, pond, ocean) is very important as the forest is tightly coupled to the water itself. Repeat your walk along the stream edge that you did previously, this time paying attention to the vegetation. This is to be done whether the channel or waterway contains water or is dry. This time walk the length very slowly, paying attention to the vegetation (species, height, age, condition) You can go farther than the original 100 m if you feel inclined and make this transect as long as you like.

As you survey the riparian area, describe the vegetation. What are the dominant tree and shrub species? Does it appear to be a young forest or is it mature or old? Is it continuous or broken up and fragmented by properties intruding into it with lawns and cleared ground. Is the stream shaded by a riparian forest or flow through an untreed field or pasture? (this is important as it affects water temperature which in turn affects water quality). Take note of all that you think important as you will be describing it as part of the assignment. Photograph the area to serve as reminder for yourself when you are later describing it.

Office Work:

Once back at your home:

- Calculate area of each habitat unit and the total area of the site. Include these in Data Table 1. These areas are calculated simply by multiplying your estimated widths and lengths for each habitat unit and for the entire site. These are data that were to be recorded in the data table (site length and bankfull width) and on your map (length and width of each individual habitat unit).
- Calculate the pool:riffle ratio and include this in Data Table 1. This is calculated by dividing the total area of pools in your site by the total area of riffles.

Fish Inventory and Fish Identification

Fish Inventory

Fish capture methods and fish habitat assessments go hand in hand. You have completed stream measurements and identified different fish habitats (pool, riffle, glide) in a nearby stream. In order to link fish capture methods with your local conditions, we'll consider methods with respect to the stream you worked on. You may do this from memory, notes and photographs, or you may want to return to the stream and think about the sampling methods there.

From the methods presented during the online training, or your knowledge of local methods outside of those introduced, select four different sampling methods that you think might work in your stream. Ideally, two of these methods will be active methods and two will be passive. If your channel was dry last week, select a new waterbody (stream, lake, pond) that contains water to complete this exercise.

- On a piece of paper, not in your field notebook as this is not a field activity, briefly explain why you chose those particular methods for your stream.
- On your site sketch, mark in pencil where you would use these gear. If your previous sketch wasn't large enough to do this, create a new sketch to show where you would place the gear.

Fish Identification

Knowing what species of fish are in the area that you're working is the first step in fish identification. You want to know what your list of candidate species is before you collect fish so that you're not identifying something that doesn't live in your area. To meet this requirement, this assignment is to create a list of fish species within your state. Most state governments have publications online about identifying the common species encountered and that's a great place to start. But try to delve deeper and search for a complete species list of fish for your area. Then write out that list, grouping the fish together as best you can. For example, keep the trout together, the minnows together, suckers together, etc.

Select three species from your list and draw a sketch of each one. Pay attention to how many fins there are, where the fins are placed and how large they are, the depth of the body, shape of the lateral line (if present), and direction of the mouth (upward? downward? straight out in front?). This exercise is a practice in your observation skills, to really pay attention to these features among three species of fish. Do this on a regular-sized sheet of paper and fit all three species on a single page to be able to compare them. Label the relevant parts of the drawings that separate the species from each other

Information to be Submitted to NRTG

In this assignment we have brought back some of the skills introduced in previous weeks, such as plant identification, creating sketch maps, and drawing. This reinforces that as we move forward we continue using skills we have previously learned. The submission requirements for these exercises are photographs of your data tables, sketch map, and freeform written descriptions. **Do not submit more than is requested (that is, do not submit anything not explicitly requested below).**

When submitting photographs of field notes, please attach all photographs to a single email. Multiple emails risk being lost in the large number of emails we receive and so ensure all of your submission is attached to a single email.

Specifically, the submission requirements for the assignment of Weeks 7 and 8 are:

- Wildlife Survey and Observation
  - ◊ Non-linear transect and block survey
    - » Photographs of wildlife or sign
    - » Detailed drawing from notebook

- Stream measurements
  - ◊ Data Table 1 (including freeform description of riparian condition)
  - ◊ Sketch map of site you are doing focussed work

- Fish Inventory
  - ◊ Sheet explaining why you have chosen the four methods you have
  - ◊ Location of gear placement on site sketch map

- Fish Identification
  - ◊ List of species in your state or region
  - ◊ Drawing of three different fish species on single page with relevant features labelled.