

Data collection protocol for GEOG 640, La Jolla Valley, 2 November 2012

In camp, measure and record each person's height in cm to their eyes (we'll sight on one another's eyes with the clinometer and need to factor in variations in our heights). We'll also prepare the GPS units and make sure we have batteries in our field gear: Setup Menu Units should be metric (elevation), Map Datum should be WGS 84, and Position Format should be the default degrees with decimal minutes (e.g., 34° 15.0456').

In the field, we'll navigate to the appropriate boundaries. We'll make sure all GPS units have captured satellites. At a chosen site, we'll identify the center of the transition zone (which is often, but not always, lined by 1-2 m of bare ground). From there, we'll lay out the transect tape. One end goes 10 m into the grassland; the other goes 10 m into the CSS (this may be an unpleasant bit of clambering around), making sure we're crossing the transition zone at right angles. The grassland end will be our origin for all transects (point 0 m), and all transects will end in CSS at 20 m.

The two people on either end of the tape should pull it taut until it forms as straight a line as possible (this may take some help from the rest of us). One person will stay in the transition zone with the clipboard and data entry form, so that they can hear data readings called out from either end of the transect. Photographs should be made of the transect vegetation and the surrounding landscape.

The people on either end will have a GPS unit and a clinometer. They should systematically record and label the latitude, longitude, and elevation of their end's position. Take 3 readings. Then, they should each do the slope using the clinometer. Holding it horizontal so the bubble hits the neutral point, look through the eyepiece and sight on the other person's eyes and note the angle in degrees from horizontal and then call the reading to the data recorder. Now, turning the clinometer on its side, align it with magnetic north and then look through the eyepiece to get the azimuth of the transect tape (we'll correct for magnetic declination in the lab).

Now, the rest of the team brings the 1 m quadrat frame to the origin and centers it on the 0 m end of the tape. Identify every species inside the frame and its % coverage of the frame "real estate," using round multiples of 5% except when it's one vertical stalk, when it's okay to use 1% or <1%. Also, estimate the % cover of bare ground and of dead and downed litter, as though these coverages were "species" in their own right. Call these down to the data recorder as you go. When you're done, the data recorder should sum all the coverages and make sure they add to 100%. If not, the data recorder will let you know they don't add up, and then you adjust your estimates until the recorder reports that the sum does equal 100%.

We are trying to get "airplane" visible coverage. A plot complication: the CSS may have different layers. If a forb or grass species is found under shrub cover but is not visible from above, please note its existence and then write "under canopy" instead of a coverage percentage.

Another plot complication is being unable to identify a plant. If that happens, note it as "Unknown #1" or "Unknown #2" (numbers are in sequence for a particular transect, with a new sequence starting for each transect). Then, take a small, representative sample of the plant, enough to show leaf arrangement, branching habit, and flowers or seeds, if present. Take a picture. Put the sample into a baggie and then label the bag with its "name" ("Unknown #1") and the transect name and the location along the transect, e.g., "Unknown #2, Transect 640-02-R, 15 m," for Mystery Critter # 2 on the second GEOG 640 transect, taken along a recovering boundary, in the 15 m quadrat"). The owner of the camera and photo number should be put on the label, too.

Now the biodiversity work is done, the soil people get to work. First, examine the ground surface, looking for bioturbation (disturbance by burrowing animals). If you see it (likelier in grassland), call it out to the data recorder.

Second, collect 3 soil compaction readings. I would like one person to handle all penetrometer readings on all transects, so that there is no variation in the readings because of different “personal styles.” Select 3 spots roughly in the middle of the quadrat frame, about 1 foot apart or so, depending on what the situation there is. This can get pretty nasty under the canopy, getting under there, resetting the penetrometer ring, and then slowly depressing its tip into the soil until the soil level matches the notch etched around the tip (it can be hard to see from whatever athletic yoga position you have to manage under there). Call out your readings to the data recorder as you go (“third reading at the 10 m quadrat is 1.5”).

Third, do the pH reading from somewhere in the middle of the quadrat. The Kelway is going to be our main bottleneck. The soil has to be trowelled (or even augured) loose down to about 10 cm/4”. Then, wipe the Kelway’s two plates clean with towels and lightly abrade them with the green cleaning sheet. Check that the needle shows 7 (neutral). If so, push it into the soil and pack the soil around it and depress the white button. Within a couple of minutes, it will let us know if there's enough soil moisture for the meter to work. If not, we need to dampen the loose soil lightly with the buffered distilled water and wait about 3-5 minutes for the added moisture to diffuse into the soil. When it's a go, let the button go and watch the needle move erratically until it settles on a reading. This might take as long as 3 minutes. Call the reading down to the data recorder.

Fourth, at 3 points along the transect, we'll also take a small sample of soil for further analysis back on campus (mycorrhizæ? seed bank? nitrogen or carbon:nitrogen ratios? grain size distribution? qualitative texture?). Trowel up some soil from the Kelway hole, including soil put it in a baggie labeled with transect name and location along the transect, call out that you've done so, and then put the baggie in the dirt bucket.

While the Kelway is being used, the team can move the quadrat frame 5 m up the tape, centering it at the 5 m mark on the tape, and repeat the whole process and wait for the soil people to catch up with you before moving it again.

Each transect, then, will have 5 quadrats, 2 each in the CSS and the grassland and 1 in the transition zone. Before taking down the transect tape and moving to the next site, the data recorder needs to go over the data entry form and make sure that all needed data have been collected and noted on the form and that all quadrat coverages sum to 100%. Better to find and fix mistakes here than find out about them on campus.

I hope we can also work in another little project to help Dr. Laris with his work. He is interested in the width of the transition zone between CSS and grassland and is having his group GPS it by having two students walk along the outermost ends of the transition zone (one on the bare soil/CSS side and one on the bare soil/grass side). We could get him some data from our end of the valley, too. Two people can set their GPS to Track mode and then walk along transitions around our transects.