Biology 3001

Sampling Protocol for Coastal Prairie Community at KNS Rancho Marino

Materials:

- Compass
- 0.25m^2 sampling square
- Flagging to mark plot boundaries
- Meter tape
- Notebook

Instructions: You will be conducting a survey using a systemized random sampling technique frequently used to assess attributes of vegetative communities. Because plants are often distributed in clumps, the systemized approach limits the amount of standard error that can be introduced when sampling is totally randomized within a site.

We are most interested in understanding how invasive plants may be impacting the diversity and abundance of native plants, pollinators, other insects and animals (Correlation) between historically cultivated and uncultivated areas (Causal-comparative). In California grasslands, tilling has been shown to have significant and long-lasting effects on native vegetation (Stromberg and Griffin 1996). For our study at Rancho Marino we will assess the potential effect of previous cultivation on abundance and distribution patterns the following coastal invasive plants: *Phalaris aquatica* (Harding grass), *Avena spp.* (Wild Oats)*, Bromus diandrus* and *Bromus madritensis* (Ripgut Brome and Red Brome)**,** *Lolium multiflorum* (Italian ryegrass), *Erodium spp* (Filarees), *Madia sativa* (coastal tarweed). We will also look at insect and animal diversity and abundance between cultivated and uncultivated sites.

To begin, we will establish 1 macroplot plot in both a previously cultivated site (old field) and not cultivated site by establishing a baseline parallel to the shore, with 5 transects running perpendicular from it. Each transect will have five 0.25m^2 plots for a total of 25 plots per site. Because we are using a systematic random sampling technique, you will use the random number table (provided) to obtain a random starting point for the baseline and transects. Don't panic! Your instructor will show how to use the random number table.

Establishing the macroplot:

1. Mark with flags a 50 meter long baseline parallel to the shoreline. *Note: because we need 25 plots per site these must be divided evenly between the transects. 25 divides nicely into 5. If we have 5 transects along a 50 meter baseline the distance between them is 10 meters.

2. Select a random number between 0 and 9 from your handy random number table.

3. Whatever number is selected is your starting point, and you will mark 5 transects off the baseline at this distance, every 10 meters. For example if you ended up on 6, you will mark the starting point along the baseline at 6 meters with subsequent transects starting at 16m (10 + 6), 26m (20 +6), 36m (30 +6)…..etc.

4. Each transect should be 50 meters in length. Walk 50 meters straight perpendicular to the baseline. Use your compass to ensure a straight line and make sure you are 10 meters away from the transect behind and in front of you (check frequently).

5. Now select a random number between 0 and 9 for each *transect*. Remember you want to establish 5 plots in each of your 5 transects. If each transect is 50 meters in length, your starting increments again will be every 10 meters. So if the number selected is 4, your first plot will be at 4 meters on transect #1 and subsequent plots will be at 14m, 24m, etc.

6. Place a flag at each plot location.

Your macroplot is all ready for sampling!

Sampling protocol

Example research questions: How does the density, frequency and cover of the invasive species of interest differ between cultivated and uncultivated sites? Do the invasives seem to influence the overall plant diversity between the cultivated and uncultivated sites? What patterns exist between the cover of invasives and the presence and diversity of pollinators, insects and animals? Is there a detectable difference in this pattern between tilled and untilled sites? Note: these are not hypotheses!

-Possible variables to be measured: Density, Frequency, Cover, Diversity

1. For each point along the transect marked with a flag, place your sampling square directly over the flag- the flag being positioned in the center.

2. Density: count the number of individuals within the square for each species

3. Frequency: does the species occur in the plot? Record yes or no.

4. Cover: what area of the sampling square do you think the species covers? Try to develop consistency between observers to limit bias.

Stromberg, M. R. & Griffin, J. R. (1996) Ecol. Appl. 6**,** 1189-1211.