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Geographic Information Systems & Sociological Geography

Mills College SOC128

Fall 1999 -- Dan Ryan

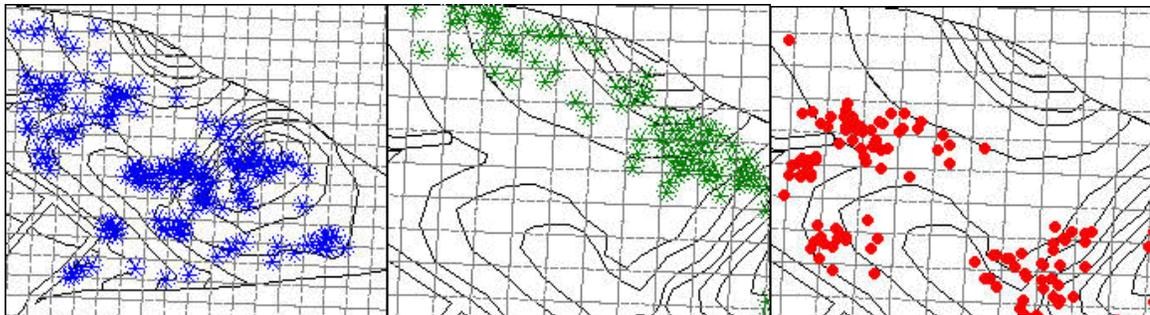
Mapping Environmental Data -- I

Preliminaries

- Copy the F99Ex05 folder to your desktop.
- Open and look at the layers (Species1, Species2, Species3, study_area_100ft_Grid, Mills_area_parcel, Mills_aerial, and buffers) in the folder. They represent hypothetical observational data for three species in the north east corner of the Mills campus.

Table	Contents
Species 1	Simulated observational data for a biological species
Species 2	Simulated observational data for a biological species
Species 3	Simulated observational data for a biological species
Study_area_100ft_Grid	100 foot grid squares covering study area. Each square is labeled with identifier (rows are numbers, columns letters), elevation, area, feet from edge of campus. Empty fields exist for storing species counts, etc.
Mills_area_parcel	Cosmetic layer showing property lines for neighborhoods adjacent to Mills campus
Mills_aerial	A registered aerial photo of the Mills Campus
Buffers	Contour lines showing approximate distance from edge of campus in 100 foot intervals.
Elevations	Contour lines showing approximate elevation above sea level in 20 foot intervals.

- Produce three side by side maps (on a single page) showing one species in each. What general observations about the distributions can you make?



Counting Point Data Into Grid Squares

- Now count the species into the "speciesN_count" columns in the grid table (NOTE: field and table names may vary slightly -- we've updated the files but not always the graphics in these handouts). Use Table > Update Column and tell Mapinfo to update the species1 count in the grid table by counting all of the species1 objects within each grid object. Your specifications will look like this:

Table to Update: Grid_100_ft

Column to Update: species1count

Get Value From Table: species1

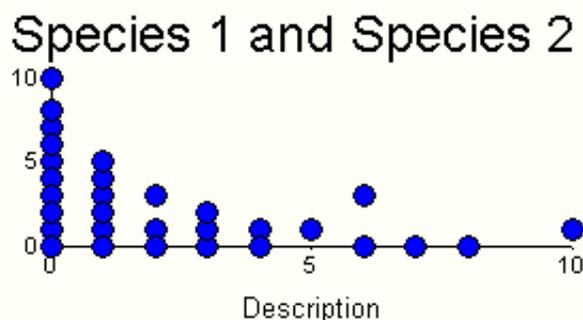
Calculate: Count

where object from table species1
is within object from table Grid_100_ft

- Repeat for species 2 and 3.
- Now experiment with different thematic representations of the spatial distributions of these three species (for example, you might want to make a pie chart map with a different pie slice for each species). **Produce one map you're proud of with proper labels, legends, documentation, etc. to turn in.**

Further Thinking About Spatial Distributions

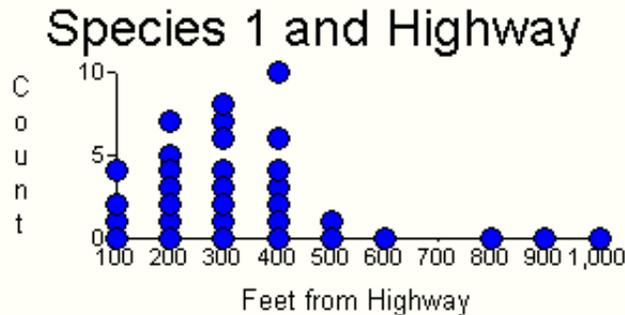
- Use Mapinfo's graphing capability (primitive though it be) to plot the counts of species 1 and 2. **Window > New Graph Window > use layer Grid with columns Species1_count and Species2_count.** The initial graph is nothing like what we want (an X-Y scatterplot) so you'll have to use **Graph > Graph Type > X-Y (also, uncheck "Rotated")**. You should see something like this (don't worry about titles and such for the moment):



- Repeat for Species 2 and 3 and 1 and 3. Comment on what you find. What are some initial ideas

about how these species are spatially related? **Challenge:** Can you make a map that communicates your "conclusion"?

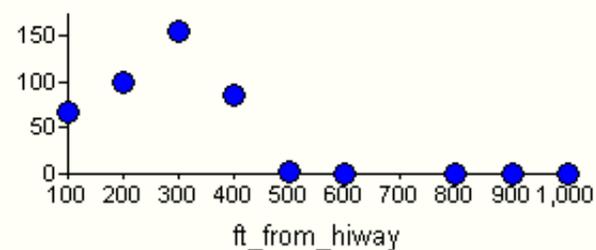
- What about distance from the surrounding roads? I've coded the grid squares with their approximate distance from the roads that border campus (Ft_from_Street). How might we investigate this relationship? It's rather tricky. A first attack might be to plot species counts vs. distance. We'd get something like this:



- This isn't quite right, though. We want to group together all the grid squares of a given distance and count the total number of species one there and then see how that varies. We can tell Mapinfo to do this by doing an SQL select from Grid. Select ft_from_hiway, Sum(species1count) from Grid grouping by ft_from_highway

ft_from_hiway	Sum(species1count)
100	67
200	100
300	155
400	86
500	2
600	0
800	0
900	0
1,000	0

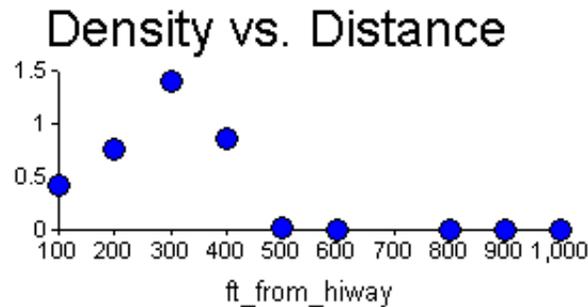
count and ft from highway



- But this doesn't take into account the fact that there may be more land area closer to the highway. What we might need here is a density measure. If we know that all our grid squares are the same size a count would do, but are they? We could divide the total count of the species by the number of grid squares over which they are spread, but instead, we'll need to add up the areas.
- To do this we do an SQL **select Ft_from_Street,sum(species1count), sum(Area_SqFt) from Grid grouping by Ft_from_Street**. This creates a virtual table (stored only in the computer's memory, not on disk) called QueryN (where N is an integer) with one row for each distance from edge of campus (100, 200, 300, etc.) with the total area of grid squares at that distance and total number of species 1 found in them. We then save a copy of this query to disk, close the virtual table it is stored in, and re-open it as a table Query N. These last three steps are necessary so

we can continue to manipulate this table.

- Then we do a SQL select on it selecting `ft_from_hiway, _COL2/_COL3` from Query N table. This produces a table with density measures in it which we can then graph to get something like this:



- This still isn't quite right because we don't know which empty grid squares we should or shouldn't include in our denominator. Should we, for example be counting the grid squares on the other side of 580? How about the grid squares in the middle of our study area that have no species 1 in them? Or the grid squares toward the middle of Mills campus? What would be a good heuristic for determining which grid squares to include in our calculations? When you have decided, you might want to delete the ones you don't want to include from your copy of the grid table and re-do the calculations.
- Once you have decided on an approach, do the appropriate calculations for each of our species.

Can you think of a way to represent this type of information on a map? Or perhaps the thing to do is to include graphs on the layout? Produce one or more graphics to turn in showing map, graphs, explanatory text, etc. evaluating the relative spatial distributions of species 1, 2 and 3. You may want to think of other environmental variables that might be derived from this map (and layers we might acquire and add to it) and assigned to each grid square in order to try to explain the spatial distribution of these three species. Some of these you would have to make up for this exercise but others could be produced as maplayers with a moderate amount of work using the materials available to you.

- Soil
- Steepness of slope
- Directionality of slope (south facing, etc.)
- Ground cover
- Distance from other structures
- Elevation