



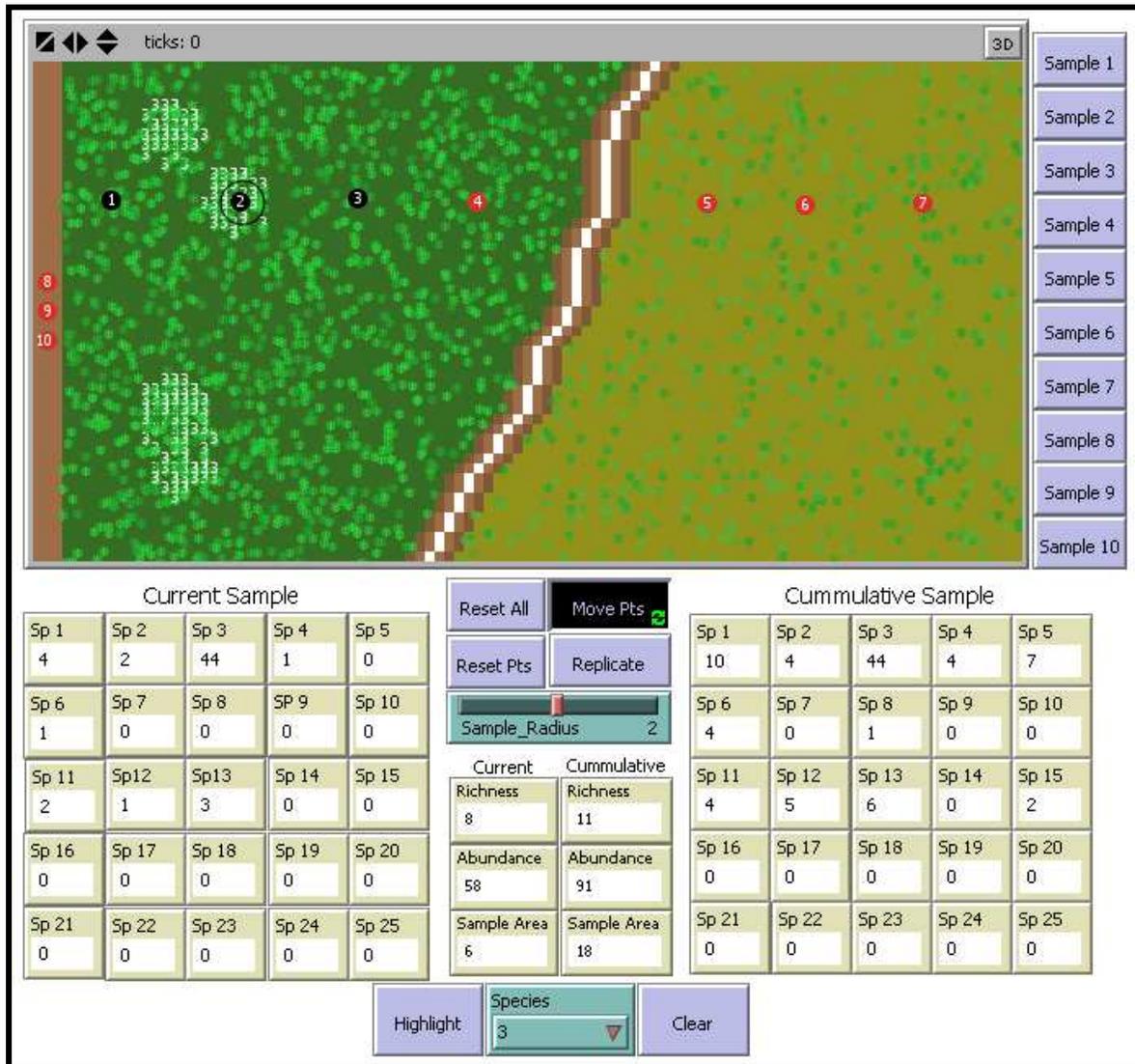
## Model Details

This model simulates plants present in two habitats that are separated into a southeast-facing xeric slope and a northwest-facing mesic slope (Fig. 1). To the left (northwest) of the ridge, the background is green, symbolizing mesic habitat; and to the right (southeast) of the ridge it is a yellow-brown, simulating xeric habitat. There are 25 different plant species in the entire simulation that all appear similar, except for slight differences in color. These species represent wildflowers common to the southern Appalachians, with some being more characteristic of mesic habitat, others more characteristic of xeric, and some which may be found in both. In both habitats some of the species are common while some are rare. Individual species distributions are either clumped or random. The total abundance of plants in the xeric habitat is about half that of the mesic habitat. There are a variety of controls (Table 1) and banks of monitors (Table 1) beside and below the world-view of the habitat to be sampled. Table 3 is a list of all of the plants simulated in the model.

When the model is initially opened, or if 'Reset All' is clicked, ten numbered red circles appear in a side-bar on the left of the world-view (Fig. 1). These red circles are the sampling points. 'Move Pts' should be clicked first, and then the sample points can be placed in the habitat world-view by dragging and dropping with the computer mouse. After all the desired sample points (maximum of ten) are placed in the habitat, then a sample can be obtained from each sample points by clicking the corresponding sample button in the right-most column (Sample 1 - Sample 10). When a sample button is clicked, the corresponding point will turn black and a black ring will appear around it that roughly corresponds to the sampling radius (size set by the 'Sample\_Radius' slider). The count of each species from the current sample point is given in the left-hand bank of monitors. Points which have been sampled will remain black, with the black ring denoting which sample point is being displayed as the current sample. The right-hand bank of 25 monitors displays the cumulative counts of each species among all the points sampled. Between the two main monitor banks are two columns of three monitors that give the species richness, total abundance, and sample area for the current and cumulative samples.

Other features of this model are designed to allow students to experiment with various sampling schemes. The 'Reset Pts.' button puts the sample points back on the side-bar without clearing the cumulative data. This allows further sampling of the current world. The 'Replicate' button leaves the sample points in place, but clears all the data, and resets the distributions of plants in the world. This allows students to quickly replicate sampling schemes for robust comparisons of different communities. Finally, students can check to see where individuals of a species are by choosing a species from the 'Species' drop-down menu and clicking "Highlight". For example, in the world-view of Figure 3, species 3 is highlighted. The sample point 2 is located in the middle of a clump of species 3, and the abundance of species 3 in the 'Current Sample' monitor is correspondingly high. The ability to highlight specific species allows students to see how different sampling schemes might miss entire species.

**Figure 1 :** The user interface of the Estimating Plant Diversity simulation.



**Table 1: Controls for the Estimating Plant Diversity simulation**

Control	Action
Reset All	Clears all reporters, resets/returns sample points, recreates the population
Move Pts	Enables the user to move sample points around the habitat
Reset Pts	Enables points to be re-sampled
Replicate	Enables re-sampling, recreates the population, clears all reporters
Sample_Radius	Adjusts the size of the area that will be sampled around each point
Sample (1-10)	Counts the numbers of each species around the identified point
Highlight	Identifies individual plants with their species number
Species	Drop-down menu to select which species will be highlighted
Clear	Removes all of the identifiers

**Table 2: Reporters for the Estimating Plant Diversity simulation**

Reporter	Description
Current Sample (Sp1-Sp25)	Counts for each species in the highlighted sample
Cumulative Sample (Sp1-Sp25)	Counts for each species in the total sampled area
Current (3 stacked reporters)	Species richness, total abundance, and sampled area for the current sample
Cumulative (3 stacked reporters)	Species richness, total abundance, and sampled area for the cumulative sample

**Table 3: Checklist of plant species in the Estimating Plant Diversity Simulation.**

ID	Species Name	Habitat	Abundance	Distribution
Sp 1	Bloodroot	Mesic	Common	Random
Sp 2	Spring Beauty	Mesic	Common	Random
Sp 3	Jack-in-the-pulpit	Mesic	Common	Clumped
Sp 4	Partridgeberry	Mesic	Common	Random
Sp 5	Dwarf Crested Iris	Mesic	Common	Random
Sp 6	American Gensing	Mesic	Occasional	Random
Sp 7	Showy Orchis	Mesic	Occasional	Clumped
Sp 8	Yellow Trout Lily	Mesic	Occasional	Random
Sp 9	Canada Mayflower	Mesic	Rare	Random
Sp 10	Red Trillium	Mesic	Rare	Clumped
Sp 11	White Wood Aster	Xeric	Common	Random
Sp 12	Pipsissewa	Xeric	Common	Random
Sp 13	Fire Pink	Xeric	Common	Random
Sp 14	Common Cinquefoil	Xeric	Common	Random
Sp 15	Roundleaf Ragwort	Xeric	Common	Random
Sp 16	White Milkweed	Xeric	Occasional	Random
Sp 17	Wild Columbine	Xeric	Occasional	Clumped
Sp 18	Woodland Sunflower	Xeric	Occasional	Clumped
Sp 19	Early Buttercup	Xeric	Rare	Random
Sp 20	Whorled Coreopsis	Xeric	Rare	Clumped
Sp 21	Wild Geranium	Both	Common	Random
Sp 22	Rose Pink	Both	Common	Random
Sp 23	Galax	Both	Occasional	Random
Sp 24	Pink Lady's Slipper	Both	Occasional	Clumped
Sp 25	Maryland Golden Aster	Both	Rare	Random

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