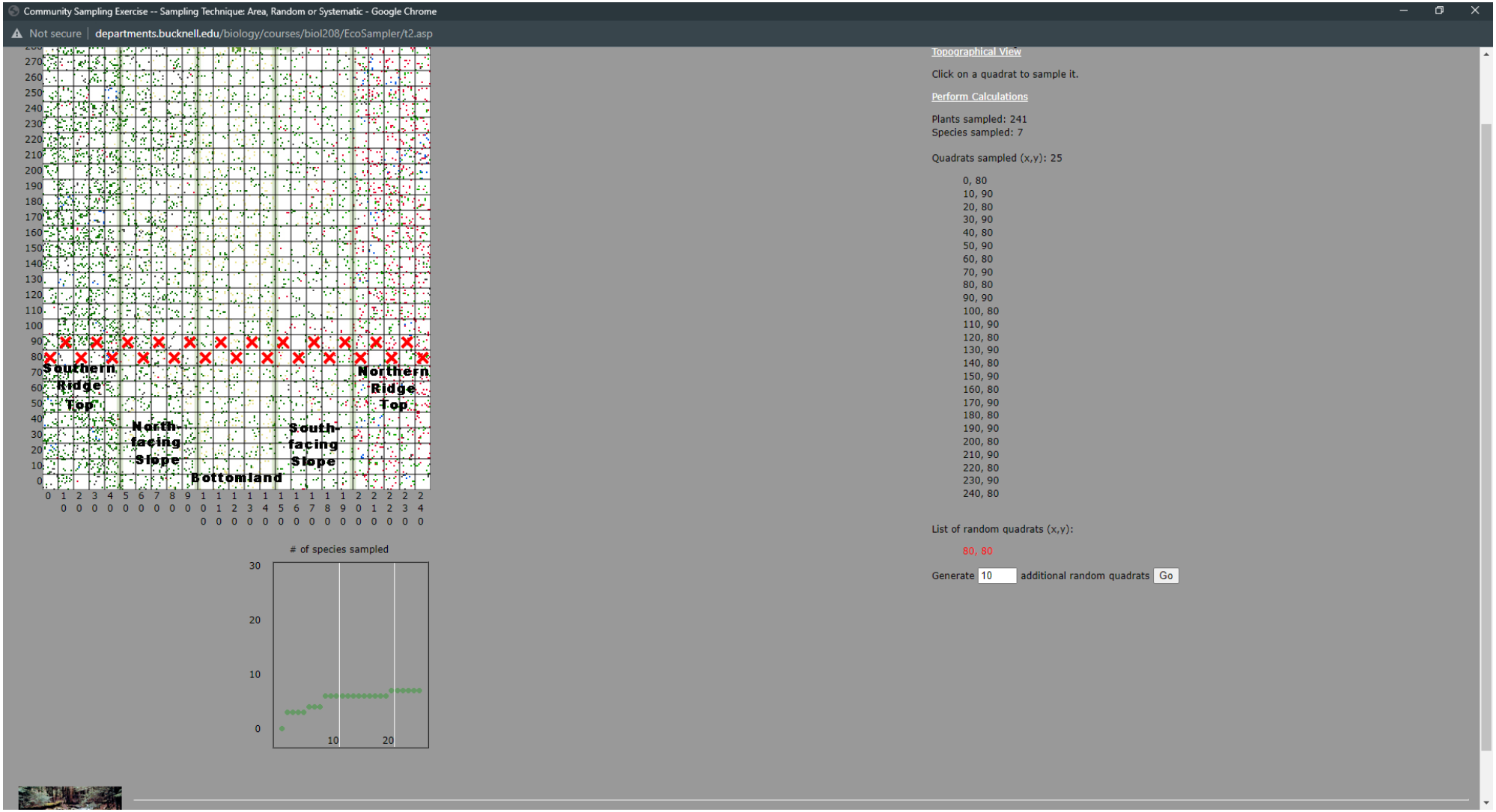
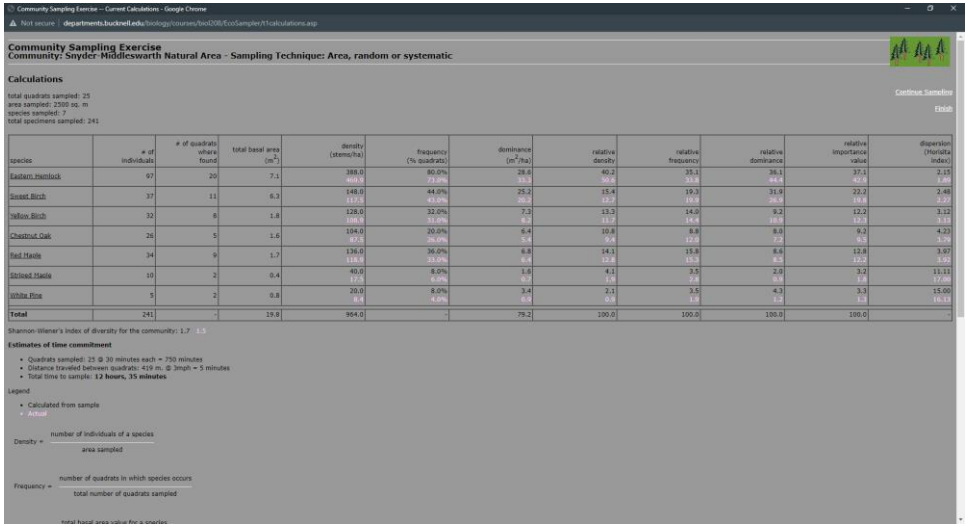
1. Systematic: Sampling along a topographic gradient Results





Community Sampling Exercise -- Current Calculations - Google Chrome

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Community Sampling Exercise
Community: Snyder-Middleswarth Natural Area - Sampling Technique: Area, random or systematic

Calculations

Continue Sampling

Finish

total quadrats sampled: 25
area sampled: 2500 sq. m
species sampled: 7
total specimens sampled: 241

species	# of individuals	# of quadrats where found	total basal area (m^2)	density (stems/ha)	frequency (% quadrats)	dominance (m^2/ha)	relative density	relative frequency	relative dominance	relative importance value	dispersion (Horisita index)
Eastern Hemlock	97	20	7.1	388.0 469.5	80.0% 73.0%	28.6 33.3	40.2 50.6	35.1 33.8	36.1 44.4	37.1 42.8	2.15 1.89
Sweet Birch	37	11	6.3	148.0 117.5	44.0% 43.0%	25.2 20.2	15.4 12.7	19.3 19.8	31.9 26.9	22.2 19.8	2.48 2.27
Yellow Birch	32	8	1.8	128.0 108.9	32.0% 31.0%	7.3 8.2	13.3 11.7	14.0 14.4	9.2 10.8	12.2 12.3	3.12 3.13
Chestnut Oak	26	5	1.6	104.0 87.5	20.0% 26.0%	6.4 5.4	10.8 9.4	8.8 12.0	8.0 7.2	9.2 9.5	4.23 3.79
Red Maple	34	9	1.7	136.0 118.9	36.0% 33.0%	6.8 6.4	14.1 12.8	15.8 15.3	8.6 8.5	12.8 12.2	3.97 3.92
Striped Maple	10	2	0.4	40.0 17.5	8.0% 8.0%	1.6 0.8	4.1 1.8	3.5 2.8	2.0 0.9	3.2 1.8	11.11 17.00
White Pine	5	2	0.8	20.0 8.8	8.0% 4.0%	3.4 0.8	2.1 0.9	3.5 1.8	4.3 1.9	3.3 1.5	15.00 16.13
Total	241	-	19.8	964.0	-	79.2	100.0	100.0	100.0	100.0	-

Shannon-Wiener's index of diversity for the community: 1.7 1.5

Estimates of time commitment

- Quadrats sampled: 25 @ 30 minutes each = 750 minutes
- Distance traveled between quadrats: 419 m. @ 3mph = 5 minutes
- Total time to sample: **12 hours, 35 minutes**

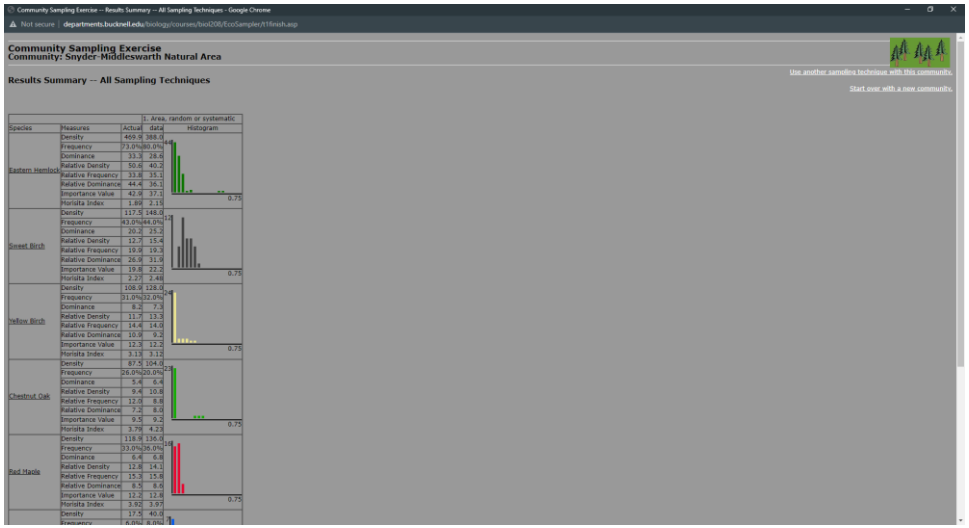
Legend

- Calculated from sample
- Actual

$$\text{Density} = \frac{\text{number of individuals of a species}}{\text{area sampled}}$$

$$\text{Frequency} = \frac{\text{number of quadrats in which species occurs}}{\text{total number of quadrats sampled}}$$

total basal area value for a species



Community Sampling Exercise -- Results Summary -- All Sampling Techniques - Google Chrome

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Community Sampling Exercise
Community: Snyder-Middleswarth Natural Area

Use another sampling technique with this community.

Start over with a new community.

Results Summary -- All Sampling Techniques

		1. Area, random or systematic		
Species	Measures	Actual	data	Histogram
Eastern Hemlock	Density	469.5	388.0	
	Frequency	73.0%	80.0%	
	Dominance	33.3	28.6	
	Relative Density	50.6	40.2	
	Relative Frequency	33.8	35.1	
	Relative Dominance	44.4	36.1	
	Importance Value	42.8	37.1	
	Horisita Index	1.89	2.15	
Sweet Birch	Density	117.5	148.0	
	Frequency	43.0%	44.0%	
	Dominance	20.2	25.2	
	Relative Density	12.7	15.4	
	Relative Frequency	19.8	19.3	
	Relative Dominance	26.9	31.9	
	Importance Value	19.8	22.2	
	Horisita Index	2.27	2.48	
Yellow Birch	Density	108.9	128.0	
	Frequency	31.0%	32.0%	
	Dominance	8.2	7.3	
	Relative Density	11.7	13.3	
	Relative Frequency	14.4	14.0	
	Relative Dominance	10.8	9.2	
	Importance Value	12.3	12.2	
	Horisita Index	3.13	3.12	
Chestnut Oak	Density	87.5	104.0	
	Frequency	26.0%	20.0%	
	Dominance	5.4	6.4	
	Relative Density	9.4	10.8	
	Relative Frequency	12.0	8.8	
	Relative Dominance	7.2	8.0	
	Importance Value	9.5	9.2	
	Horisita Index	3.79	4.23	
Red Maple	Density	118.9	136.0	
	Frequency	33.0%	36.0%	
	Dominance	6.4	6.8	
	Relative Density	12.8	14.1	
	Relative Frequency	15.3	15.8	
	Relative Dominance	8.5	8.6	
	Importance Value	12.2	12.8	
	Horisita Index	3.92	3.97	
	Density	17.5	40.0	
	Frequency	8.0%	8.0%	

2. Random Sampling Results

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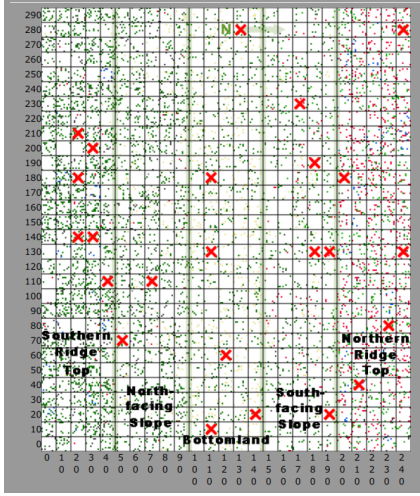

Community View

Topographical View

Click on a quadrat to sample it.

Perform Calculations

Plants sampled: 226
Species sampled: 7

Quadrats sampled (x,y): 24

190, 130
50, 70
230, 80
40, 110
180, 190
20, 180
70, 110
180, 130
170, 230
30, 200
20, 140
140, 20
190, 20
30, 140
200, 180
240, 280
110, 180
110, 130
130, 280
240, 130
20, 210
110, 10
120, 60
210, 40

List of random quadrats (x,y):

190, 130

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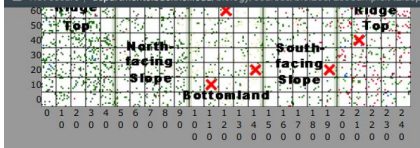
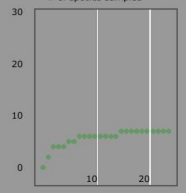


# of species sampled



110, 130
130, 280
240, 130
20, 210
110, 10
120, 60
210, 40

List of random quadrats (x,y):

190, 130
50, 70
230, 80
40, 110
180, 190
20, 180
70, 110
180, 130
170, 230
30, 200
20, 140
140, 20
190, 20
30, 140
200, 180
240, 280
110, 180
110, 130
130, 280
240, 130
20, 210
110, 10
120, 60
210, 40

Generate 10 additional random quadrats Go

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Community Sampling Exercise
Community: Snyder-Middleswarth Natural Area - Sampling Technique: Area, random or systematic

Calculations

Continue Sampling

Finish

total quadrats sampled: 24
area sampled: 2400 sq. m
species sampled: 7
total specimens sampled: 226

species	# of individuals	# of quadrats where found	total basal area (m^2)	density (stems/ha)	frequency (% quadrats)	dominance (m^2/ha)	relative density	relative frequency	relative dominance	relative importance value	dispersion (Morisita index)
Eastern Hemlock	125	18	9.7	520.8 469.9	75.0% 73.0%	40.6 33.3	55.3 50.6	35.4 33.8	53.3 44.4	48.0 42.9	1.69 1.89
Sweet Birch	20	9	3.9	83.3 117.5	38.0% 43.0%	16.1 20.2	8.8 12.7	17.9 19.9	21.2 26.9	16.0 19.8	2.27 2.27
Yellow Birch	24	6	1.3	100.0 108.9	25.0% 31.0%	5.4 8.2	10.6 11.7	11.8 14.4	7.1 10.9	9.8 12.3	4.17 3.13
Chestnut Oak	28	7	1.2	116.7 87.5	29.0% 26.0%	5.1 5.4	12.4 9.4	13.7 12.0	6.7 7.2	10.9 9.5	3.43 3.79
Red Maple	21	8	1.3	87.5 118.9	33.0% 33.0%	5.5 6.4	9.3 12.8	15.6 15.3	7.2 8.5	10.7 12.2	3.31 3.92
Striped Maple	5	2	0.2	20.8 17.5	8.0% 6.0%	1.0 0.7	2.2 1.8	3.8 2.4	1.3 0.9	2.4 1.8	14.40 17.00
White Pine	3	1	0.6	12.5 8.4	4.0% 4.0%	2.4 0.9	1.3 0.9	1.9 1.8	3.2 1.2	2.1 1.3	24.00 16.18
Total	226	-	18.3	941.7	-	76.1	100.0	100.0	100.0	100.0	-

Shannon-Wiener's index of diversity for the community: 1.4 1.5

Estimates of time commitment

- Quadrats sampled: 24 @ 30 minutes each = 720 minutes
- Distance traveled between quadrats: 3429 m. @ 3mph = 43 minutes

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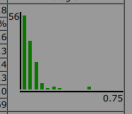
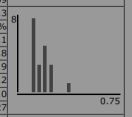
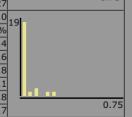
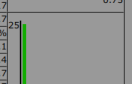
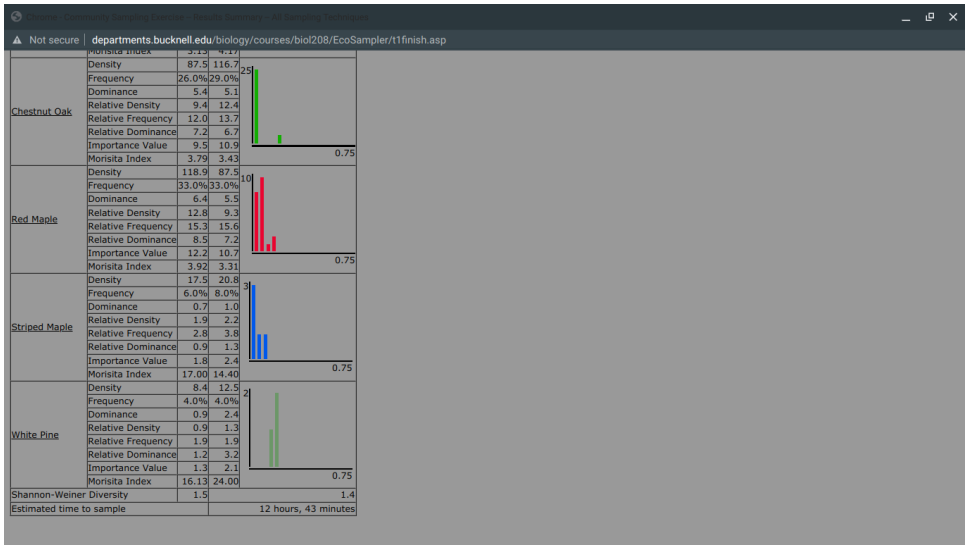
Use another sampling technique with this community.

Start over with a new community.

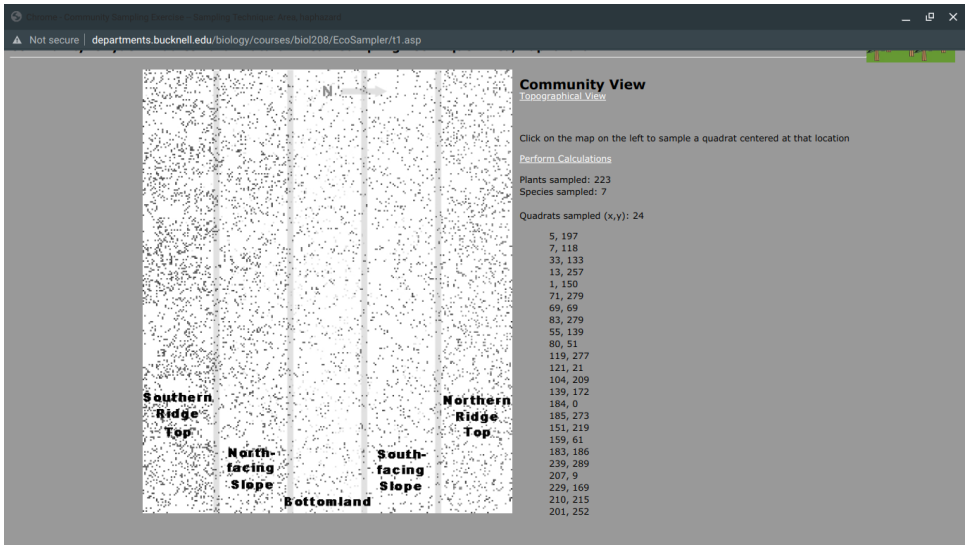
Results Summary -- All Sampling Techniques

Species	Measures	Actual	1. Area, random or systematic data	Histogram
Eastern Hemlock	Density	469.9	520.8	
	Frequency	73.0%	75.0%	
	Dominance	33.3	40.6	
	Relative Density	50.6	55.3	
	Relative Frequency	33.8	35.4	
	Relative Dominance	44.4	53.3	
	Importance Value	42.9	48.0	
	Morisita Index	1.89	1.69	
Sweet Birch	Density	117.5	83.3	
	Frequency	43.0%	38.0%	
	Dominance	20.2	16.1	
	Relative Density	12.7	8.8	
	Relative Frequency	19.9	17.9	
	Relative Dominance	26.9	21.2	
	Importance Value	19.8	16.0	
	Morisita Index	2.27	2.27	
Yellow Birch	Density	108.9	100.0	
	Frequency	31.0%	25.0%	
	Dominance	8.2	5.4	
	Relative Density	11.7	10.6	
	Relative Frequency	14.4	11.8	
	Relative Dominance	10.9	7.1	
	Importance Value	12.3	9.8	
	Morisita Index	3.13	4.17	
Chestnut Oak	Density	87.5	116.7	
	Frequency	26.0%	29.0%	
	Dominance	5.4	5.1	
	Relative Density	9.4	12.4	
	Relative Frequency	12.0	13.7	



Chestnut Oak	Density	87.5	116.7
	Frequency	26.0%	29.0%
	Dominance	5.4	5.1
	Relative Density	9.4	12.4
	Relative Frequency	12.0	13.7
	Relative Dominance	7.2	6.7
	Importance Value	9.5	10.9
	Morisita Index	3.79	3.43
Red Maple	Density	118.9	87.5
	Frequency	33.0%	33.0%
	Dominance	6.4	5.5
	Relative Density	12.8	9.3
	Relative Frequency	15.3	15.6
	Relative Dominance	8.5	7.2
	Importance Value	12.2	10.7
	Morisita Index	3.92	3.31
Striped Maple	Density	17.5	20.8
	Frequency	6.0%	8.0%
	Dominance	0.7	1.0
	Relative Density	1.9	2.2
	Relative Frequency	2.8	3.8
	Relative Dominance	0.9	1.3
	Importance Value	1.8	2.4
	Morisita Index	17.00	14.40
White Pine	Density	8.4	12.5
	Frequency	4.0%	4.0%
	Dominance	0.9	2.4
	Relative Density	0.9	1.3
	Relative Frequency	1.9	1.9
	Relative Dominance	1.2	3.2
	Importance Value	1.3	2.1
	Morisita Index	16.13	24.00
Shannon-Weiner Diversity		1.5	1.4
Estimated time to sample			12 hours, 43 minutes

3. Haphazard or subjective sampling



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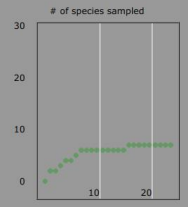
121, 21
104, 209
139, 172
184, 0
185, 273
151, 219
159, 61
183, 186
239, 289
207, 9
229, 169
210, 215
201, 252



configuration options

Biology Department, Bucknell University

Close Window
(and terminate exercise)

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Community Sampling Exercise

Community: Snyder-Middleswarth Natural Area - Sampling Technique: Area, haphazard

Calculations

Continue Sampling

Finish

total quadrats sampled: 24
area sampled: 2400 sq. m
species sampled: 7
total specimens sampled: 223

species	# of individuals	# of quadrats where found	total basal area (m^2)	density (stems/ha)	frequency (% quadrats)	dominance (m^2/ha)	relative density	relative frequency	relative dominance	relative importance value	dispersion (Morisita index)
Eastern Hemlock	104	18	7.3	433.3 469.9	75.0% 73.0%	30.3 33.3	46.6 50.6	32.2 33.8	42.2 44.4	40.3 42.9	1.76 1.89
Sweet Birch	22	11	3.6	91.7 117.5	46.0% 43.0%	15.0 20.2	9.9 12.7	19.7 19.9	20.9 26.9	16.8 19.8	2.08 2.27
Yellow Birch	29	8	2.5	120.8 108.9	33.0% 31.0%	10.3 8.2	13.0 11.7	14.2 14.4	14.4 10.9	13.8 12.3	2.96 3.13
Chestnut Oak	22	6	1.4	91.7 87.5	25.0% 26.0%	5.7 5.4	9.9 9.4	10.7 12.0	7.9 7.2	9.5 9.5	3.74 3.79
Red Maple	43	10	2.4	179.2 118.9	42.0% 33.0%	10.1 6.4	19.3 12.8	18.0 15.3	14.1 8.5	17.1 12.2	3.38 3.92
Striped Maple	2	2	0.0	8.3 17.5	8.0% 6.0%	0.2 0.7	0.9 1.9	3.4 2.8	0.2 0.9	1.5 1.8	0.00 17.00
White Pine	1	1	0.0	4.2 8.4	4.0% 4.0%	0.2 0.9	0.4 0.9	1.7 1.9	0.2 1.2	0.8 1.3	** 16.13
Total	223	-	17.2	929.2	-	71.9	100.0	100.0	100.0	100.0	-

Shannon-Wiener's index of diversity for the community: 1.5 1.5

Estimates of time commitment

- Quadrats sampled: 24 @ 30 minutes each = 720 minutes
- Distance traveled between quadrats: 3514 m. @ 3mph = 44 minutes

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Striped Maple	2	2	0.0	8.3 17.5	8.0% 6.0%	0.2 0.7	0.9 1.9	3.4 2.8	0.2 0.9	1.5 1.8	0.00 17.00
White Pine	1	1	0.0	4.2 8.4	4.0% 4.0%	0.2 0.9	0.4 0.9	1.7 1.9	0.2 1.2	0.8 1.3	** 16.13
Total	223	-	17.2	929.2	-	71.9	100.0	100.0	100.0	100.0	-

Shannon-Wiener's index of diversity for the community: 1.5 1.5

Estimates of time commitment

- Quadrats sampled: 24 @ 30 minutes each = 720 minutes
- Distance traveled between quadrats: 3514 m. @ 3mph = 44 minutes
- Total time to sample: **12 hours, 44 minutes**

Legend

- Calculated from sample
- Actual

$$\text{Density} = \frac{\text{number of individuals of a species}}{\text{area sampled}}$$

$$\text{Frequency} = \frac{\text{number of quadrats in which species occurs}}{\text{total number of quadrats sampled}}$$

$$\text{Dominance} = \frac{\text{total basal area value for a species}}{\text{area sampled}}$$

$$\text{Relative Density} = \frac{\text{density for a species}}{\text{total density for all species}} * 100$$

frequency value for a species

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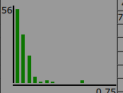
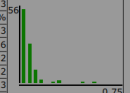
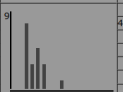
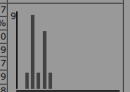
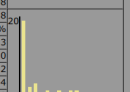
Community Sampling Exercise
Community: Snyder-Middleswarth Natural Area

Show me what was sampled.

Results Summary -- All Sampling Techniques

Use another sampling technique with this community.

Start over with a new community.

			1. Area, random or systematic		2. Area, haphazard	
Species	Measures	Actual	data	Histogram	data	Histogram
Eastern Hemlock	Density	469.9	520.8		433.3	
	Frequency	73.0%	75.0%		75.0%	
	Dominance	33.3	40.6		30.3	
	Relative Density	50.6	55.3		46.6	
	Relative Frequency	33.8	35.4		32.2	
	Relative Dominance	44.4	53.3		42.2	
	Importance Value	42.9	48.0		40.3	
	Morisita Index	1.89	1.69		1.76	
Sweet Birch	Density	117.5	83.3		91.7	
	Frequency	43.0%	38.0%		46.0%	
	Dominance	20.2	16.1		15.0	
	Relative Density	12.7	8.8		9.9	
	Relative Frequency	19.9	17.9		19.7	
	Relative Dominance	26.9	21.2		20.9	
	Importance Value	19.8	16.0		16.8	
	Morisita Index	2.27	2.27		2.08	
Yellow Birch	Density	108.9	100.0		120.8	
	Frequency	31.0%	25.0%		33.0%	
	Dominance	8.2	5.4		10.3	
	Relative Density	11.7	10.6		13.0	
	Relative Frequency	14.4	11.8		14.2	
	Relative Dominance	10.9	7.1		14.4	
	Importance Value	12.3	9.8		13.8	
	Morisita Index	3.13	4.17		2.96	

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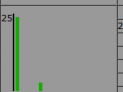
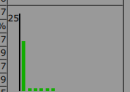
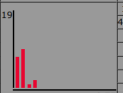
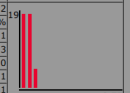
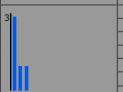
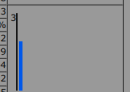
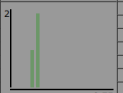
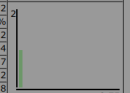
Chestnut Oak	Density	87.5	116.7		91.7	
	Frequency	26.0%	29.0%		25.0%	
	Dominance	5.4	5.1		5.7	
	Relative Density	9.4	12.4		9.9	
	Relative Frequency	12.0	13.7		10.7	
	Relative Dominance	7.2	6.7		7.9	
	Importance Value	9.5	10.9		9.5	
	Morisita Index	3.79	3.43		3.74	
Red Maple	Density	118.9	87.5		179.2	
	Frequency	33.0%	33.0%		42.0%	
	Dominance	6.4	5.5		10.1	
	Relative Density	12.8	9.3		19.3	
	Relative Frequency	15.3	15.6		18.0	
	Relative Dominance	8.5	7.2		14.1	
	Importance Value	12.2	10.7		17.1	
	Morisita Index	3.92	3.31		3.38	
Striped Maple	Density	17.5	20.8		8.3	
	Frequency	6.0%	8.0%		8.0%	
	Dominance	0.7	1.0		0.2	
	Relative Density	1.9	2.2		0.9	
	Relative Frequency	2.8	3.8		3.4	
	Relative Dominance	0.9	1.3		0.2	
	Importance Value	1.8	2.4		1.5	
	Morisita Index	17.00	14.40		0.00	
White Pine	Density	8.4	12.5		4.2	
	Frequency	4.0%	4.0%		4.0%	
	Dominance	0.9	2.4		0.2	
	Relative Density	0.9	1.3		0.4	
	Relative Frequency	1.9	1.9		1.7	
	Relative Dominance	1.2	3.2		0.2	
	Importance Value	1.3	2.1		0.8	
	Morisita Index	16.13	24.00		**	
Shannon-Weiner Diversity		1.5	1.4		1.5	
Estimated time to sample			12 hours, 43 minutes		12 hours, 44 minutes	

Sampling Type	Estimated Sampling Time	% Error 2 Most Common Species (density)	% Error 2 Rarest Species (density)	Accurate?
1. **Systematic: Sampling along a topographic gradient**	12 hrs 35 min	17% 26%	129% 138%	
2. Sampling method 2 Random sampling	12 hr 43 min	11% 29%	19% 49%	
3. Haphazard or subjective sampling	12hr 44 min / 12hr 43min	8% 22%	53% 96%	

1. Which technique had the fastest estimated sampling time?

Sampling technique 1 Systematic: Sampling along a topographic gradient had the fastest estimated sampling time.

2. Compare the percentage error of the different strategies for the two most common and two rarest species. Did the accuracy change with species abundance?

In all the strategies % error increased with a decrease in species abundance.

3. Was one sampling strategy more accurate than another?

Sampling strategy 2 Random Sampling is the most accurate for both high density and low-density species as we can see from the comparisons of percent error in the table.