Project 3: Functional Decomposition

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Tables and Graphs

Table 1: Six-Year Ecosystem Simulation Metrics

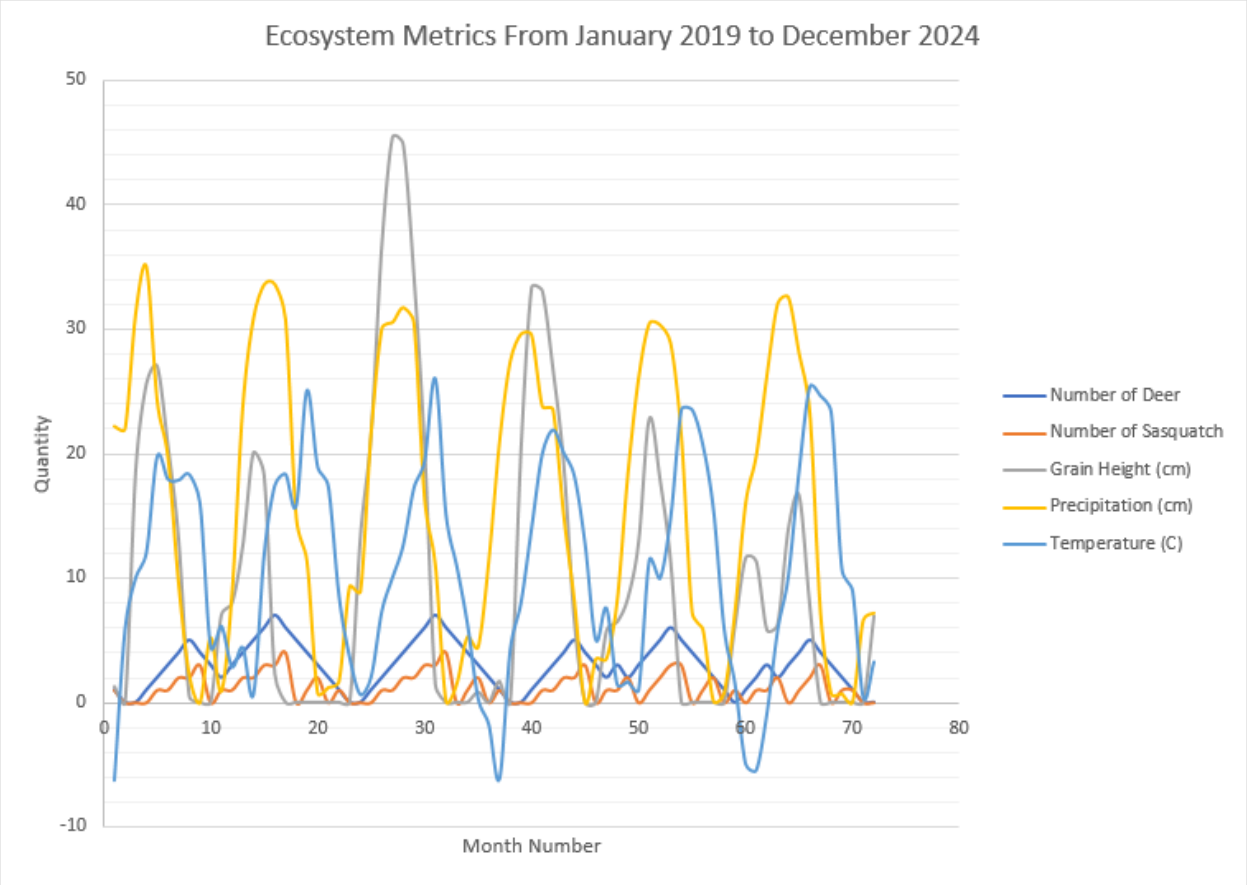
Month Number	Number of Deer	Number of Sasquatch	Grain Height (cm)	Precipitation (cm)	Temperature (C)
1	1	1	1.270001	22.227524	-6.282825
2	0	0	0	22.022623	5.861134
3	0	0	18.707006	31.327993	10.051372
4	1	0	25.655727	35.038357	12.074157
5	2	1	27.05426	24.332943	19.769329
6	3	1	20.714317	19.783997	17.965813
7	4	2	13.14609	9.623411	17.882677
8	5	2	0.485838	2.206547	18.343422
9	4	3	0	0	16.04632
10	3	0	0	5.23638	4.444109
11	2	1	7.01024	0.92033	6.132569
12	3	1	7.9789	8.80457	2.848432
13	4	2	12.568113	23.739006	4.406664
14	5	2	20.10047	30.878246	0.63559
15	6	3	18.2528	33.616795	11.889604
16	7	3	2.240229	33.648945	17.458302
17	6	4	0	30.824594	18.361536
18	5	0	0	14.903015	15.836084
19	4	1	0	11.388409	25.109266

20	3	2	0	0.76211	18.959042
21	2	0	0	1.224805	17.357658
22	1	1	0	1.725797	8.559608
23	0	0	0	9.374288	3.587723
24	0	0	13.326409	8.936612	0.616197
25	1	0	21.629688	21.703764	2.025053
26	2	1	36.817123	30.078875	7.319993
27	3	1	45.492863	30.579548	10.052893
28	4	2	44.90781	31.775137	12.649937
29	5	2	34.361359	30.556292	17.254749
30	6	3	20.487053	16.399277	19.445038
31	7	3	1.449274	11.096042	26.052187
32	6	4	0	0.145692	15.103862
33	5	0	0	1.491839	10.980394
34	4	1	0	5.304685	6.311327
35	3	2	0.816139	4.473764	0.308406
36	2	0	0	11.425808	-1.801068
37	1	1	1.702344	20.974964	-6.172954
38	0	0	0	27.43959	4.207247
39	0	0	20.15263	29.637741	7.962511
40	1	0	33.386265	29.562437	14.022649
41	2	1	33.128651	23.82033	20.01005
42	3	1	26.786539	23.552505	21.932911
43	4	2	19.167543	15.06441	20.087458
44	5	2	6.473749	8.137321	18.200048
45	4	3	0	0	12.734529

46	3	0	0	3.512022	5.026983
47	2	1	5.754226	3.532581	7.567094
48	3	1	6.464533	8.201014	1.418328
49	2	2	8.393257	18.386705	1.659881
50	3	0	12.878914	26.087824	0.976463
51	4	1	22.82114	30.490555	11.439167
52	5	2	17.930891	30.382969	9.961595
53	6	3	11.253763	28.893318	14.888085
54	5	3	0	21.408098	23.553818
55	4	0	0	7.292342	23.558277
56	3	1	0	5.91662	20.736851
57	2	2	0	0.132361	15.496013
58	1	0	0	0.795371	5.910992
59	0	1	6.145467	7.233593	1.537043
60	1	0	11.600057	16.008921	-4.957448
61	2	1	11.341006	19.883514	-5.466241
62	3	1	5.795175	26.357849	-0.877486
63	2	2	6.280489	32.099186	5.804626
64	3	0	13.972209	32.599686	10.16563
65	4	1	16.65534	28.080402	18.58482
66	5	2	7.796211	23.341303	25.395254
67	4	3	0	7.258634	24.670681
68	3	0	0	0.732465	23.339775
69	2	1	0	0.719311	10.731935
70	1	1	0	0.055538	8.9619
71	0	0	0	6.642866	0.404788

72	0	0	6.941639	7.213336	3.253805

Graph 1:



Explanation and Analysis

All development and testing occurred on OSU's flip1 server.

1. **What your own-choice quantity was and how it fits into the simulation.**

I added sasquatches to the ecosystem simulation. Sasquatches like to pet deer, so much so that they like to pet two deer simultaneously. But sasquatches don't like to share so they won't pet deer that already have sasquatches. If there are deer that are not currently being pet, more sasquatches will arrive, but if there aren't enough deer to go around all sasquatches will leave the area. Sasquatches eat grain just like deer, but consume three times the amount deer do each month.

2. **A table showing values for temperature, precipitation, number of graindeer, height of the grain, and your own-choice quantity as a function of month number.**

Please see Table 1 above.

3. **A graph showing temperature, precipitation, number of graindeer, height of the grain, and your own-choice quantity as a function of month number. Note: if you change the units to °C and centimeters, the quantities might fit better on the same set of axes. cm = inches * 2.54 °C = (5./9.)*(°F-32)**

Please see Graph 1 above.

4. **A commentary about the patterns in the graph and why they turned out that way. What evidence in the curves proves that your own quantity is actually affecting the simulation correctly?**

The sine wave shapes of the precipitation and temperature curves aren't perfect due to their inserted random modifications to make them more interesting. Grain heights peak around the same time that precipitation peaks. This makes sense as increased rainfall would provide more nutrients for grain to grow and flourish. The curves for deer numbers peak just as grain height takes a nosedive. This is because the higher deer population means more grain is getting consumed. This effect is seen even more clearly as the sasquatch numbers increase with the deer, so even more grain is getting consumed. The sasquatch numbers peak right after the deer numbers peak because the lack of grain causes the deer numbers to decrease and this causes the sasquatch numbers to decrease. We can see the effect of the sasquatches on the simulation most clearly from the complete depletion of grain height at several points. These grain height troughs of 0 cm are directly caused from the deer and sasquatch eating grains.