MyAgent – Predator Wolves

As the fourth agent to the grain-deer simulation, I chose the wolves as a predator of the deer. Starting with a single wolf, their population increases by one every three months if there are more than 5 deer. If not then they starve and decrease by one.

They affect the deer population as a predator. For every five wolves they consume 1 deer every month.

I also had to tweak some of the deer stats. So now the deer population increases by 4 every month if they are less than the grass height. The grass also grows at 9 inches per month compared to 8 before.

For the data we converted all length measurement from inches to centimeters and from Fahrenheit to Celsius.

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| --- | --- | --- | --- | --- | --- |
| **Date** | **Temp** | **Height** | **Precip** | **NumDeer** | **NumWolv** |
| 1/1/2019 | 10 | 0 | 0 | 3 | 0 |
| 2/1/2019 | 5.64019 | 17.6951 | 22.3128 | 2 | 0 |
| 3/1/2019 | 11.633 | 19.0387 | 33.3644 | 6 | 0 |
| 4/1/2019 | 8.73118 | 22.4335 | 34.7244 | 10 | 1 |
| 5/1/2019 | 22.4498 | 9.73416 | 23.182 | 8 | 1 |
| 6/1/2019 | 22.2032 | 0 | 17.2354 | 6 | 1 |
| 7/1/2019 | 16.2607 | 0 | 11.7754 | 4 | 2 |
| 8/1/2019 | 15.3956 | 0 | 1.29765 | 1 | 2 |
| 9/1/2019 | 13.3967 | 0 | 5.52696 | 3 | 2 |
| 10/1/2019 | 12.2076 | 0 | 5.56334 | 0 | 1 |
| 11/1/2019 | 7.30869 | 11.6765 | 9.21547 | 3 | 1 |
| 12/1/2019 | -4.53681 | 9.21597 | 13.5901 | 6 | 1 |
| 1/1/2020 | 4.4963 | 24.3916 | 24.0725 | 4 | 2 |
| 2/1/2020 | 7.22289 | 36.8063 | 22.0525 | 6 | 2 |
| 3/1/2020 | 6.96174 | 46.2133 | 32.9895 | 8 | 2 |
| 4/1/2020 | 16.2122 | 36.3081 | 27.8985 | 10 | 3 |
| 5/1/2020 | 13.8777 | 24.8493 | 20.9849 | 11 | 3 |
| 6/1/2020 | 19.8632 | 10.8881 | 15.247 | 12 | 3 |
| 7/1/2020 | 25.3518 | 0 | 12.7156 | 8 | 4 |
| 8/1/2020 | 21.1035 | 0 | 8.30855 | 3 | 4 |
| 9/1/2020 | 17.9812 | 0 | 0.556503 | 3 | 4 |
| 10/1/2020 | 8.85469 | 1.99628 | 3.54624 | 3 | 3 |
| 11/1/2020 | -3.0155 | 0 | 3.05444 | 4 | 3 |
| 12/1/2020 | 3.14671 | 8.72766 | 8.36875 | 0 | 3 |
| 1/1/2021 | 4.08964 | 30.8297 | 21.027 | 1 | 2 |
| 2/1/2021 | 4.1292 | 52.3402 | 24.9875 | 3 | 2 |
| 3/1/2021 | 9.98801 | 56.3575 | 32.4057 | 5 | 2 |
| 4/1/2021 | 15.5772 | 50.4081 | 29.7043 | 7 | 1 |
| 5/1/2021 | 16.6593 | 41.6999 | 25.2247 | 10 | 1 |
| 6/1/2021 | 22.46 | 29.0004 | 15.8709 | 13 | 1 |
| 7/1/2021 | 17.079 | 12.5771 | 9.28303 | 11 | 2 |
| 8/1/2021 | 20.1461 | 0 | 7.48406 | 8 | 2 |
| 9/1/2021 | 7.67391 | 0 | 0 | 5 | 2 |
| 10/1/2021 | 4.6456 | 5.1025 | 4.30317 | 2 | 1 |
| 11/1/2021 | -2.89928 | 4.13326 | 0.898689 | 5 | 1 |
| 12/1/2021 | -5.20882 | 0 | 16.3153 | 3 | 1 |
| **Date** | **Temp** | **Height** | **Precip** | **NumDeer** | **NumWolv** |
| 1/1/2022 | 2.86147 | 16.9859 | 22.4549 | 1 | 0 |
| 2/1/2022 | 4.30802 | 38.2042 | 22.2082 | 5 | 0 |
| 3/1/2022 | 5.09201 | 52.6457 | 32.6404 | 9 | 0 |
| 4/1/2022 | 17.8782 | 41.2797 | 29.8651 | 13 | 1 |
| 5/1/2022 | 12.6839 | 27.2834 | 27.6785 | 16 | 1 |
| 6/1/2022 | 20.0519 | 6.9707 | 15.3835 | 14 | 1 |
| 7/1/2022 | 19.4165 | 0 | 8.35132 | 12 | 2 |
| 8/1/2022 | 20.8069 | 0 | 0 | 9 | 2 |
| 9/1/2022 | 16.1558 | 0 | 0 | 6 | 2 |
| 10/1/2022 | 3.64504 | 0.617391 | 0 | 3 | 3 |
| 11/1/2022 | 2.02953 | 6.13559 | 4.03686 | 4 | 3 |
| 12/1/2022 | -1.33711 | 6.71025 | 11.1693 | 5 | 3 |
| 1/1/2023 | 0.89319 | 15.3089 | 22.1712 | 6 | 2 |
| 2/1/2023 | 4.46953 | 29.7159 | 30.2924 | 8 | 2 |
| 3/1/2023 | 9.95408 | 27.3573 | 33.0852 | 10 | 2 |
| 4/1/2023 | 10.3872 | 21.4549 | 32.0514 | 12 | 3 |
| 5/1/2023 | 19.8534 | 6.22506 | 20.9649 | 8 | 3 |
| 6/1/2023 | 22.4558 | 0 | 21.3252 | 4 | 3 |
| 7/1/2023 | 16.9837 | 0 | 12.7582 | 0 | 2 |
| 8/1/2023 | 13.6234 | 0.734094 | 4.01699 | 2 | 2 |
| 9/1/2023 | 12.8576 | 0 | 3.30229 | 4 | 2 |
| 10/1/2023 | 12.2325 | 0 | 1.26864 | 1 | 1 |
| 11/1/2023 | 0.369767 | 7.21048 | 8.29155 | 0 | 1 |
| 12/1/2023 | 0.214912 | 17.8348 | 14.4267 | 3 | 1 |
| 1/1/2024 | -3.80127 | 16.1102 | 14.285 | 6 | 0 |
| 2/1/2024 | 4.93511 | 30.6494 | 29.2802 | 10 | 0 |
| 3/1/2024 | 4.40307 | 38.7407 | 33.2205 | 14 | 0 |
| 4/1/2024 | 12.942 | 22.9021 | 34.4319 | 18 | 1 |
| 5/1/2024 | 20.0687 | 0.0505008 | 25.129 | 16 | 1 |
| 6/1/2024 | 25.0759 | 0 | 18.4038 | 14 | 1 |
| 7/1/2024 | 25.8357 | 0 | 12.1181 | 12 | 2 |
| 8/1/2024 | 18.3814 | 0 | 0.989558 | 9 | 2 |
| 9/1/2024 | 8.86048 | 0 | 3.17848 | 6 | 2 |
| 10/1/2024 | 3.2275 | 0.39573 | 0 | 3 | 3 |
| 11/1/2024 | -0.551092 | 2.82158 | 7.61059 | 4 | 3 |
| 12/1/2024 | 3.05324 | 16.6039 | 16.259 | 5 | 3 |

Commentary

With the addition of wolves, you can see that when there are a peak amount of wolves, there is a sharp decrease in the deer population (as seen in July 2020, 2021, 2022, and 2023). It is also a sign, that I needed to increase the deer population factors such as: the growth of the deer, and growth of the grain as well.

Also you can see that when the wolf population is high, the deer population steeply drops in July 2020. This year though, coincides with a drop in temperature and precipitation. And when the precipitation and temperature rise in the spring, there is very little deer population, so it grows unchecked. This leads to the tallest season of grass in April 2021.

Running Information

The following data was run on my personal computer:

OS - Windows 10 Version 10.0.17134 Build 17134

CPU - Intel(R) Core(TM) i7-7700HQ CPU @ 2.80GHz, 2808 Mhz, 4 Cores, 8 Logical Processors

GPU - NVIDIA GeForce GTX 1060 1 GB RAM