SPECIFIRES

NEW MEXICO

FINAL REPORT

ROBERTSON HIGH SCHOOL

Team 106

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TABLE OF CONTENTS

Executive Summary:

The overall assessment of Specifires was to conduct an experiment relating to our surrounding area. Twenty-eight percent of New Mexico is forest cover. We chose the forest environment because we felt that it fit the environment around us. Everything in our programming is native and well known to New Mexico.

We chose this project because of the recent problems New Mexico has had with wildfires, mainly due to extremely dry and windy conditions. Wildfires are mainly caused by human interaction, and it can be devastating for a forest in short-term ways. However, wildfires also benefit environments; wildfires burn away needless overgrowth in forest and also add vital nutrients to forest soil. We wanted to show both the short and long term effects wildfires have on forest environments.

To approach this problem, we started by researching the different species of New Mexico and came up with seven keystone species. Keystone species are defined as species that other animals are dependent on to survive. For example, an elk is a keystone species to a cougar, because one animal is not able to live without the other. Rabbits, Albert's Squirrels, Rio Grande Wild Turkeys, Elk, Common Barn Owls, Foxes, and Cougars are all New Mexican keystone species we used in our simulation.

Description of the Method used:

For our project, we decided to use Netlogo to model our New Mexican forest. We have seven different keystone species. We used predators, prey, and vegetation interacting in our simulation and reacting to the wildfire. Our vegetation gives "energy" points to the prey, which is required for them to survive. The prey takes away "hunger" points from the predators, allowing them to survive simultaneously. If "energy" points get too low or "hunger" points get too high, the animal then dies.

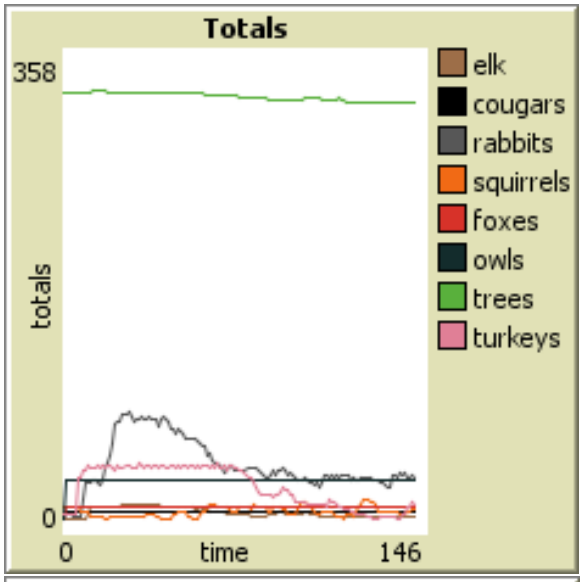
The "fire" of our simulation takes away a percentage of vegetation and animals from the environment, and effects the growth of the vegetation. This becomes a "domino effect," in which the prey population is affected by the vegetation, which in turn affects the predator population. The purpose of this is to see what happens immediately after a fire destroys an environment, and then to see the effects after a long time.

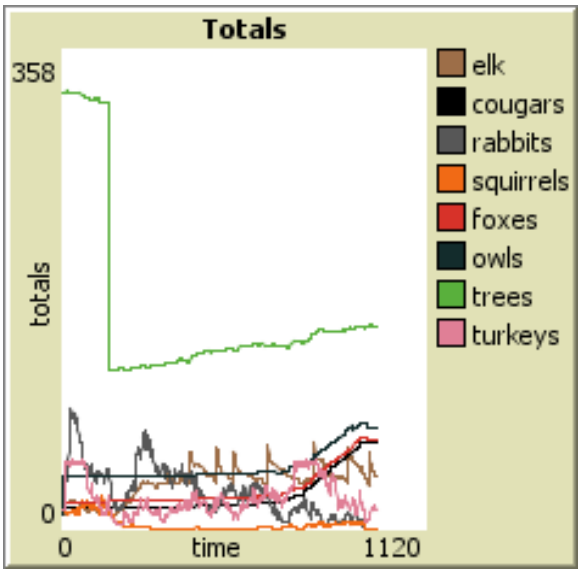
Statement:

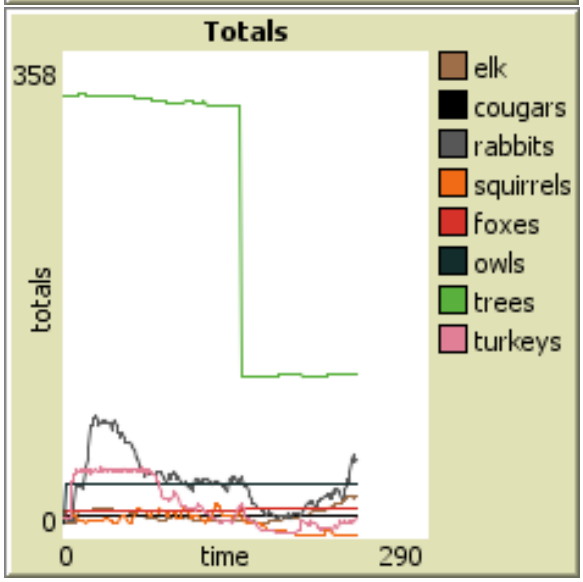
The statement of our project is to find out how wildfires affect New Mexican forests in short and long term means.

Results:

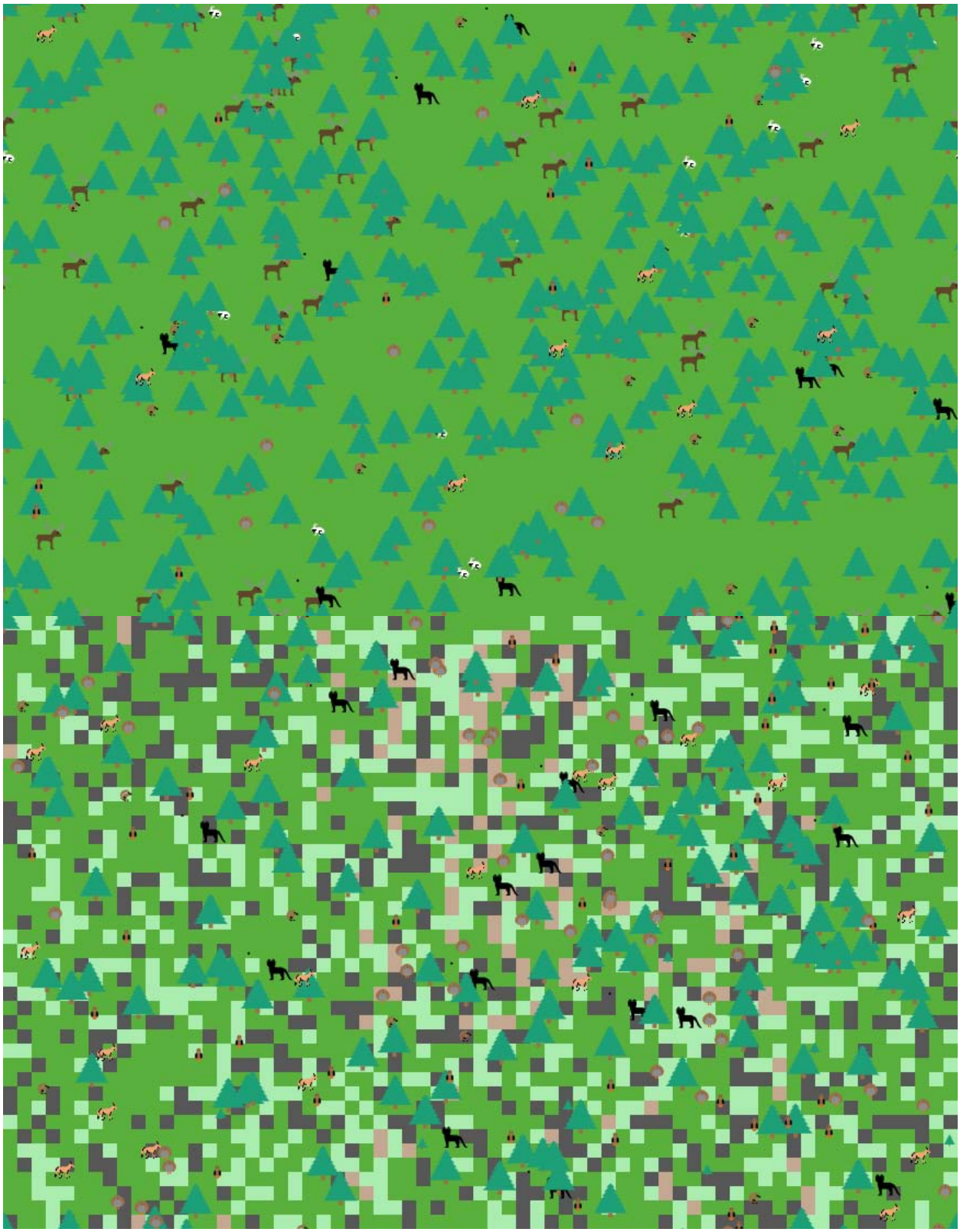
The results of our project shows that wildfires on New Mexican forests do have a negative short-term effect on the vegetation and wildlife of the forest, but the long-term effect definitely improves the long-term state of the forest.

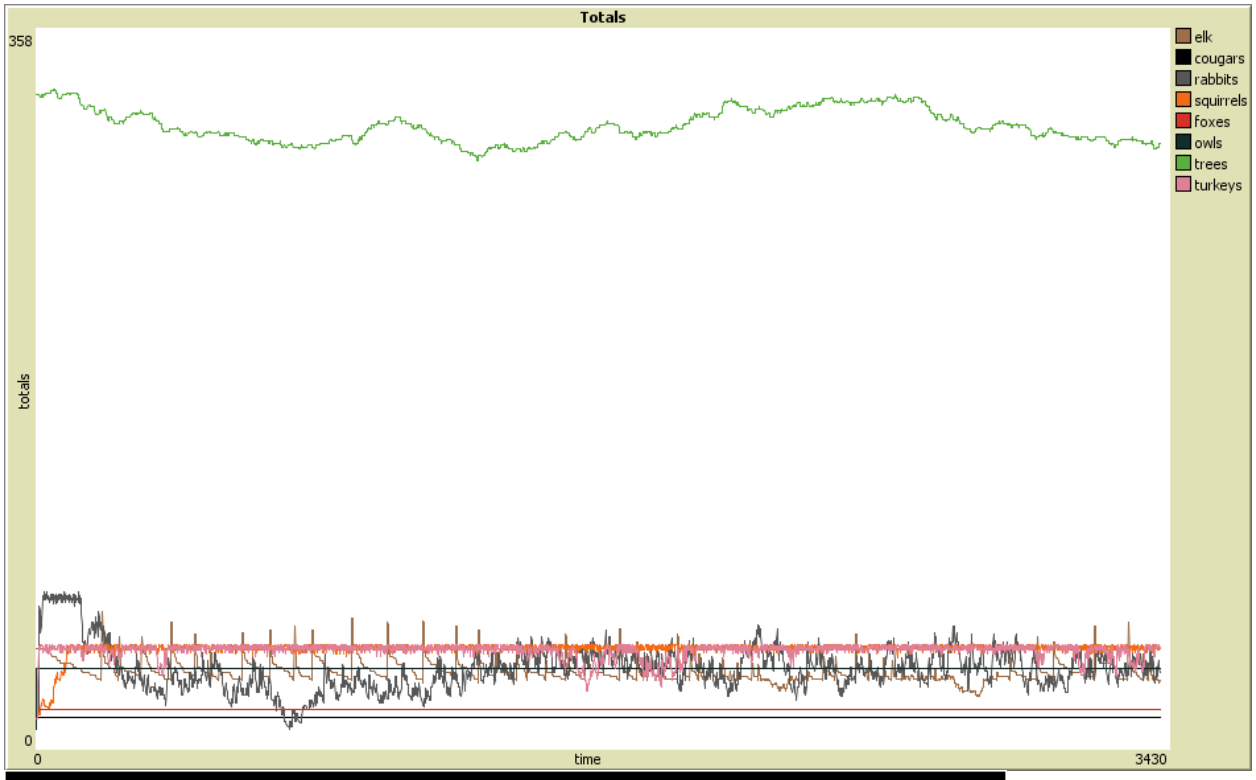






The top left graph are not results at all but instead it is what was going on before the simulation was even set into action. The top right graph shows the results once the animals and vegetation are going. The bottom left graph is the results after the fire.

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foxes
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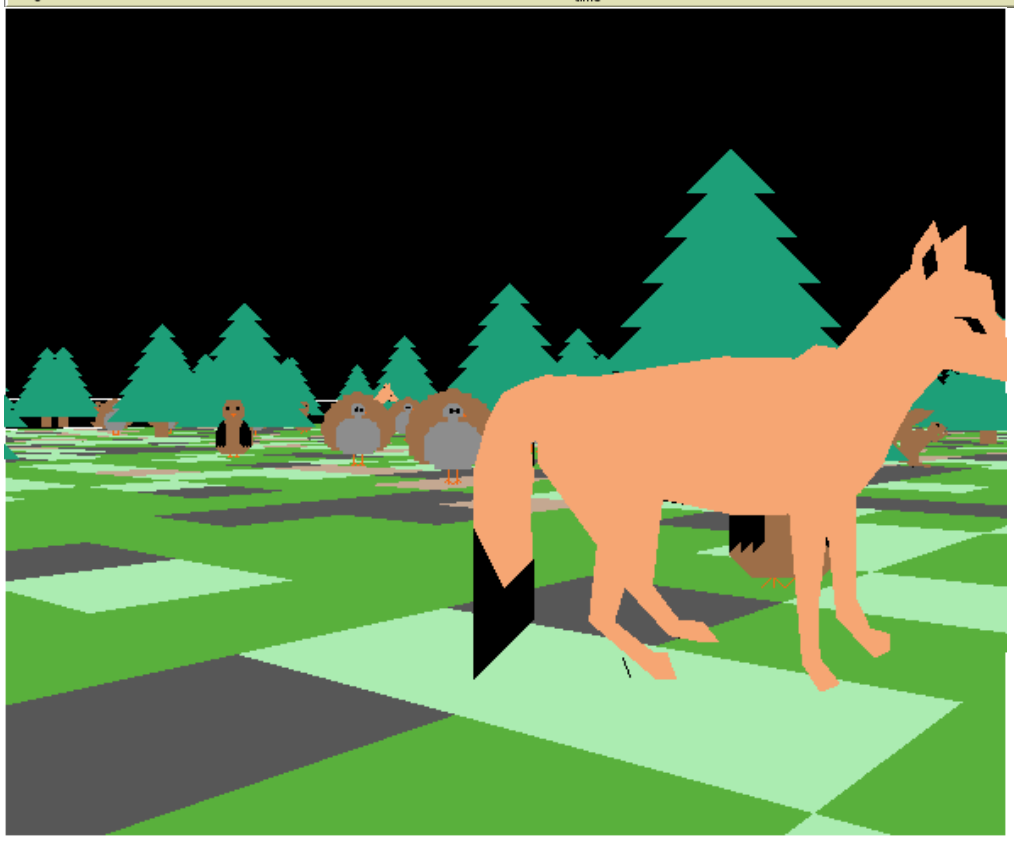
turkeys



Conclusion:

In conclusion we have found that once the animals are introduced into the environment the vegetation begins to decrease, and on average the animals begin to repopulate. As we imagined, once the fire was set into action every variable decreased. Gradually each variable began to increase. One point of error we was time, through the simulation time goes by tics, meaning hours, and the recovery time that the forest takes is not nearly close to the actual time it would take in real life.

Most significant original achievement:

We were part of the skeptical group whom imagined that fire had mainly a negative side, but we learned that even something as destructive as fire has a bright side. No, not the flame, but the positive side like the fact that over years the fire helps to restore nutrients. Also that when a forest is burned it recovers, normally looking better than it did before, therefore leading to the importance of prescribed burning.

We learned how to use a fascinating new software called Netlogo. This may come in handy in the future, especially because our future is computer engineering.

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