

Supercomputing team:

- McCurdy-1

Project Name:

- Bug infestation in Carson National Forest

Team Members:

- Christopher Maestas

- Isaiah Marquez

- Ramses Martinez

Michael Trujillo

Mentors:

- Josephine Kilde

Sponsor:

- Melissa Berryhill

Our project this year is on the infestation of the dreaded tent caterpillar mainly in the Carson National Forest. This being not only the group's first year, but the whole schools first year participating in the competition. With that in mind we have actually

made quite a lot of progress toward our code. We have based our model off of a forest fire simulation in the Net Logo program. The simulation helped us a lot due to we didn't know much about the coding in Net Logo. Hopefully we are able to find a way to predict the movement of tent caterpillars to stop the harmful side effects of them being in an area.

The reason why we chose to use the tent caterpillar is actually very interesting. Michael Trujillo one of the teammates has a very weird obsession with caterpillars and used to collect caterpillars. When we had to come up with an issue to tackle we fell back on forestry and used that to decide what we would do for our project. Michael then gave the idea to do it on caterpillars, we were skeptical at first but we decided to use the idea. We chose the tent caterpillars because nearby at Carson National forest there is a tent caterpillar infestation, it's one of the most infested forests and it would be very sad to lose such a beautiful forest when New Mexico doesn't have that much forest. We also chose the tent caterpillar because of the affect they have on trees, and because they come along mostly in the spring when trees are starting to come back to life, their effects are more harmful. One of the biggest problem that tent caterpillars present is not that they eat leaves of trees, but also the ways of killing them. When you spray an area to kill them it doesn't only kill them but it will also for lack of a better word cause's collateral damage. What happens is the pesticide that kills caterpillars can also kill the underbrush that they nest on, because of the underbrush dying all it takes is a decent amount of rain to up root the tree and possibly make the land barren. Another reason is the fact that 14% of the forest is aspen trees which its buds are a vital food source for wildlife in the winter.

Since this seasons kickoff we have made quite a lot of progress on our coding and possible predictions of the tent caterpillar spread through a forest consisting aspen and conifers using Net Logo 2D. We are trying to simulate the effect of bug infestations particularly the tent caterpillar on forests with different densities. Due to it being our first year we are still new to the Net Logo program so we couldn't start the code from scratch. Instead of playing around with it hoping we would do something right we went to the models library and found one titled fire. When we selected it: it seemed like it could be a good starting point, the only problem was that the fire would start on the left side, but we needed it to start at a random or chosen point. This is where we ourselves fell flat we tried to go into the code to see what we could change; we successfully were able to start the fire at random points but we couldn't control how much points would ignite. That's when Nick Bennett showed up to help us, we were able to setup a way for us to click a point to start or have a certain number of random start points. One of the problems now is to go into the code and have everything that has to do with fire be replaced with bugs. From here on we are going to try to have a way so the trees have a health bar in a way so that when we start a fire some trees are more likely to ignite than others. Hopefully we can use the data collected to help out whenever another tent caterpillar infestation occurs in any forest.

Resources:

- <https://www.facebook.com/PlanetNatural>. "How to Control Tent Caterpillars | Planet Natural." *Planet Natural*. N.p., n.d. Web. 07 Dec. 2016.
- "Forest Tent Caterpillar." *Forest Tent Caterpillar*. N.p., n.d. Web. 07 Dec. 2016.
- Menlove, Jim. "Black Hills." *SpringerReference* (n.d.): n. pag. *Forest Resources of The Carson National Forest*. United States Department of Agriculture, 1 Aug. 2004. Web. 7 Dec. 2016.
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- Sutherland, Carol A. "Tent Caterpillars." *Encyclopedia of Entomology* (n.d.): 2212. *Fall Webworms and Tent Caterpillars*. Web. 7 Dec. 2016.