

What are the effects of Massive rainfall in a
desert environment?

New Mexico

Supercomputing Challenge

Final Report

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Team #54

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1. EXECUTIVE SUMMARY:

As of late in the world today natural disasters have been occurring in stronger proportions in the areas of commonality and occurring in areas of un-commonality, so my team and I thought of the fact that a massive rainstorm of Pre-historic proportions could occur here in New Mexico. We then decided to simulate and model the rainstorm and create accurate agents to represent the effect.

Our project is about the effects of massive rainfall in the desert environment. We decided to simulate this by creating a model in star logo TNG. We have added raindrops, landscapers, and plants. We will continue to add on to our model and tweak it to make it better. Using our model we created accurate representations of the effects of erosion and its effect on plants.

To program our rain we used an invisible rainmaker. This agent creates rain based on a slider. When the slider is at one it creates less rain than when it is set at nine or ten. Our plants rely on reproduction rules and scatters to have them live and move. These rules support a good balance and show the interaction clearly.

2. STATEMENT OF THE PROBLEM:

In the world today there are hundreds of climates. Many of these climates are those such as the Amazons in South America, the frozen Tundra of Antarctica, or even the grassy plains in North America. There is one particular type of climate that we live in though. A dry and hot climate is what Albuquerque, New Mexico and the areas surrounding it are part of. New Mexico gets little rain and has a mild change in climate compared to areas such as New York City, New York and Juneau, Alaska.

Albuquerque's climate ranges from just under freezing temperatures to high 80's and 90's. Our question was 'what would happen to the climate and ecosystem if a rainstorm of such massive proportions sat on the state of New Mexico for a period of time'.

The goal would be to determine the effects and determine an efficient way to prepare for or negate the effects happening.

3. METHOD:

To solve our problem we did lots of research to determine that massive rainfall would cause great geological changes in the terrain and the displacement of plants. Causing near extinction of species with specific conditions needed to reproduce. These animals include the silvery minnow and many other animals.

To begin with we created a suitable terrain for our model. This included a valley.

We then went on to create and manipulate the rain. This included determining the method to have the rain descend accurately and sustainably. Doing this we had to work past over population and disappearance. Faulty rules and tests that caused reproducing of a rate that the program could not sustain, and rules that caused early death at an alarming rate. Our rain also eventually “eroded” and made the ground turn brown.

We then progressed and added the factor of plants that were unable to live on areas that the rain had run on. These plants also reproduced and were the food of rabbits.

The rabbits then provided food for the wolves and other predators. These predators hunted the rabbits by using scent and speed to catch their prey.

Eventually our simulation proved to render no remaining life in Space land other than the fall of rain. This was devastating and was what I was expecting.

4. THE RESULT OF THE STUDY:

Our study shows that enormous rainfall would cause great devastation to many animals and could potentially cause human casualties. We did discover various ways to prevent many of the effects. These include creating diversions and other ways to take the water if such were to happen. These diversions could lead to reservoirs that could take and use the water. This would also prevent excessive erosion and wildlife harm. Other options include more involved protection of animals. This would help grow populations and make sure a species could survive the blow dealt.

We also determined that a massive rainstorm would eventually take all fertility out of the soil and cause plants to die and not come back. The lack of plant life then sadly ended in the death of prey and then the death of the predators.

5. CONCLUSION:

In analyzing our results we determined that massive rainfall in a desert climate would rather than cause growth cause destruction and infertility. It would not cause growth because it would cause such great erosion that it would cause landslides and would wash away any nutrients the soil had hence halting plant growth. It was also determined, as has been known, that without the plant life animal life would also cease. These effects would take a long time to reverse.

Overall the effects could be prevented and halted but the technology to do so has yet to be invented.

6. ``REFERENCES, TABLES, AND OTHER PRODUCTS OF OUR WORK:

http://www.fgmorph.com/fg_2_1.php

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Greenberger, Robert, Deserts.

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7. OUR MOST SIGNIFICANT ORIGINAL ACHIEVEMENTS:

We think that our most significant achievement is learning, hands on, how to make a program.

I also believe that we have learned a lot about making a good model.

Nolan's most significant achievement is gaining more knowledge about the Rio Grande, about water and how it flows.

8. ACKNOWLEDGMENTS

Nick Bennett – For help with our programming, advice about our problem, and listening to all of our problems.

Roger Critchlow – For answering our plea for help and suggestions to narrow down our problem.

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