

Rapid Speed Of A Fire

Team Number: 17

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Area of Science: Environmental Sciences

Executive Summary

Fire spreads rapidly, which creates a problem when trying to save the Bosque. Natural resources, rainwater, and no trees around the fire are helpful in reducing fire in the Bosque area. Man-made resources, such as firemen, hoses, and helicopters that drop water directly above the fire, are also useful in reducing the spread of fire. Fire is very dangerous if it's not put out right away. It can spread extremely fast and is immensely dangerous.

Statement of Problem

Decreasing fire damage to the Bosque area in Albuquerque is essential. We plan to research current and past fires in the Bosque to learn how to reduce the spread of fires. We are trying to see how fast it grows and how far it spreads.

Description of the Method

As explained to us by a mentor, it will take half a gallon of water to put out a starting fire that just started. Fire can burn anything like trees, weeds, dry plants, dry grass, wooden gates, and wooden fences. We plan to use NetLogo to express the rapid speed of fire through the Bosque area. We will use code to illustrate how the fire can be stopped faster and less damage can happen to the area.

Discussion of Model

NetLogo is the coding program we used. It allows users to see how fast fire spreads, the tick speed, and the density. We've borrowed codes from Netlogo, and we're changing them up as well.

```

globals [
  initial-trees ;; how many trees (green patches) we started with  burned-trees ;; how
  many have burned so far
]

breed [fires fire] ;; bright red turtles -- the leading edge of the fire breed [embers ember] ;;
turtles gradually fading from red to near black

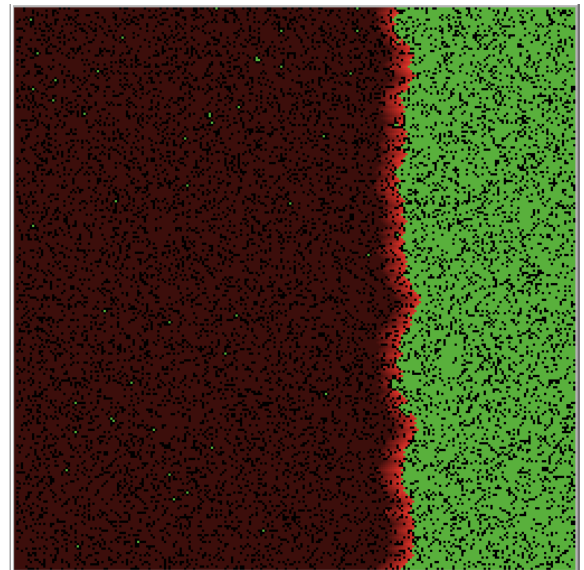
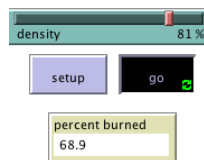
to setup
  clear-all
  set-default-shape turtles "square"
  ;; make some green trees
  ask patches with [(random-float 100) < density]
  [ set pcolor green ]
  ;; make a column of burning trees
  ask patches with [pxcor = min-pxcor]
  [ ignite ]
  ;; set tree counts
  set initial-trees count patches with [pcolor = green]
  set burned-trees 0
  reset-ticks
end

to go
  if not any? turtles ;; either fires or embers
  [ stop ]
  ask fires
  [ ask neighbors4 with [pcolor = green]
    [ ignite ]
    set breed embers ]
  fade-embers
  tick
end

;; creates the fire turtles
to ignite ;; patch procedure
  sprout-fires 1
  [ set color red ]
  set pcolor black
  set burned-trees burned-trees + 1
end

;; achieve fading color effect for the fire as it burns
to fade-embers
  ask embers
  [ set color color - 0.3 ;; make red darker
    if color < red - 3.5 ;; are we almost at black? [ set pcolor color
    die ] ]
end

```



Conclusion

Fires are a really extreme heat that burns everything in their path and is very destructive. There are approximately 70,000 wildfires per year, and that's especially not good for places that have droughts for long periods of time. The longest wildfire lasted for 5 months. We have become well informed on how to prevent house fires from bursting into flames and burning to the ground. We've also learned how to help stop fires from happening.

Our objective is to stop fires from spreading so fast from place to place. We started this project this year because we wanted to find out ways to stop fires from increasing. We have found many ways to stop fires from growing so fast. We thought the project would be an interesting topic to research/code/write about because we all want to know how to be much safer from fires. We also all enjoy finding out ways to help the world to be safer. We focused on fires in New Mexico.

Works Cited

NetLogo Home Page, ccl.northwestern.edu/netlogo/.

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Significant Achievements:

Isaiah- This year was very interesting. This was also my very first year in Challenge. I have learned how to do some coding, socialize, and write faster. I gained more confidence in myself.

Elijah- Learning to work together with people, learning how to code, and socialize was something that gave me more confidence. This was my first year in the Challenge.

Acknowledgment of People:

Mrs. Glennon - The sponsor gives us snacks, reads our papers, and edits them.

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Steven Gurin- SimTable, fire reference