Extensions [gis]

globals [

DryP ;; Dry fuel patches

WetP ;; Wet fuel patches

DevP ;; Dev ignition patches

WtrP ;; Wtr barrier patches

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

patches-own [is-dry

is-wet

is-dev

is-wtr

is-IgP] ;;setting patch variables

to setup

clear-all

set-default-shape turtles "square"

;;set DryP gis:load-dataset "C:/Users/kevin/Desktop/583 - Project 4/ASCII/DryP.asc" ;;Loading Datasets to Globals

set WetP gis:load-dataset "C:/Users/kevin/Desktop/583 - Project 4/ASCII/WetP.asc"

set DevP gis:load-dataset "C:/Users/kevin/Desktop/583 - Project 4/ASCII/DevP.asc"

set WtrP gis:load-dataset "C:/Users/kevin/Desktop/583 - Project 4/ASCII/WtrP.asc"

gis:set-world-envelope (gis:envelope-of WtrP) ;;Set world envelope to match files from GIS

;;gis:apply-raster Dryp is-dry ;;not working, workaround is setting background patches to YELLOW

gis:apply-raster Wetp is-wet ;;assign patch variables to raster datasets

gis:apply-raster Devp is-dev

gis:apply-raster Wtrp is-wtr

ask patches [ set pcolor yellow ] ;;making all the background patches to yellow since couldn't load DryP

ask patches with [is-wet = 1][ set pcolor green ]

ask patches with [is-dev = 1][ set pcolor gray ]

ask patches with [is-wtr = 1][ set pcolor cyan ]

ask patches [

if ((pcolor = yellow) and (random-float 1000 < rainfall)) ;;converts randomly selected dry patches to wet

[set pcolor green]]

ask patches [

if (pcolor = yellow) ;; makes dry patches ignition points

[set is-IgP 1]]

ask patches with [is-dev = 1] ;;ignites randomly selected dry fuel next to developed areas

[ask neighbors [if (is-IgP = 1) and (random-float 20000 < 3)

[ ignite ]]]

;; set tree counts

set initial-trees count patches ;;to calculate total burned area out of total # of patches

set burned-trees 0

reset-ticks

end

to go

if not any? turtles ;; either fires or embers

[ stop ]

ask fires

[ ask neighbors [ ;;different probabilities of burning different types of patches

if ((pcolor = yellow) or ((pcolor = green) and (random-float 100 < 30)) or ((pcolor = gray) and (random-float 100 < 10)))[ignite]]

set breed embers ]

fade-embers

tick

end

;; creates the fire turtles

to ignite ;; patch procedure

sprout-fires 1

[ set color red ]

set pcolor brown

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

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