Weight and Veterans' Environments Study

Neighborhood land area: Weight and Veterans' Environments Study GIS protocol

Xiang W, Jones KK, Matthews SA, Zenk SN.

UIC Neighborhoods + Health

Overview

This protocol describes the method by which the area of egocentric neighborhood measures was adjusted for land area.

Acknowledgements

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Table of Contents

Background

This document describes the work process for constructing land area-based measures.

Data

Sources

The data is obtained from ESRI ArcGIS StreetMap Premium 2013 disks, and the data source is Navteq (now called HERE).

Definitions

Land variables definition and years

The land grid is created by taking a shapefile of the detailed water body in the US, subtract (via ArcGIS tool "Erase") the water file from a mask file that represents the shape of the US, to create a land shapefile (which has holes to represent water body), then create grids using the newly created land file.

We assume the water area do not change much over years, so only one land area file was greated.

Cleaning

Create land polygon file

The "Erase" process discussed above is done manually in ArcGIS.

The result of the process is a land polygon file.

Decisions

Land polygon file to raster

Using the land polygon file in ArcGIS, a numeric column "count" is added, calculate count=1.

Then Python script is used to convert the land polygon to raster, in which land area will have value of 1, water area will have NoData value.

The Python script to convert polygon to raster is given in Appendix A.

For reference in future scripts, the result is the "land_detailed" raster file.

Land grids generation process

Using the base raster files generated from the last step, Python script is used (given in Appendix B) to create the land grids for 400m, 1600m, 4800m and 8000m:

Appendix

Software

The software used is ArcGIS 10.3.1 and Python 2.7.

Script

Note: Script will need to be adjusted with project-specific file names and locations.

A: Polygon to raster

```
#this script is for generating the water grids
#it converts polygon to raster

import arcpy,sys, os, time
from arcpy.sa import *


in_workspace = {insert file location}
out_workspace = {insert file location}
arcpy.env.workspace = in_workspace
arcpy.env.extent = "-2493045.0 -1429501.25 2342655.0 1703218.75"
arcpy.env.overwriteOutput = True
#arcpy.CheckOutExtension("Spatial")


featureList = arcpy.ListFeatureClasses()
for count,feature in enumerate(featureList):
                if feature == "USAContinental_noWater_detailed.shp":
                                lyr_feature = "lyr"+str(count)
                                arcpy.MakeFeatureLayer_management(feature, lyr_feature)
                                '''
                                for field in arcpy.ListFields(lyr_feature):
                                                if field.type == "OID":
                                                                OBJECTID = str(field.name)

        arcpy.PolygonToRaster_conversion(lyr_feature,OBJECTID,out_workspace+feature+"_CO
UNT","CELL_CENTER","",30)
                                '''


        arcpy.PolygonToRaster_conversion(lyr_feature,"count",out_workspace+"land_detailed"
,"CELL_CENTER","",30)
                                print feature
```

B: Grid Generation

```
#park grids generation

import arcpy
```

```
from arcpy.sa import *

in_workspace = {insert file location}
out_workspace = {insert file location}
arcpy.env.workspace = in_workspace
arcpy.env.extent = "-2493045.0 -1429501.25 2342655.0 1703218.75"
arcpy.env.overwriteOutput = True
arcpy.CheckOutExtension("Spatial")



#set focal statistics variables

neighborhood_400 = NbrCircle(400, "MAP")
neighborhood_1600 = NbrCircle(1600, "MAP")
neighborhood_4800 = NbrCircle(4800, "MAP")
neighborhood_8000 = NbrCircle(8000, "MAP")

# land grid
# Set focal statistics variables
lyr = "Land Detailed"
arcpy.MakeRasterLayer_management("land_detailed", lyr)
inRaster = lyr

# Execute FocalStatistics

outFocalStatistics = FocalStatistics(inRaster, neighborhood_400, "SUM","")
outFocalStatistics.save(out_workspace+"land_detailed_400m")
print inRaster

outFocalStatistics = FocalStatistics(inRaster, neighborhood_1600, "SUM","")
outFocalStatistics.save(out_workspace+"land_detailed_1600m")
print inRaster

outFocalStatistics = FocalStatistics(inRaster, neighborhood_4800, "SUM","")
outFocalStatistics.save(out_workspace+"land_detailed_4800m")
print inRaster

outFocalStatistics = FocalStatistics(inRaster, neighborhood_8000, "SUM","")
outFocalStatistics.save(out_workspace+"land_detailed_8000m")
print inRaster
```