Suitability Analysis using Arcpy.

This notebook uses arcpy to perform a suitability analysis on a DSM. First, I will extract the DSM from DRUM. Then I will merge the rasters. Finally, I will use a hillshade, reclass, and multiply the rasters.

In [2]:
```
import numpy as np
import arcpy
import requests
```

Part 1 Extracting the DSM From DRUM

In [18]:
```
drum = "https://conservancy.umn.edu/" ##main site

handle = "handle/11299/166578/" ## Handle found in the metadata

query = "discover?query=DSM"

information =  requests.get(drum + handle + query)

new_handle = "handle/11299/172696/" #found in information.content

ashland = "q2758_DSM.zip" ##dsm needed


end = "?sequence=9&isAllowed=y" ##what I needed to add for it to work


r = requests.get(drum + "bitstream/" +new_handle + ashland + end)

open(ashland, 'wb').write(r.content)
import zipfile
with zipfile.ZipFile(ashland, 'r') as zip_ref:
    zip_ref.extractall("d:/git/GIS5572shpfiles/projdata/")
```

Part 2: Merging the rasters

In [19]:
```
arcpy.env.workspace = "D:/git/GIS5572shpfiles/projdata/q2758/" ##Worksp
ace where the rasters are.
```

In [20]:
```
rasters = arcpy.ListRasters()

merge = rasters[0] ##defining the raster to merge.
rasters
```

Out[20]:
```
['2758-01-09_2786.img',
 '2758-03-03_2652.img',
 '2758-03-07_2719.img',
 '2758-06-01_2651.img']
```

In [21]:
```
arcpy.management.Mosaic(rasters, merge) ## Merging rasters
```

Out[21]:

Output

D:/git/GIS5572shpfiles/projdata/q2758\2758-01-09_2786.img

Messages

Start Time: Wednesday, May 5, 2021 1:12:03 PM
D:/git/GIS5572shpfiles/projdata/q2758\2758-01-09_2786.img is loading...
D:/git/GIS5572shpfiles/projdata/q2758\2758-03-03_2652.img is loading...
D:/git/GIS5572shpfiles/projdata/q2758\2758-03-07_2719.img is loading...
D:/git/GIS5572shpfiles/projdata/q2758\2758-06-01_2651.img is loading...
Succeeded at Wednesday, May 5, 2021 1:13:17 PM (Elapsed Time: 1 minutes 14 seconds)

Part 3: Performing the Suitability Analysis.

In [22]:
```
arcpy.env.workspace = 'D:/Users/Owner/Documents/ArcGIS/Projects/Arc2_Project_4_25_2021/Arc2_Project_4_25_2021.gdb/'
arcpy.env.overwriteOutput = True  ##Default Geodatabase
```

In [26]:
```
arcpy.management.CopyRaster("D:/git/GIS5572shpfiles/projdata/q2758/2758-01-09_2786.img", 'DSM') ##merged DSM
arcpy.management.CopyRaster("D:/git/GIS5572shpfiles/projdata/q2758/2758-03-03_2652.img", "DSM_52") ##just one tile, much quicker
```

Out[26]:

Output

D:/Users/Owner/Documents/ArcGIS/Projects/Arc2_Project_4_25_2021
/Arc2_Project_4_25_2021.gdb\DSM_52

Messages

Start Time: Wednesday, May 5, 2021 2:15:54 PM
Building Pyramids...
Calculating Statistics...
Succeeded at Wednesday, May 5, 2021 2:16:25 PM (Elapsed Time: 30.54 seconds)

In [27]:
```
arcpy.ddd.HillShade("DSM_52", "HillSha_winAM",131.87, 5, "NO_SHADOWS",
1) #Input, output, azimuth, zenith, and z factor
ShadowWinteram_raster = arcpy.sa.Reclassify("HillSha_winAM", "Value", "
1 255 1", "DATA"); ShadowWinteram_raster.save("D:/Users/Owner/Documents
/ArcGIS/Projects/Arc2_Project_4_25_2021/Arc2_Project_4_25_2021.gdb/Wint
erAM")

##Hillshade and Reclassify Winter Solstice Morning
```

In [28]:
```
arcpy.ddd.HillShade("DSM_52", "HillSha_winPM", 228.11, 5, "NO_SHADOWS",
1)
ShadowWinterpm_raster = arcpy.sa.Reclassify("HillSha_winPM", "Value", "
1 255 1", "DATA"); ShadowWinterpm_raster.save("D:/Users/Owner/Documents
/ArcGIS/Projects/Arc2_Project_4_25_2021/Arc2_Project_4_25_2021.gdb/Wint
erPM")

##Hillshade and Reclassify Winter Solstice Evening
```

In [29]:
```
arcpy.ddd.HillShade("DSM_52", "HillSha_sumAM", 60.66, 5, "NO_SHADOWS",
1)
ShadowSummeram_raster = arcpy.sa.Reclassify("HillSha_sumAM", "Value", "
1 255 1", "DATA"); ShadowSummeram_raster.save("D:/Users/Owner/Documents
/ArcGIS/Projects/Arc2_Project_4_25_2021/Arc2_Project_4_25_2021.gdb/Summ
erAM")

##Hillshade and Reclassify Summer Solstice Morning
```

In [30]:
```
arcpy.ddd.HillShade("DSM_52", "HillSha_sumPM", 299.33, 5, "NO_SHADOWS",
1)
ShadowSummerpm_raster = arcpy.sa.Reclassify("HillSha_sumPM", "Value", "
1 255 1", "DATA"); ShadowSummerpm_raster.save("D:/Users/Owner/Documents
/ArcGIS/Projects/Arc2_Project_4_25_2021/Arc2_Project_4_25_2021.gdb/Summ
erPM")

##Hillshade and Reclassify Winter Solstice Morning
```

In [34]:
```
Final_52 = arcpy.Raster("WinterAM") * arcpy.Raster("WinterPM") * arcpy.
Raster("SummerAM") * arcpy.Raster("SummerPM") ##Multiplying all four ra
sters to get one suitability output
```

In [36]:
```
Final_52.save("D:/Users/Owner/Documents/ArcGIS/Projects/Arc2_Project_4_
25_2021/Arc2_Project_4_25_2021.gdb/Final") ##Saving the output.
```

The final output is stored the database. This conclude the notebook.