# **Example: Water Ladder Marginal**

import arcpy

import numpy

import csv

from arcpy import env

from arcpy.sa import \*

arcpy.env.cellSize = 2.5

arcpy.env.overwriteOutput = True

arcpy.env.workspace = "D:/Data/Dropbox/Lactuca/Temp"

arcpy.env.extent = "Research\_Areas"

arcpy.env.outputCoordinateSystem = "Research\_Areas"

betas = [~, 3.617,-0.3003,0.0148,-0.000411,1.534e-07,0.000150,-2.2047e-08,-0.0222,0.000246,

-1.778e-07,0.000182,-4.232e-08,0.000116,-1.199e-07,-7.943e-05,1.383e-08,7.933e-05,-1.390e-08,-1.708e-05]

outRas1 = (betas[2]\* Log10(Raster("Pop\_2019Cor")+1))+( betas[3]\* Square(Log10(Raster("Pop\_2019Cor")+1)))

outRas2 = (betas[4]\*(Raster("Distances\DistToiletRdArea")))+ (betas[5]\* Square(Raster("Distances\DistToiletRdArea")))

outRas3 = (betas[6]\* (Raster("Distances\DistBinsEuc")))+( betas[7]\*Square(Raster("Distances\DistBinsEuc")))

outRas4 = (betas[8]\*(Log10(Raster("Distances\DistNalasRdArea")+1)))

outRas5 = (betas[9]\*(Raster("Distances\DistParksEuc"))) +(betas[10] \*Square(Raster("Distances\DistParksEuc")))

outRas6 = (betas[11]\*\*(Raster("Distances\DistPlaydArea")))+( betas[12]\*Square( Raster("Distances\DistPlaydArea")))

outRas7 = (betas[13]\*(Raster("DistOpenRdArea")))+(betas[14]\*Square( Raster("DistOpenRdArea")))

outRas8 = (betas[15]\*(Raster("Distances\DistForestEuc")))+( betas[16] \*Square(Raster("Distances\DistForestEuc")))

outRas9 = (betas[17]\*(Raster("Distances\DistWaterRdArea")))+ (betas[18]\*Square(Raster("Distances\DistWaterRdArea")))

outRas10 = (betas[19]\*(Raster("Distances\TownCentreEuc")))

# **Combine rasters**

arcpy.env.outputCoordinateSystem = "Research\_Areas"

arcpy.env.cellSize = 2.5

OutRasFull = betas[1] + Raster("outRas1 ")+ Raster("outRas2 ") + Raster("outRas3 ") + Raster("outRas4 ") + Raster("outRas5 ") + Raster("outRas6 ") + Raster("outRas7 ") + Raster("outRas8 ") + Raster("outRas9 ") + Raster("outRas10 ")

OutRasFullScaled = ((Con("WaterMarginal"<1,1,Con("WaterMarginal">4,4,"WaterMarginal")))-1)/3

# **Clip to shape**

arcpy.Clip\_management("OutRasFullScaled", "Research\_Areas", " OutRasFullScaledClipped.tif", "Research\_Areas", "ClippingGeometry", "MAINTAIN\_EXTENT")

**# Possible factors**

" GHMCWorldPop\_2000.tif"

" Pop\_2019Cor"

"PopGrowth2000\_2019"

"DistToiletsEuc"

"DistToiletRdArea"

"DistBinsEuc"

"DistBinsRdArea"

"DistHealthEuc"

"DistHealthRdArea"

"DistSlumsEuc"

"DistSlumsRdArea"

"DistNalasEuc"

"DistNalasRdArea"

"DistParksEuc"

"DistParksRdArea"

"DistPlayEuc"

"DistPlaydArea"

"DistOpenEuc"

"DistOpenRdArea"

"DistForestEuc"

"DistForestArea"

"DistWaterEuc"

"DistWaterRdArea"

"BuildingDensityHa"

"TownCentreEuc"

"DistCentreRdArea"

# Linear and quadratic functions

outRasx = (betas[x]\* (Raster("y")))

outRasx = (betas[x]\* Log10(Raster("y")+1))

outRasx = (betas[x]\* (Raster("y"))) +(betas[x]\* Square(Raster("y")))

outRasx = (betas[x]\* Log10(Raster("y")+1))+(betas[x]\* Square(Log10(Raster("y")+1)))