

## Procedure Log for Assignment 10 – Suitability Analysis and Weighted Overlay

Problem: Wildlife biologists working in Great Smoky Mountains National Park are seeking to define areas of bear habitat within the park where human interactions are unlikely to occur.

| Factors    | Least favorable                | Favorable                                                        | Most Favorable   |
|------------|--------------------------------|------------------------------------------------------------------|------------------|
| Roads      | 0 - 0.5 miles                  | 0.5-1 mile                                                       | > 1 mile         |
| Streams    | > 1 mile                       | 0.5-1 mile                                                       | 0 - 0.5 miles    |
| Trails     | 0 - 0.5 miles                  | 0.5-1 mile                                                       | > 1 mile         |
| Vegetation | - All other vegetation classes | - Cove Hardwood<br>- Mixed Mesic Hardwood<br>- Northern Hardwood | - Grape Thickets |
| Slope      | > 60 degrees                   | 30-60 degrees                                                    | 0-30 degrees     |

Procedure Log:

Data: Data was provided by NCSU GIS 520.

elev\_all: elevation data for Great Smoky Mountains National Park and surrounding area  
(raster)

roads.shp: roads in Great Smoky Mountains National Park (line)

streams.shp: streams in Great Smoky Mountains National Park (line)

trails.shp: trails in Great Smoky Mountains National Park (line)

veg\_poly\_clipped.shp: vegetation types in Great Smoky Mountains National Park (polygon)

Projection: All spatial files are projected in UTM, NAD27, zone 17, meters.

Limit output processing extent to the vegetation layer.

Target layer: veg\_poly\_clipped

Geoprocessing > Environments

Processing Extent > Extent > Same as layer veg\_poly\_clipped

Set cell size to 30m.

Geoprocessing > Environments

Raster Analysis > Cell Size > As Specified Below > 30

In model builder:

Calculate slope from the elevation model.

Target layer: elev\_all

Tool: Slope

Input raster: elev\_all  
Output raster: Slope\_elev  
Output measurement: DEGREE

Change vegetation layer to raster.  
Target layer: veg\_poly\_clipped  
Tool: Feature to Raster  
Field: GRID\_CODE  
Output raster: Veg\_raster  
Output cell size: 30

Calculate distance to trails.  
Target layer: trails  
Tool: Euclidean Distance  
Input raster or feature source data: trails  
Output distance raster: EucDist\_trail  
Output cell size: 30

Calculate distance to streams.  
Target layer: streams  
Tool: Euclidean Distance  
Input raster or feature source data: streams  
Output distance raster: EucDistStream  
Output cell size: 30

Calculate distance to roads.  
Target layer: roads  
Tool: Euclidean Distance  
Input raster or feature source data: roads  
Output distance raster: EucDist\_roads  
Output cell size: 30

Reclassify slope raster to fit suitability categories.  
Target layer: Slope\_elev  
Tool: Reclassify  
Reclass field: Value  
Classify > Manual Breaks > 3 (30, 60, & max)  
Adjust new values as below.

| Old values     | New values |
|----------------|------------|
| 0 - 30         | 3          |
| 30 - 60        | 2          |
| 60 - 65.053215 | 1          |
| NoData         | NoData     |

Output raster: Reclass\_Slope

Reclassify vegetation to fit suitability categories.

Target layer: Veg\_raster

Tool: Reclassify

Reclass field: Value

Classify > Manual Breaks > 7

Adjust old values and new values as below.

| Old values | New values |
|------------|------------|
| 1          | 1          |
| 2 - 3      | 2          |
| 4          | 1          |
| 5          | 2          |
| 6 - 11     | 1          |
| 12         | 3          |
| 13 - 14    | 1          |
| NoData     | NoData     |

Output raster: Reclass\_Veg

Reclassify distance to trails to fit suitability categories.

Target layer: EucDist\_trail

Tool: Reclassify

Reclass field: Value

Classify > Manual Breaks > 3

Adjust old values and new values as below.

| Old values              | New values |
|-------------------------|------------|
| 0 - 804.672             | 1          |
| 804.672 - 1609.344      | 2          |
| 1609.344 - 16482.671875 | 3          |
| NoData                  | NoData     |

Output raster: Reclass\_Trail

Reclassify distance to streams to fit suitability categories.

Target layer: EucDistStream

Tool: Reclassify

Reclass field: Value

Classify > Manual Breaks > 3

Adjust old values and new values as below.

| Old values              | New values |
|-------------------------|------------|
| 0 - 804.672             | 3          |
| 804.672 - 1609.344      | 2          |
| 1609.344 - 16290.027344 | 1          |
| NoData                  | NoData     |

Output raster: ReclassStream

Reclassify distance to roads to fit suitability categories.

Target layer: EucDist\_roads

Tool: Reclassify

Reclass field: Value

Classify > Manual Breaks > 3

Adjust old values and new values as below.

| Old values              | New values |
|-------------------------|------------|
| 0 - 804.672             | 1          |
| 804.672 - 1609.344      | 2          |
| 1609.344 - 14463.764648 | 3          |
| NoData                  | NoData     |

Output raster: Reclass\_Roads

Create weighted overlay raster with equal weights for all 5 layers.

Target layers: Reclass\_Slope, Reclass\_Veg, Reclass\_Trail, Reclass\_Trail, ReclassStream, Reclass\_Roads

Tool: Weighted Overlay

Weighted overlay table > % Influence 20% for each raster

Weighted overlay table > Scale Values as below.

| Raster               | % Influence | Field  | Scale Value |
|----------------------|-------------|--------|-------------|
| Reclassified Slope   | 20          | VALUE  | ↶           |
|                      |             | 1      | 1           |
|                      |             | 2      | 2           |
|                      |             | 3      | 3           |
|                      |             | NODATA | NODATA      |
| Reclassified Veget   | 20          | VALUE  | ↶           |
|                      |             | 1      | 1           |
|                      |             | 2      | 2           |
|                      |             | 3      | 3           |
|                      |             | NODATA | NODATA      |
| Reclassified Dist. t | 20          | VALUE  | ↶           |
| Trails               |             | 1      | 1           |
|                      |             | 2      | 2           |
|                      |             | 3      | 3           |
|                      |             | NODATA | NODATA      |
| Reclassified Dist. t | 20          | VALUE  | ↶           |
| Streams              |             | 1      | 1           |
|                      |             | 2      | 2           |
|                      |             | 3      | 3           |
|                      |             | NODATA | NODATA      |
| Reclassified Dist. t | 20          | VALUE  | ↶           |
| Roads                |             | 1      | 1           |
|                      |             | 2      | 2           |
|                      |             | 3      | 3           |
|                      |             | NODATA | NODATA      |

Evaluation scale: 1 to 3 by 1

Output raster: Weighted\_Rast