

Corridor Modeling



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Corridor Modeling – *Overview*

- At this stage, we know...
 - *what* we want to connect
 - *who* we want to connect
 - *where* potential suitable habitat is for each species
 - *how much* potential suitable habitat for each species
- What we still need to know...
 - how to get a **continuous strand of good habitat?**

Corridor Modeling – *CorridorDesigner*

1) Create corridor model

Output Workspace

Species Name (9 characters max)

Habitat Suitability Model

Wildland Block 1

Wildland Block 2

Patch Configuration Text File (optional)

Moving Window (optional)
Rectangle

Neighborhood Settings

Height: 1

Width: 1

Units: ☒ Cell ☐ Map

Patch Quality Threshold (optional)

Minimum Home Range Patch Size (ha) (optional)
0

Minimum Population Patch Size (ha) (optional)
0

OK Cancel Environments... Show Help >>

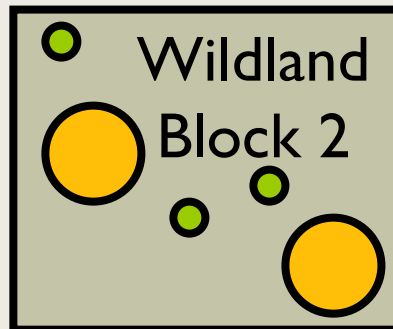
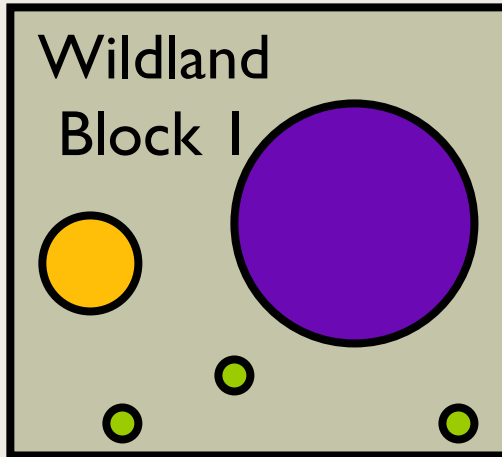
- Converting suitability to resistance
- Determining termini for corridor
- The cost distance algorithm
- Determining corridor width

Corridor Modeling – *Resistance*

- Empirical methods to estimate resistance, but...
 - Still experimental
 - Difficult and costly for many species
- Solution: assume *resistance is inverse of suitability*

Bad	Suitability	Resistance/Cost	Bad
	90	10	
0	30	70	100

Corridor Modeling – *Corridor Termini*



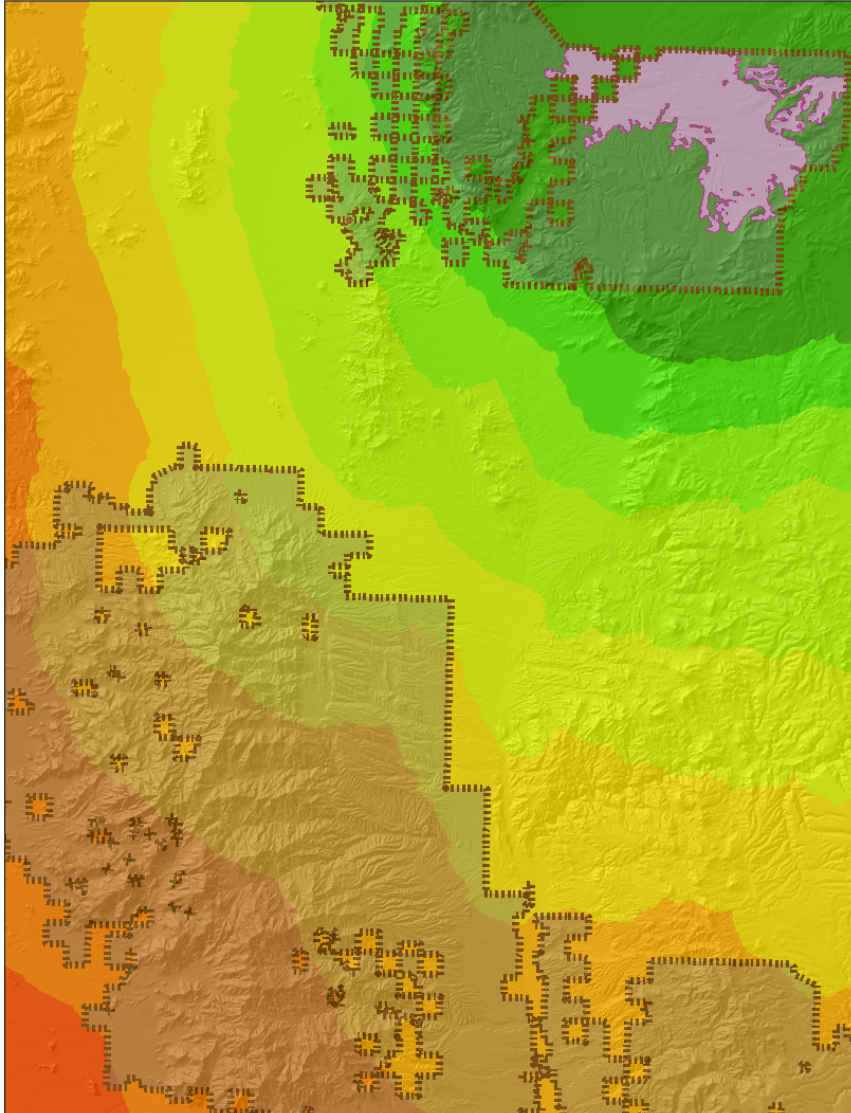
- Pre-defined termini:
 - Draw known populations
 - Wildland blocks
- Calculated termini within Wildland blocks
 1. Population patches
 2. Breeding patches
 3. Any available habitat

Corridor Modeling – *Cost Distance*

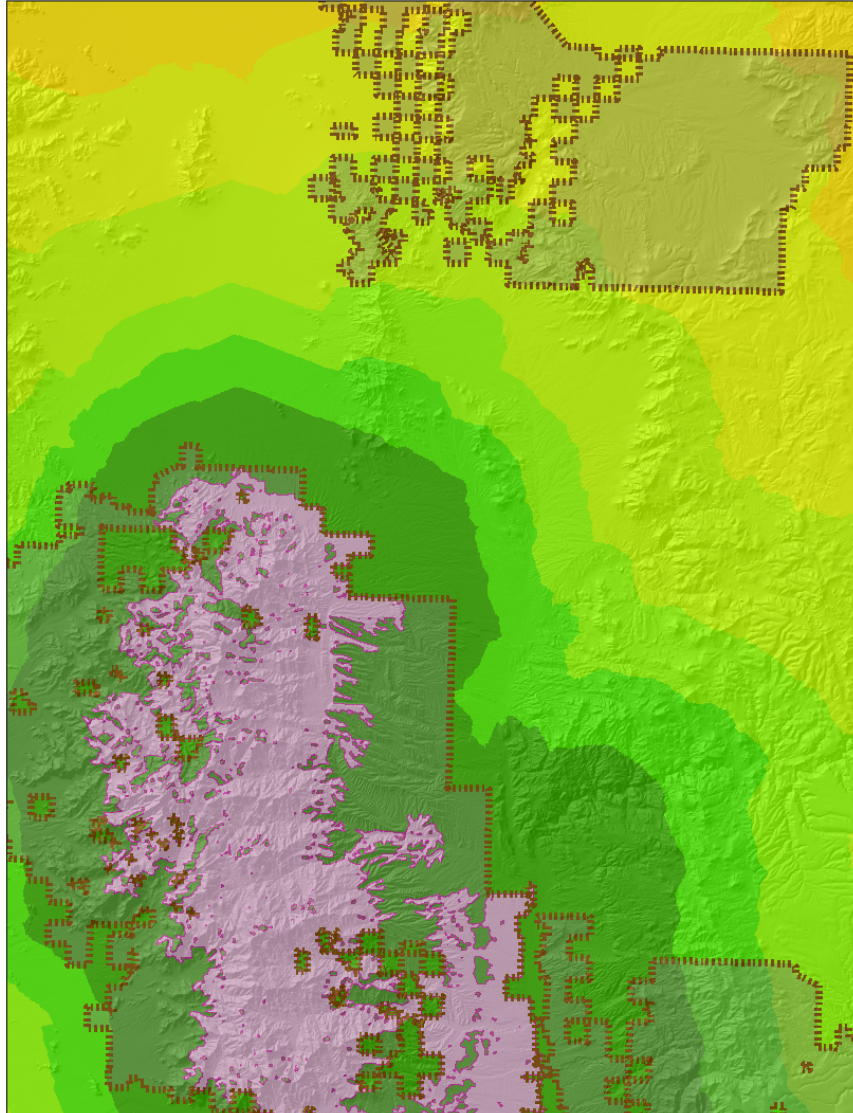
32	38	75	17	13	Terminus 2	
42	37	44	12	50		
53	51	75	44	68	19	55
26	10	73	35	23	64	17
24	33	48	64	17	51	59
Terminus 1		35	12	11	59	18
		25	12	13	84	86

- **Cost distance** – value calculated for *each cell*
- Least cost of traveling from each cell to each terminus.
- Calculated automatically in CorridorDesigner

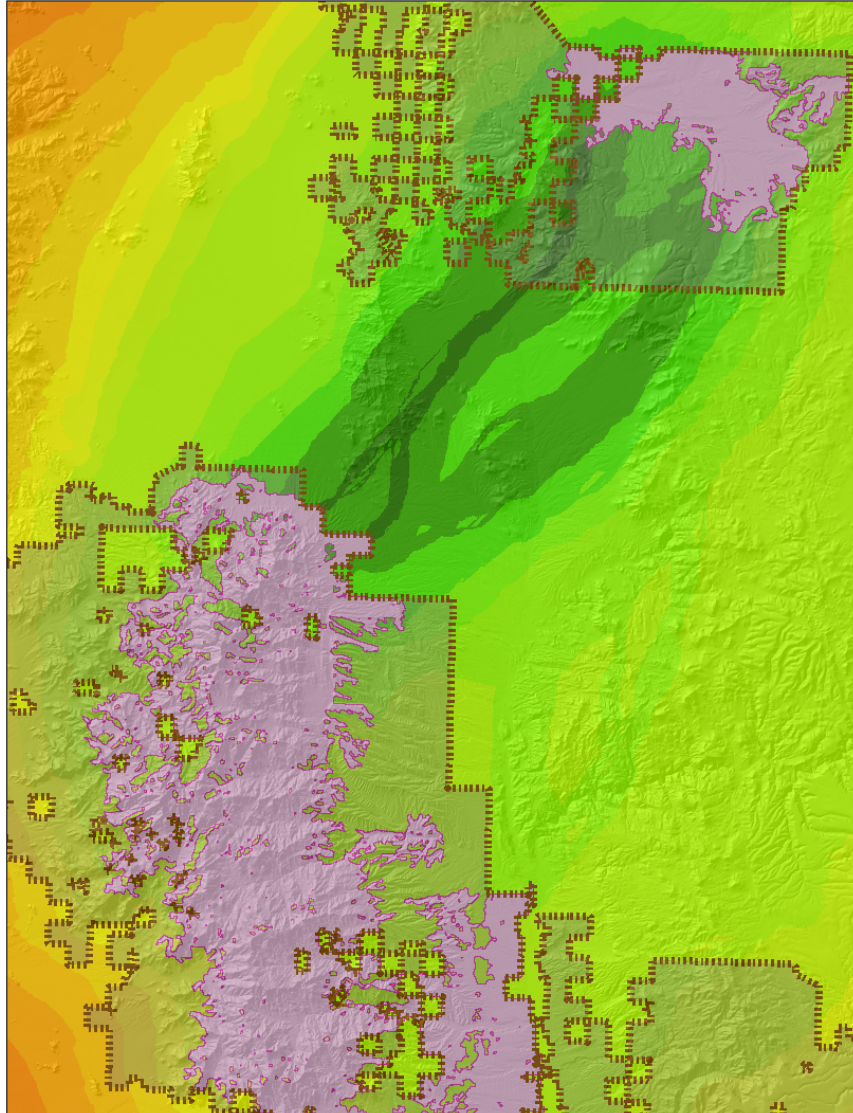
Corridor Modeling – *Cost Distance 1*



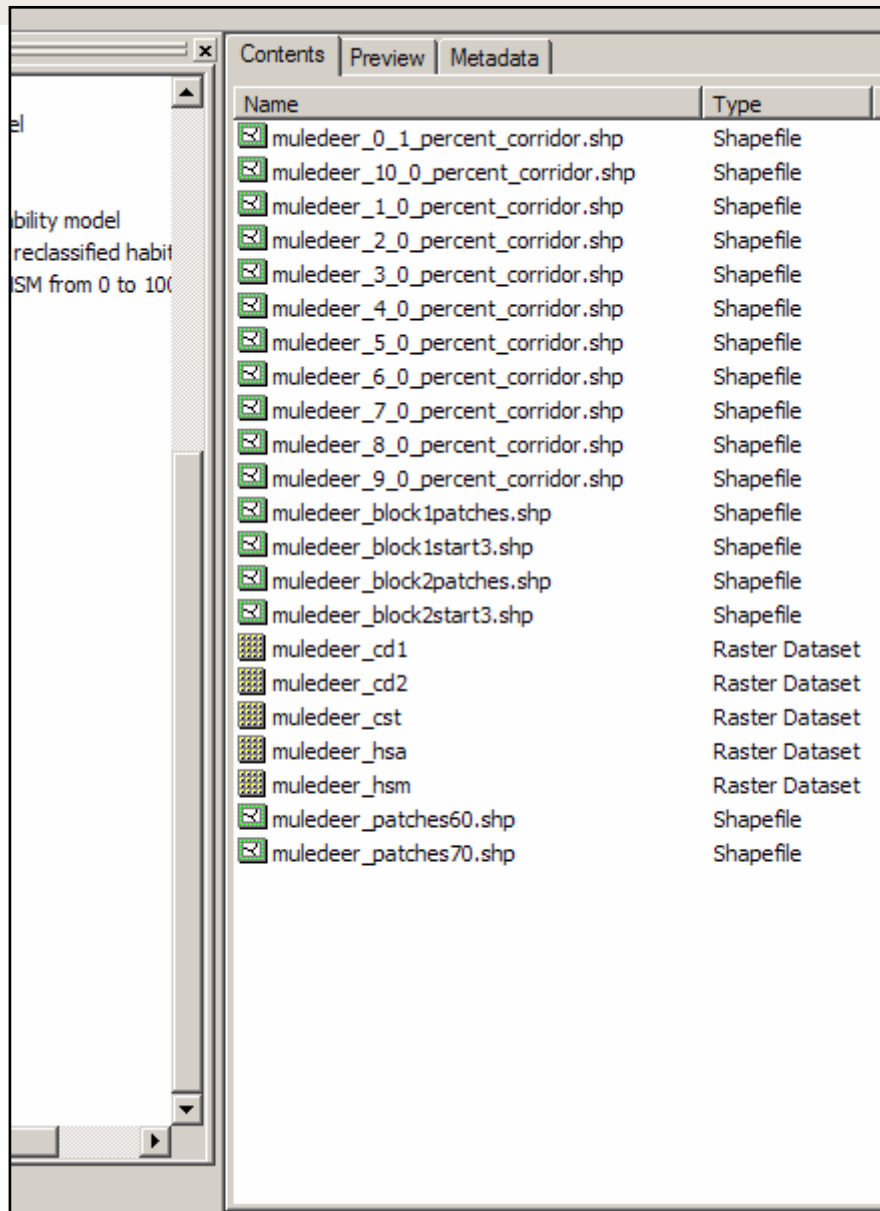
Corridor Modeling – *Cost Distance 2*



Corridor Modeling — *Summed Cost Distance*



Corridor Modeling – *Choosing corridors*



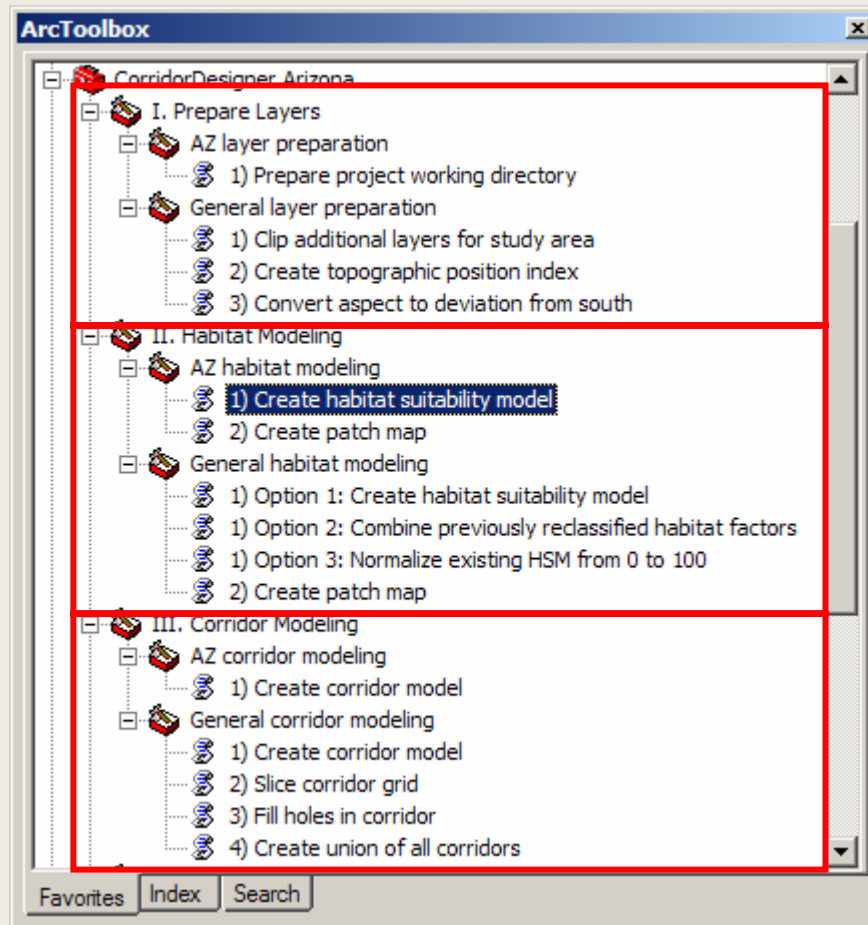
- Width dependent on species & landscape
- Width selected by choosing most permeable fraction of landscape
 - 1_0_percent_corridor
 - 2_0_percent_corridor
- Iterative process

Corridor Modeling – *Review*

- CorridorDesigner treats **resistance** as the **opposite of suitability**
- Define **meaningful termini** for corridor analysis
 - CorridorDesigner selects for 1) population patches, 2) breeding patches, or 3) any habitat found within Wildland blocks
- Optimal width of corridor dependent on species and landscape

Habitat, Patch, & Corridor Modeling Review

CorridorDesigner – *Toolbox Overview*



- Divided into tools for:
 - Layer preparation
 - Habitat & patch modeling
 - Corridor modeling
- Additional streamlined tools for Arizona
 - Less inputs to fill out
 - Could be adapted for other states

CorridorDesigner – *Habitat Modeling*

1) Option 1: Create habitat suitability model

Method of Combining Factors
Geometric Mean

Output Habitat Suitability Model

☒ Delete Temporary Factors?

Habitat Factor 1

Factor 1 Reclass Table

Factor 1 Weight
0

Habitat Factor 2 (optional)

Factor 2 Reclass Table (optional)

Factor 2 Weight (optional)
0

OK Cancel Environments... Show Help >>

- Select habitat factors
- Weight factors
- Score classes within factors
- Combine factors

CorridorDesigner – *Patch Modeling*

2) Create patch map

Habitat Suitability Map

Output Patch Shapefile

Average HSM Using Moving Window (optional)

Circle

Neighborhood Settings

Radius: 200

Units: ☐ Cell ☒ Map

Habitat Patch Quality Threshold

50

Minimum Home Range Patch Size (ha)

Minimum Population Patch Size (ha) (optional)

OK Cancel Environments... Show Help >>

- Define habitat patches
 - Neighborhood based on species perceptual range, & influence of adjacent pixels.
 - Habitat quality threshold
- Define meaningful patch sizes

Corridor Modeling – *Corridor Modeling*

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Patch Quality Threshold (optional)

Minimum Home Range Patch Size (ha) (optional)
0

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0

OK Cancel Environments... Show Help >>

- Convert suitability to resistance
- Determine termini for corridor
- Calculate cost distance to each terminus
- Determine preliminary corridor