

Patch Modeling



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CorridorDesigner Workshop

Patch Modeling – *CorridorDesigner*

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

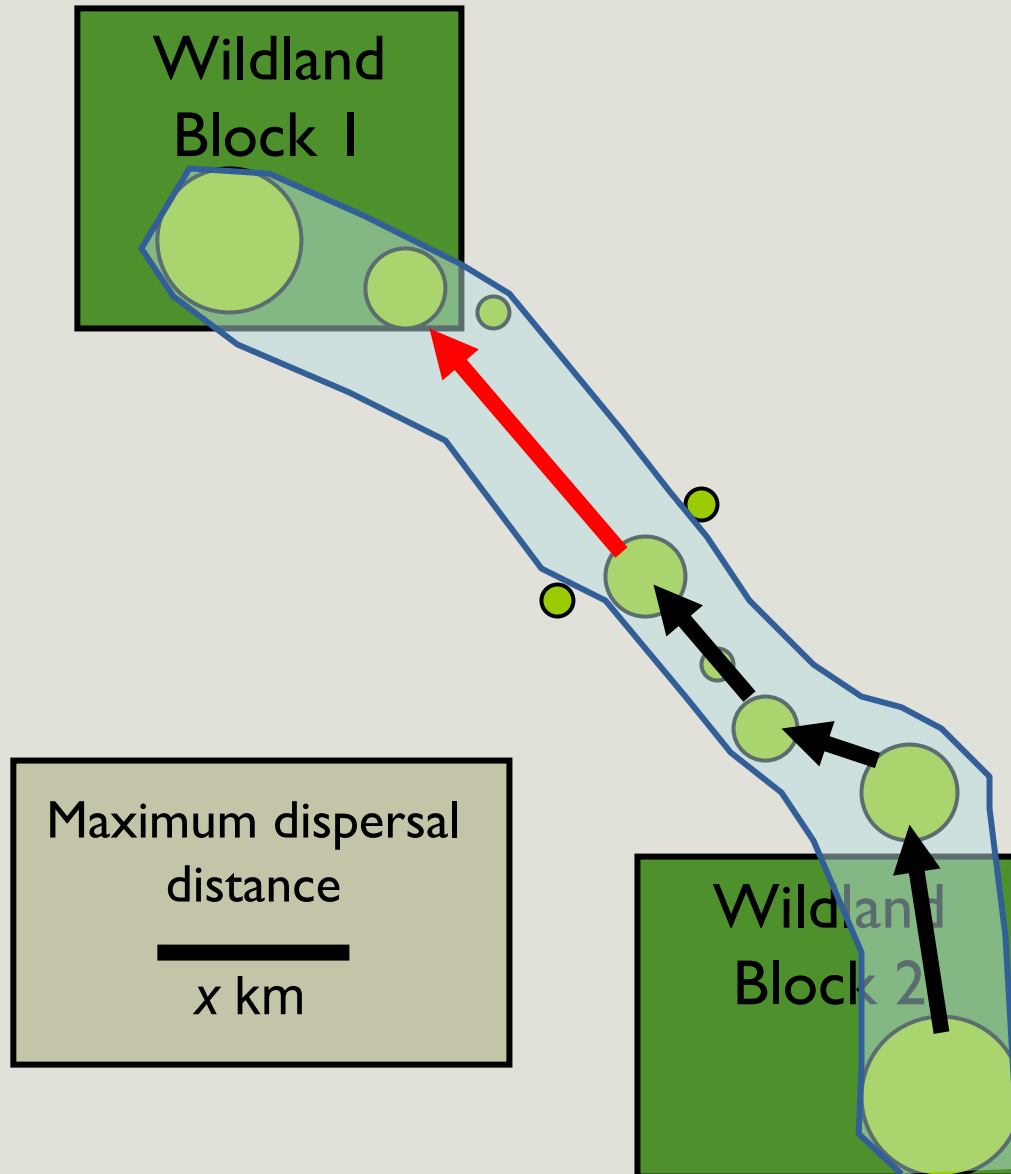
Minimum Home Range Patch Size (ha)

Minimum Population Patch Size (ha) (optional)

OK Cancel Environments... Show Help >>

- Why are patches important for corridor modeling?
- How are patches defined?
 - Neighborhood based on species perceptual range, need for space, and influence of adjacent pixels.
 - Habitat quality threshold
- Defining meaningful patch sizes

Patch Modeling – *Patches and Corridors*



- Start/end patches *within* wildland blocks for corridors to connect
- Delineate possible steppingstones
- Useful metrics for assessing functionality

Patch Modeling – *Overview*

- What is a **habitat patch**?
 - Contiguous area of habitat suitable for breeding
- Patches are species specific
 - One species breeding patch is another species' nightmare
- Patches are landscape specific

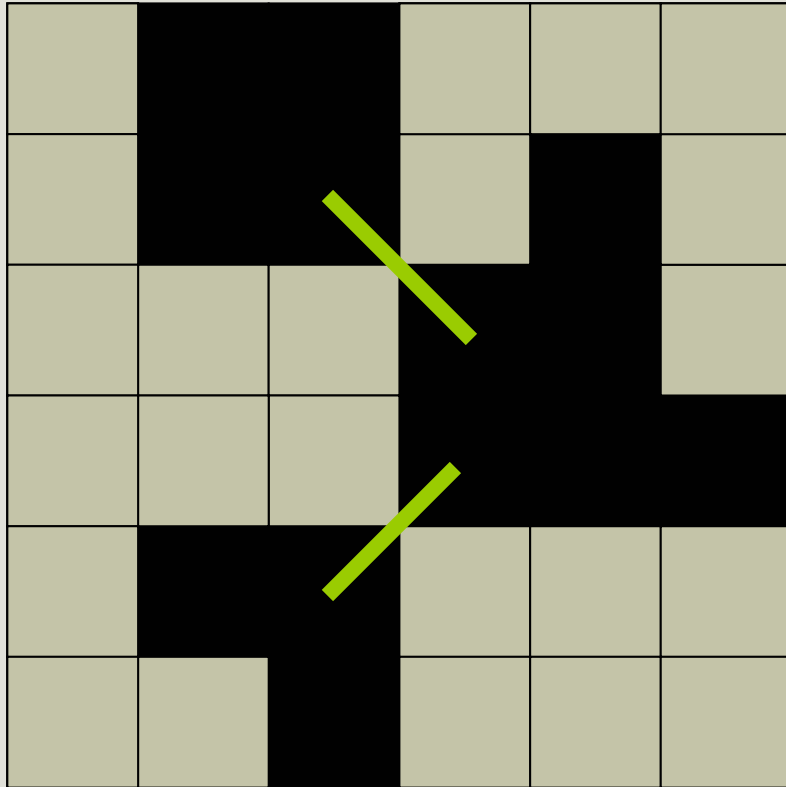
Patch Modeling – *Spot the Patch*



Patch Modeling – *Spot the Patch*

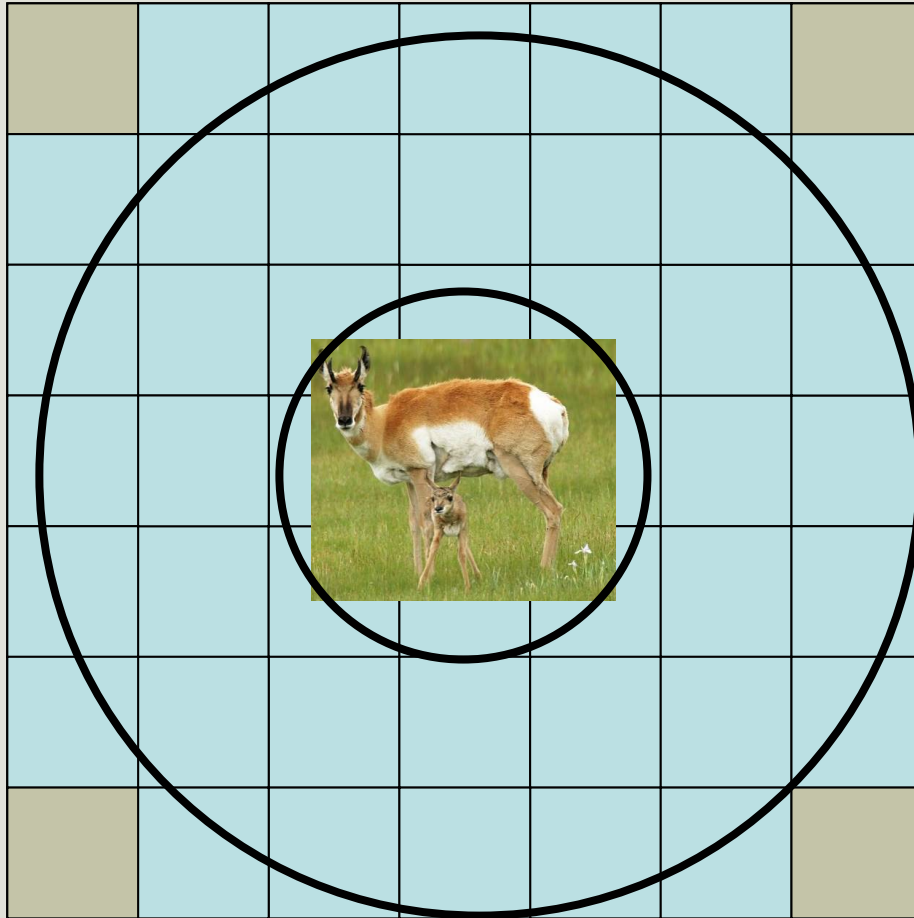


Patch Modeling – *Patches in GIS*



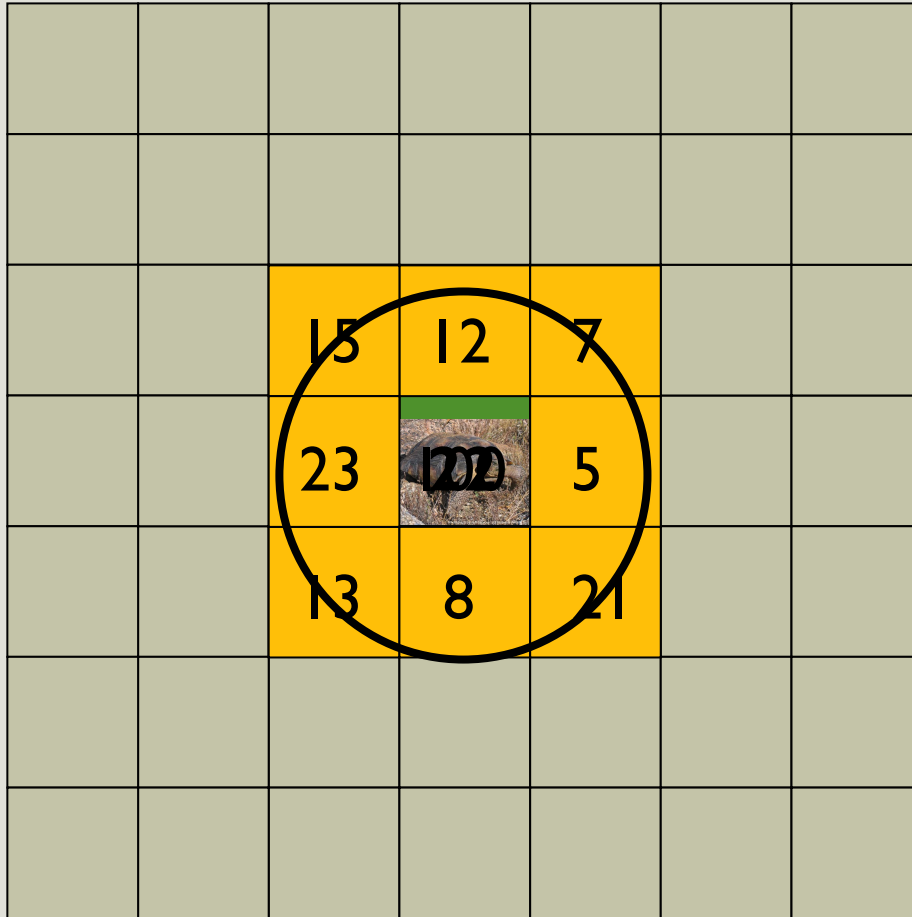
- Contiguous pixels of habitat
- What is contiguous?
 - **4-neighbor rule** – pixels that share edge
 - **8-neighbor rule** – edges & diagonals
- 8 neighbor rule used in CorridorDesigner

Patch Modeling – *neighborhood effects*



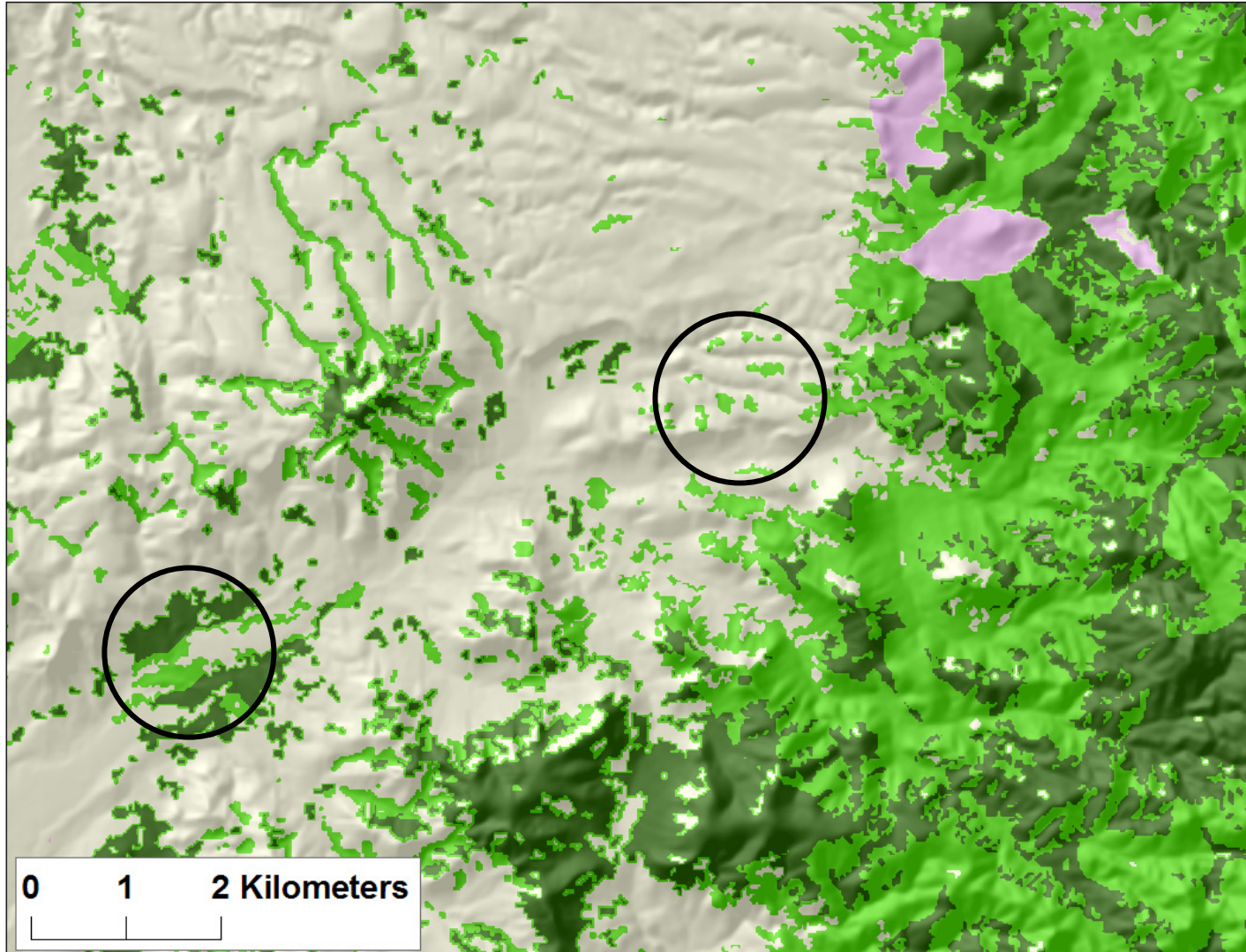
- A given landscape affects each species differently
 - **Perceptual range** - spatial extent of the landscape which affects movement decisions.
 - **Sphere of influence** - surrounding landscape affects habitat suitability

Patch Modeling – *neighborhood effects*



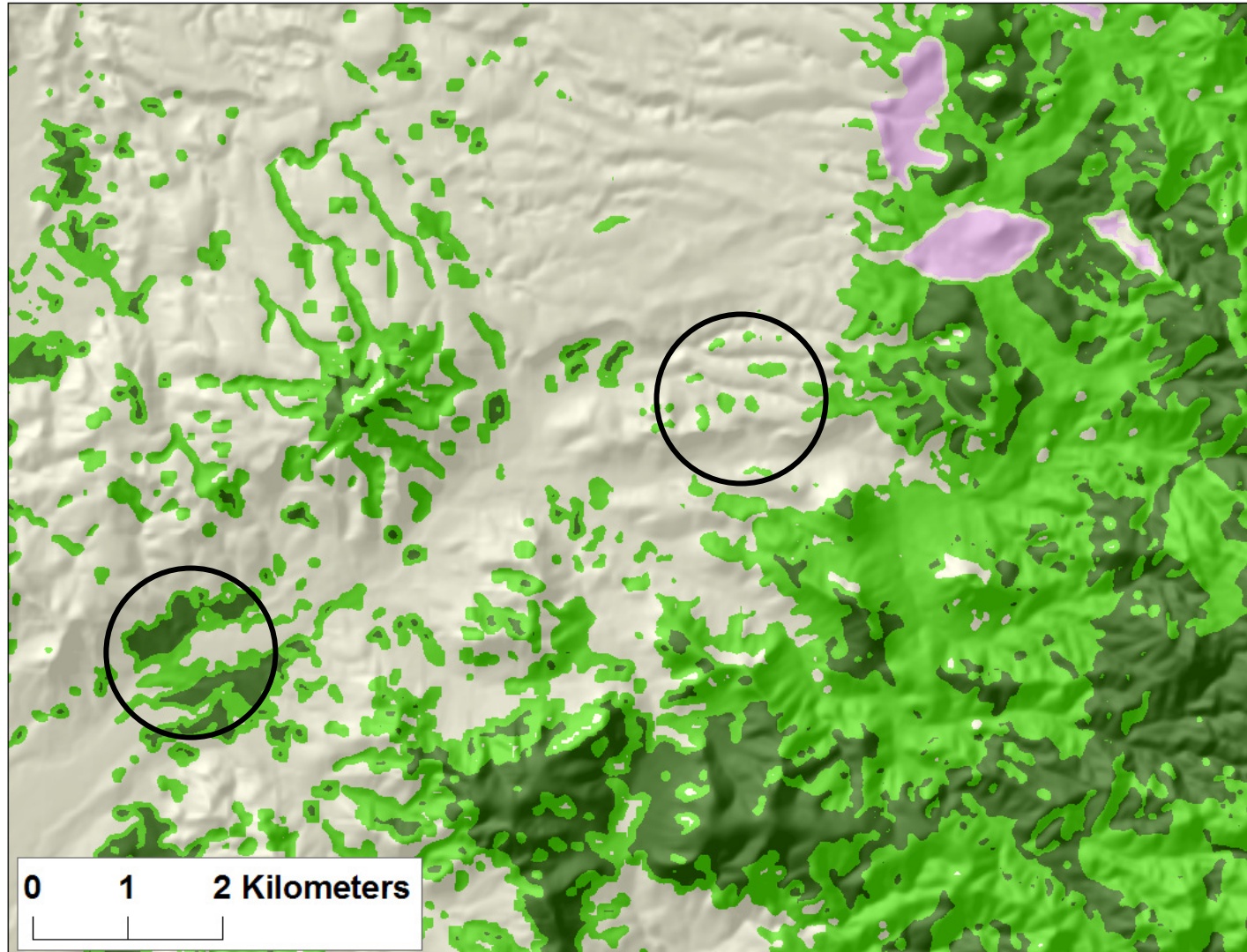
- In GIS, a **moving window** can simulate perceptual range & neighborhood effects
- Moving window average - the effect of a pixel's neighbors on its habitat quality

Patch Modeling – *neighborhood effects*



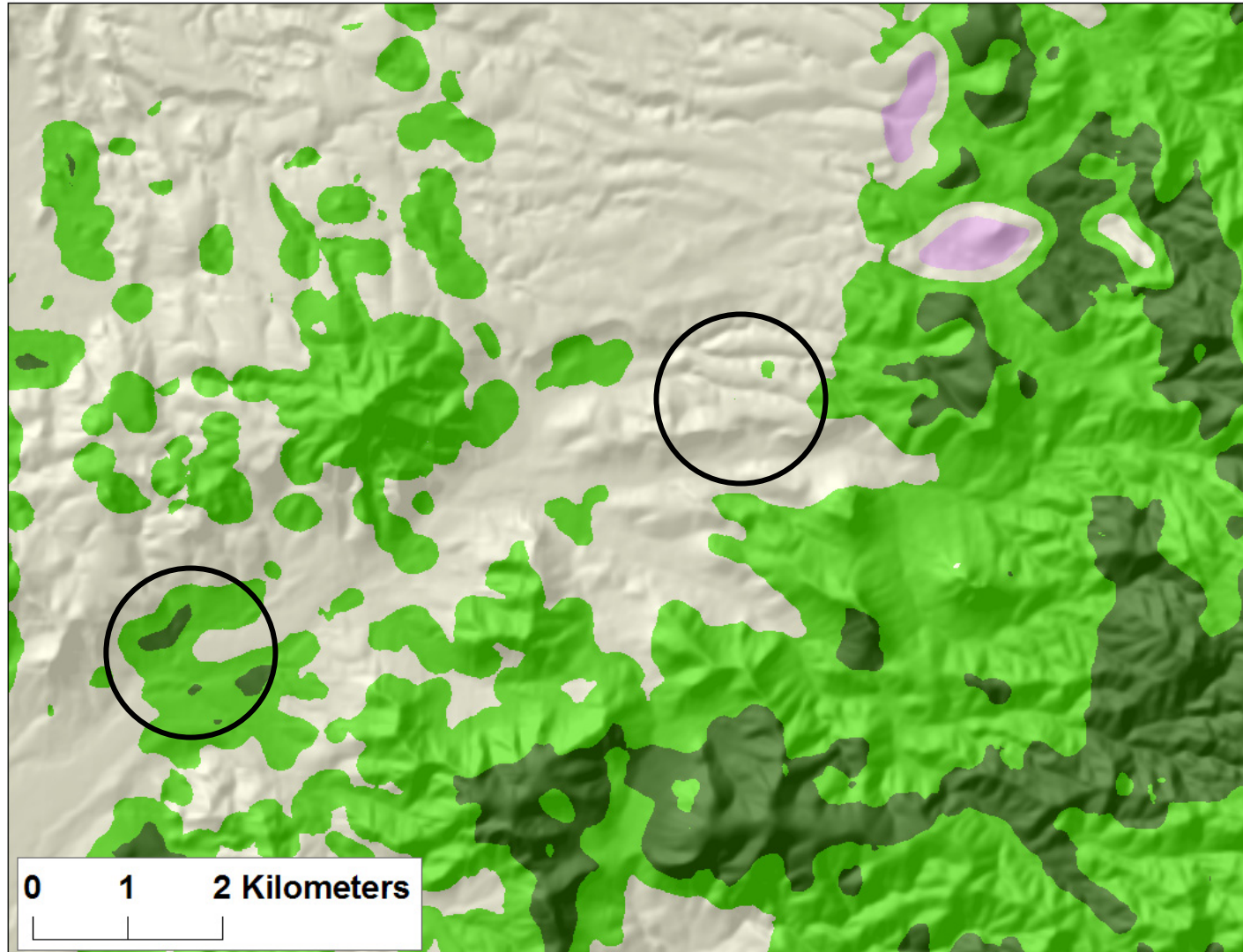
Raw
habitat
suitability
map

Patch Modeling – *neighborhood effects*



3x3
moving
window
average

Patch Modeling – *neighborhood effects*



200 m
moving
window
average

Patch Modeling – *Minimum habitat suitability for a pixel to be part of a patch*

Habitat Suitability Range	Biological Meaning
0-30	Strongly avoided
30-50	Occasionally used; not for breeding
50-70	Suboptimal but usable
70-100	Optimal habitat

- In CorridorDesigner, the “**patch threshold**” defines the cutoff between suitable & unsuitable habitat
- Define the threshold **before** parameterizing the model
- Threshold has a large effect on corridor location

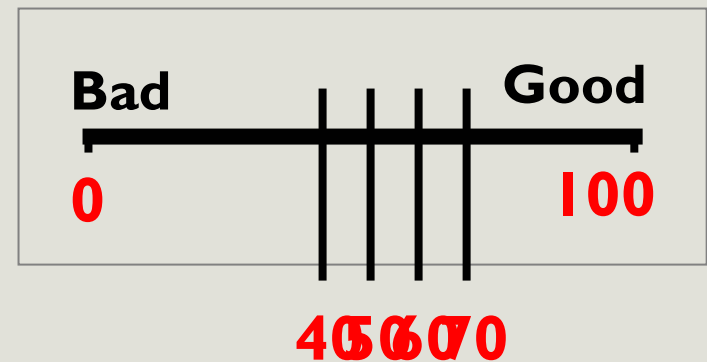
Patch Modeling – *Minimum habitat suitability for a pixel to be part of a patch*

32	38	75	17	13	73	69
42	37	44	12	10	82	78
53	51	75	94	68	59	15
26	10	73	75	83	64	17
44	53	88	64	57	51	59
65	67	75	12	51	89	78
74	64	75	12	63	84	86

- Threshold has large effect on:

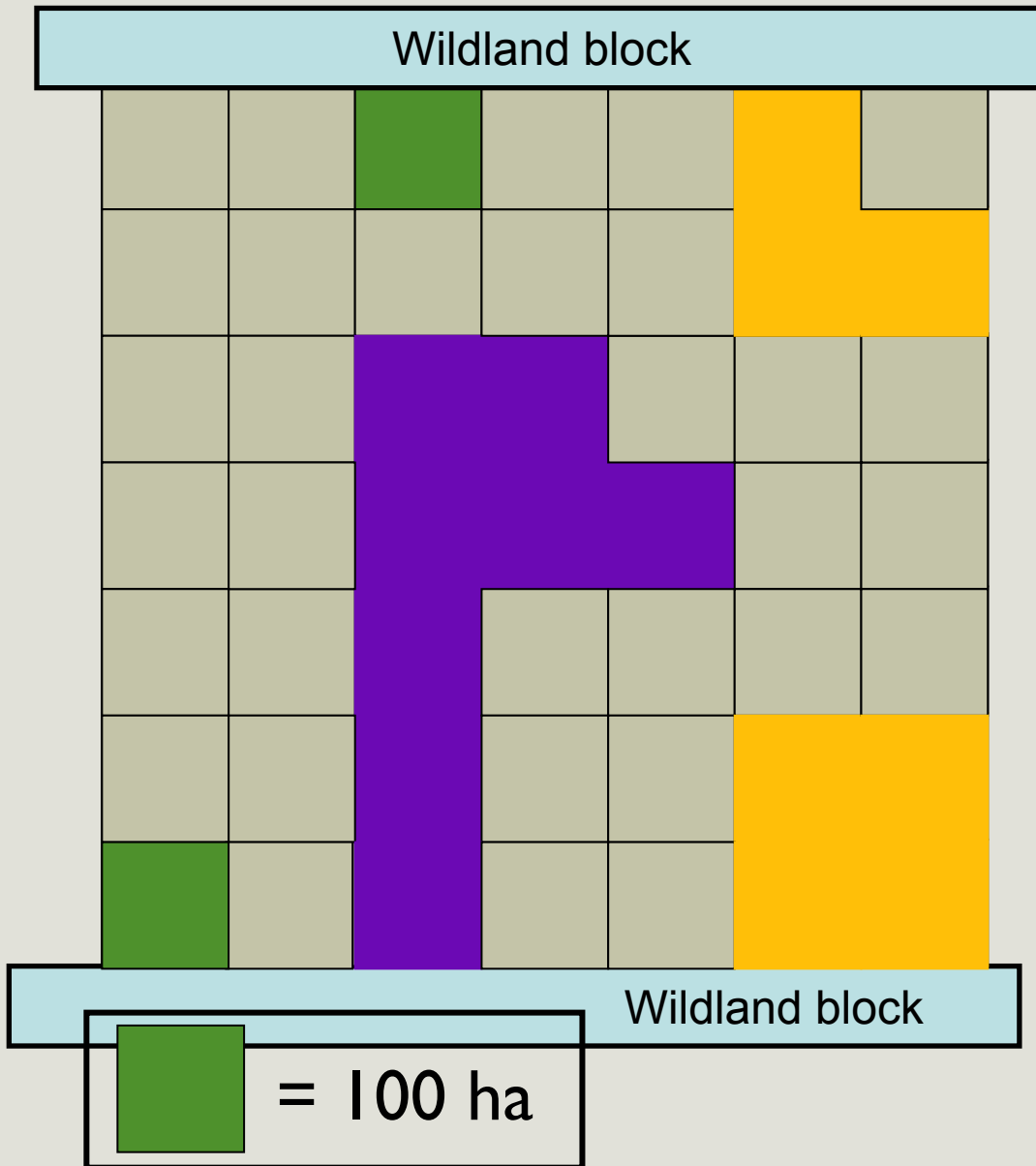
- what we evaluate as ‘good habitat,’ ‘a patch’ or ‘a good corridor’

- corridor location



Habitat patch threshold

Patch Modeling – *Patches in GIS*



- Define meaningful patch sizes for species
- In CorridorDesigner:
 - **Breeding patch** (≥ 300 ha in this example) – home range, breeding event
 - **Population patch** (≥ 600 ha in this example) – enough habitat to support population

Patch Modeling – *Review*

- Patches are **species and landscape specific**
- To create patches in GIS, we must define:
 - Species perceptual range and neighborhood effects
 - **moving windows**
 - **Threshold** habitat suitability value needed to qualify a pixel as a potential part of a patch
 - Minimum **patch sizes** for breeding and population patches

Patch Modeling – *Group Discussion*

- For one of your focal species, try to define an appropriate
 - **moving window** that reflects influence of neighboring pixels on habitat quality of the pixel, or the perceptual range affecting movement decisions.
 - Minimum **patch sizes** for breeding and population patches