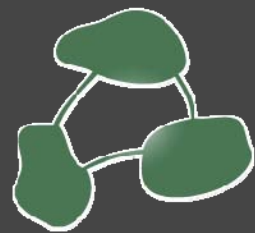


Patch Modeling

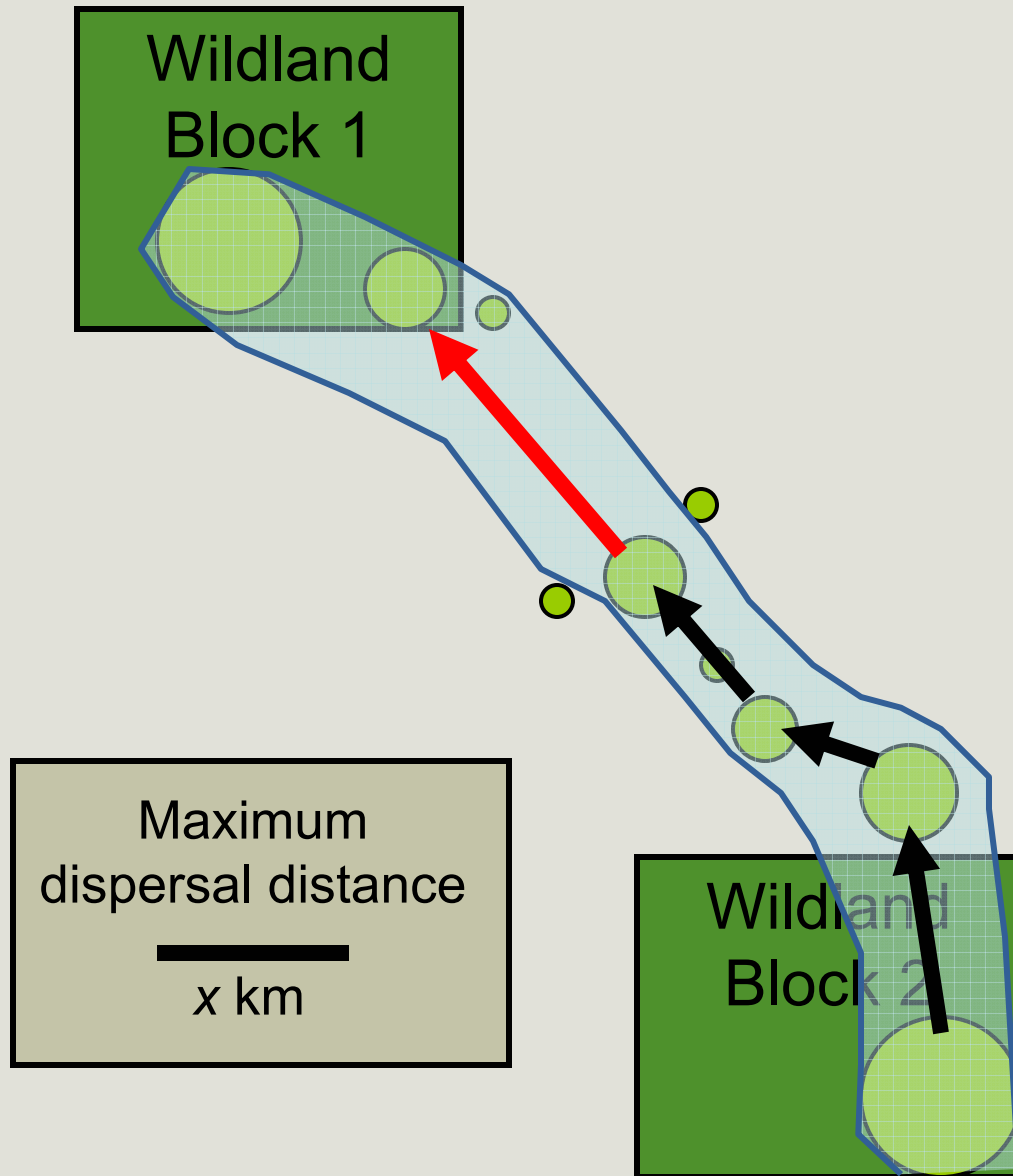


Corridor
Design

Paul Beier
Dan Majka
Jeff Jenness

CorridorDesigner Workshop

Patch Modeling – *Why model patches?*



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

Patch Modeling – *Defining patches*

32	38	75	17	13	73	69
42	37	44	12	10	82	78
53	51	75	94	59	59	15
26	10	73	55	83	64	17
44	53	68	64	57	51	59
65	67	15	12	51	89	78
74	64	15	12	63	84	86

Good enough:

habitat quality threshold of 60

Big enough:

10 pixels necessary for breeding

Close enough together:

8-neighbor rule used in CorridorDesigner

Patch Modeling – *Defining patches*

32	38	75	17	13	73	69
42	37	44	12	10	82	78
53	51	75	94	59	59	15
26	10	73	55	83	64	17
44	53	68	64	57	51	59
65	67	15	12	51	89	78
74	64	15	12	63	84	86

This result seems reasonable.

But this simple procedure sometimes produces strange results...

Patch Modeling – *Strange results*

99	99	99	50	99	99	99
99	99	99	50	99	99	99
99	99	99	50	99	99	99
50	50	50	59	50	50	50
99	99	99	50	99	99	99
99		99	50	99	99	99
99	99	99	50	99	99	99

5	5	5	5	5	5	65
5	5	5	5	5	65	5
5	5	5	5	65	5	5
5	5	5	65	5	5	5
5	5	65	5	65	5	5
5	65	5	5	5	65	5
65	5	5	5	5	5	65

Strange results – *Failure to recognize patches*

99	99	99	50	99	99	99
99	99	99	50	99	99	99
99	99	99	50	99	99	99
50	50	50	59	50	50	50
99	99	99	50	99	99	99
99	99	99	50	99	99	99
99	99	99	50	99	99	99

- Can't animals include small ribbons or grains of suboptimal habitat in a breeding area?

Strange results – *Failure to recognize patches*

99	99	83	83	83	99	99
99	99	83	83	83	99	99
83	83	73	73	73	83	83
83	83	73	73	73	83	83
83	83	73	73	73	83	83
99	99	83	83	83	99	99
99	99	83	83	83	99	99

- **Moving window:**
replace each pixel's suitability score with the average score of the pixel's 8 neighbors
- CorridorDesigner lets you use the moving window mean to delineate patches.

Strange results – *Edge effects*

5	5	5	5	5	5	65
5	5	5	5	5	65	5
5	5	5	5	65	5	5
5	5	5	65	5	5	5
5	5	65	5	65	5	5
5	65	5	5	5	65	5
65	5	5	5	5	5	65

- Raw pixel scores could identify a “breeding patch” that is all edge, and therefore unrealistic.
- Wouldn't edge effects degrade the utility of the green cells for breeding?

Strange results – *Edge effects*

5	5	5	5	15	25	35
5	5	5	12	18	25	25
5	5	12	18	25	18	15
5	12	18	32	25	18	5
15	18	25	25	25	18	15
25	25	18	18	18	25	25
35	25	15	5	15	25	35

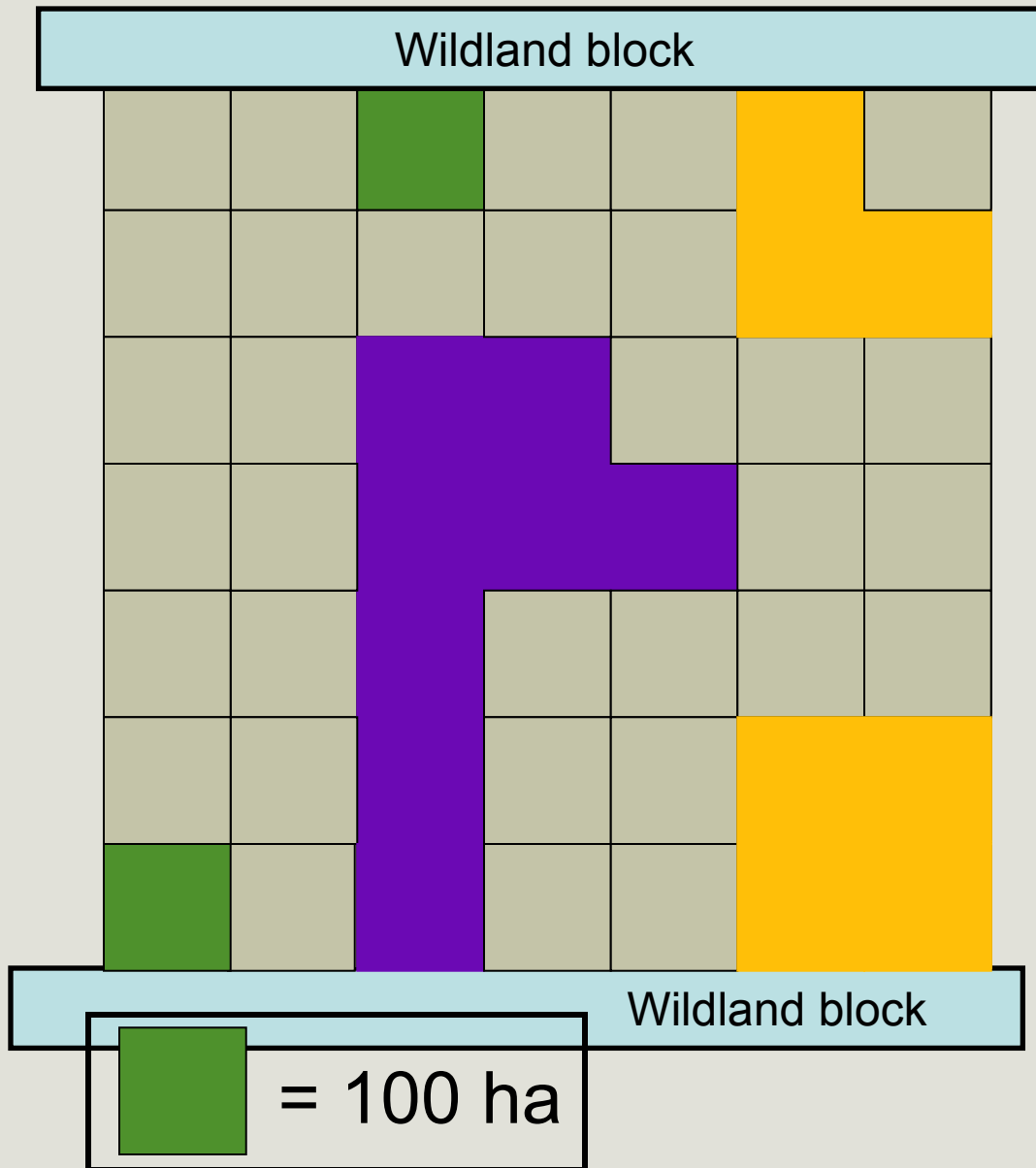
- Again, a moving window can address this problem.

Patch Modeling – *Patch thresholds*

Habitat Suitability Range	Biological Meaning
0-30	Strongly avoided
30-60	Occasionally used; not for breeding
60-70	Suboptimal but usable
70-100	Optimal habitat

- Define the threshold *before* parameterizing the model

Patch Modeling – *Two kinds of patches*



- CorridorDesigner lets you define two meaningful patch sizes for each species:
 - **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 in *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 >>

...requires you to specify:

1. Moving window size
2. Habitat Quality threshold
3. Minimum size of patch for

- One breeding home range
- Population persistence

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,
 - the fact that breeding can occur in an area that includes a few ‘bad’ pixels,
 - the influence of perceptual range on movement decisions.
 - Minimum **patch sizes** for breeding and population patches