

## Wang

**Connectivity:** Two sites are structurally/functionally connected if there is a path of structurally/functionally adjacent sites between them. A reserve is connected if the species can move from one site to the other.

This is ensured in the model as follows: If a site  $j$  is selected and belongs to a subreserve centered at site  $i$ , then at least one site  $k$  that is closer to center site  $i$  must be selected.

Constraint:

$$X_{rsij} \leq \sum_{\substack{k \in N_j \\ f_{sik} < f_{sij}}} X_{rsik} \text{ for all } (r,s,i,j), i \neq j \text{ and } j \notin N_i \quad (1)$$

functionally adjacent: two sites are within a certain threshold distance of each other which the species is able to cross. structurally adjacent: two sites share a common edge (or corner?).

**Compactness** Minimize total (structural or functional) distance. This is enforced in the objective function (additionally to minimizing the cost).

$$\text{Min } w_d * \sum_r \sum_s \sum_i \sum_j d_{ij} * X_{rsij} \quad (2)$$

Additionally, compactness is enforced in constraint 11 which ensures that the subreserve centers in a reserve are close to each other. This ensures compactness within each reserve and encourages the selection of sites which serve multiple species.

$$X_{rsii} + X_{r\tilde{s}jj} - 1 \leq 0 \text{ for all } (r, s, \tilde{s}, i, j), d_{ij} \geq d_c \quad (3)$$

**Aggregation** This term is not used by Wang and Oenal.

## Beyer

**Aggregation** Frequency of selection of adjacent planning units (sites). An increase in aggregation leads to a decrease in the number of spatially disjoint planning units. This is comparable to the term *connectivity* in the wang-paper.

**Compactness** Dispersion of selected planning units. An increase in compactness reduces the total space in which selected planning units are.

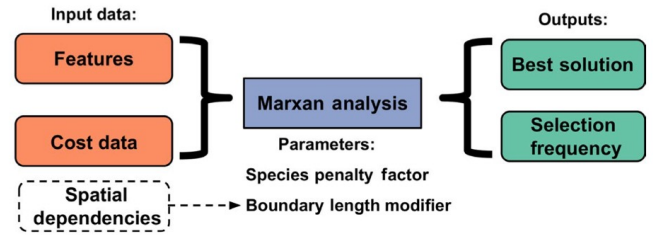
**Connectivity** Connectivity is defined in a much more complete way than in the wang-paper. It is about identifying a single and completely contiguous set of planning units.

## Daigle

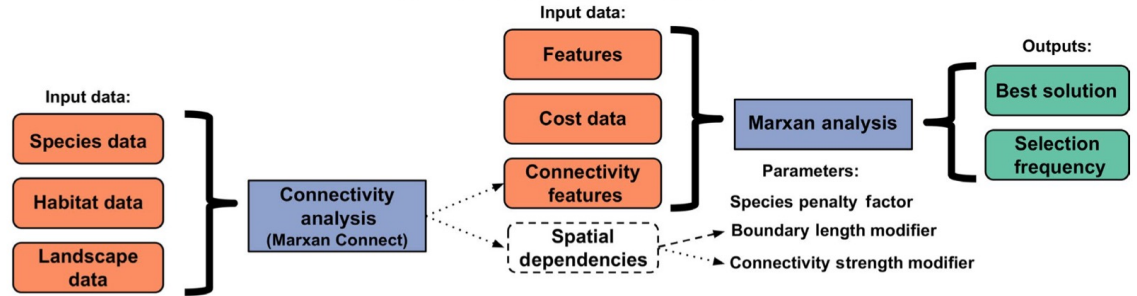
**maximise ‘clumping’ of protected area** Reduce the length of the boundary in a reserve. This is comparable to *compactness* in the wang- and beyer-papers. This can be set in Marxan and is not explicitly a feature of Marxan-connect.

**Connectivity** Connectivity refers to the exchange of individuals, energy or materials among habitat patches, populations, communities or ecosystems. Connectivity is not defined as broadly as with Beyer and Wang. Marxan Connect requires the user to input pathways the animals actually use. Thus it does not make the assumption that sharing a common edge means connectivity.

## Standard Marxan workflow

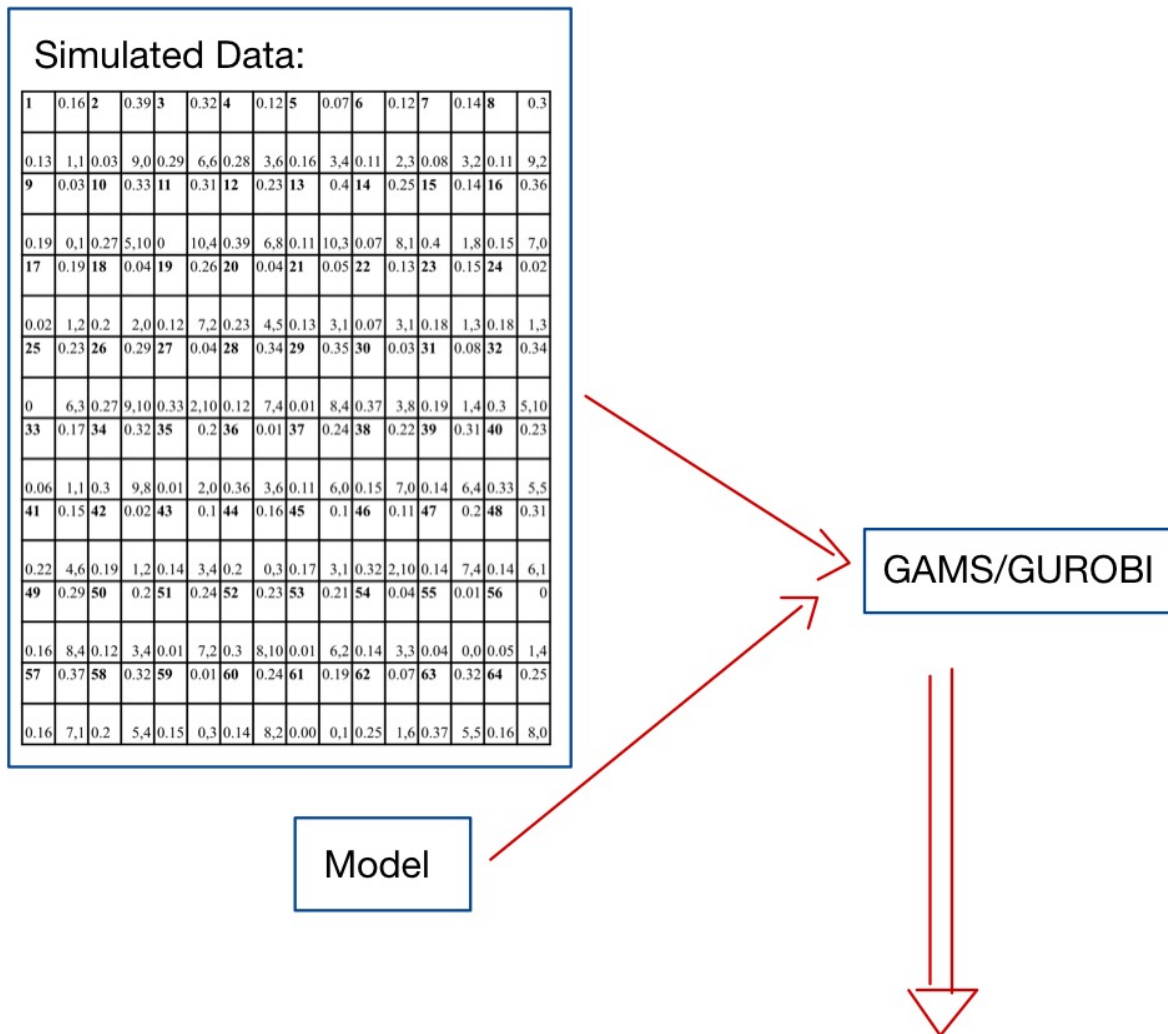


## Marxan Connect workflow



## Workflow

FIGURE 4 Comparison of workflow between the “representation only” standard approach to Marxan and “Marxan Connect”



1	2	3	4	5	6	7	8
9	10	11	12	13	14	15	16
17	18	19	20	21	22	23	24
25	26	27	28	29	30	31	32