3.13.10 Site selection

In this way the landscape was redefined in terms of energy intake profitability providing a common currency for the mechanisms of diet encounter, travel and memory. From any current location (*x*,*y*), HAL found the most profitable destination cell by maximization of an assessment of cell, directional and remembered profitability,

$$\text{Max}\left[e_{ij} + \frac{\sum_i \sum_j e_{dij}}{D_d} + \frac{\sum_i \sum_j M_{dij}}{M_d} \right] \qquad 3.7$$

where; D_d is the number of cells in direction *d* (1,…,4), and M_d is the number of cells remembered in direction *d*. *i* and *j* define the extent of search and are bounded by the extent of the grid ($0 \le i \le I$ and $0 \le j \le J$) and animal perception ($x\text{-}p \le i \le x+p$ and $y\text{-}\ p \le j \le y+p$). To avoid introducing edge effects, animal perception is not truncated by grid extent such that $p \le (\text{Max}(x, I\text{-}x), \text{Max}(y, J\text{-}y))$. Note that the assessment includes the current animal location and therefore "no move" may prove most profitable. Also, because visual range may allow assessment of several cell-lengths from the current location, and grid-wide searches extend even further, some herd moves may involve "jumps" from the current location to the destination cell. This mechanism thereby adopts more direct and quicker movement between sparsely distributed forage resources (Etzenhouser *et al.* 1998). Travel costs are tallied correctly to include these longer movements.

Lastly, upon selection of a new cell destination, a linear relationship between the cell grass biomass (B_{ij}) and G* was used to convert e_{ij} into potential biomass intake (b_{ij}) for the herd (Equation 3.8).

$$b_{ij} = e_{ij} \sum_i \sum_j B_{ij} \Big/ \sum_i \sum_j E_{ij}^R \qquad 3.8$$