

APPENDIX 1

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ASSIGNMENT OF STRENGTH OF SPATIAL BEHAVIOUR OF FISH ONTO A 1 TO 100 ARBITRARY SCALE

We obtained qualitative descriptions on the spatial behaviour of the fish from FishBase. We looked for keywords that linguistically describe the spatial behaviour of fish (Table 1). We assumed a baseline spatial behaviour strength of 1 for species forming groups or colonies, 40 for aggregations and shoals and 80 schools (Pitcher, 2001). The baseline spatial behaviour strength was then adjusted by a multiplication factor (β) based on their linguistic descriptions (Table 1). That is:

$$S = \frac{1}{m} \cdot \left(1 + \sum_{i=1}^n \beta_i\right) \cdot \sum_{j=1}^m \phi \quad \text{for } 1 \leq S \leq 100$$

where S is the total spatial behaviour strength (1 to 100) of the species, β is the percentage contribution to spatial behaviour strength, ϕ is the baseline spatial behaviour strength, while n and m are the number of linguistics terms that describe the strength and types of spatial behaviour respectively. Moreover, if spatial behaviour only occurs in either juvenile or adult stage, the total spatial strength was divided by two.

Table 1. Keywords that linguistically describe the strength of spatial behaviour and their corresponding multiplication factors (β).

Linguistic descriptions	Multiplication (β)
Usually Solitary/Pair	-40%
Occasionally/Sometimes/Alternately/May/Probably/Loose/small	-40%
Sometimes Solitary/Pair	-20%
Presumably/Apparently/	-20%
Frequently/Often	20%
Commonly/Usually/Large/Dense	40%

REFERENCES

Pitcher, T. J. 2001. Fish schooling: Implications for pattern in the oceans and impacts on human fisheries. Pp. 975-987 *In*: Steele, J. H., Turekian, K. K. and Thorpe, S. A. (eds.). *Encyclopedia of Ocean Sciences*, Academic Press, UK.