Appendix 6: Sensitivity Analyses

Given that the decisions taken in the process of weighing the indicators equally could be unclear, we ran a sensitivity analysis to check the robustness of our findings. A sensitivity analysis is a repeat of the primary analysis but uses alternative decisions (or weights) to check uncertainty in the output of a mathematical model (Deeks et al. 2008, Nardo et al. 2008). It is also used to prove that the findings are not dependent on arbitrary decisions.

We chose four weighting schemes to check how each component contributes to estimating index values. In addition to assigning the same weight to the three components (equal weight), we also calculated the index by emphasizing one dimension at a time. We did that by assigning a ½ weight to the emphasized component and ¼ to the remaining two. This alternative was run three times: once for each emphasized component. Although the weight variations changed SERI values (Table A6.1), the ordination of the three reserves was similar in the four weighting schemes. In other words, regardless of the weight assigned to the components, the RESEX Batoque was always the least resilient, followed by RESEX Canto Verde and RDSE Ponta do Tubarão (the most resilient).

Additionally, we checked if the SERI average values were statistically different among the three reserves in the four weighting schemes. For that, we ran Kruskal-Wallis tests with pairwise comparisons (Bonferroni post-hoc tests) (Neter et al. 1996) (See table A6.2).

Table A6.1: Components and index values in the weighting scheme: equal weight (same weight among components), Emphasis SRi (SRi component weighing ½ and the other two weighing ¼), Emphasis SRc (SRc component weighing ½ and the other two weighing ¼), and Emphasis ER (ER component weighing ½ and the other two weighing ¼). SRi = Social resilience at individual level; SRc = Social resilience at community level; ER = Ecological resilience; SERI = Index of Social-Ecological Resilience. Highlighting the least resilient reserve in each weighting scheme (bold).

	Components			SERI values			
Reserves	SRi	SRc	ER	Equal weight	Emphasis SRi	Emphasis SRc	Emphasis ER
RDSE Ponta do Tubarão	0.54	0.86	0.47	0.63	0.60	0.69	0.67
RESEX Batoque	0.49	0.59	0.42	**0.50**	**0.50**	**0.52**	**0.47**
RESEX Canto Verde	0.57	0.69	0.48	0.59	0.59	0.62	0.57

Table A6.2: The SERI average values for the four weighting schemes in the three marine protected areas (MPAs) analyzed: RDSE Ponta do Tubarão, RESEX Batoque, and RESEX Canto Verde. The last two columns show the results of the Kruskal-Wallis statistical test. SERI = Social-Ecological Resilience Index. SRi = Social resilience at the individual level; SRc = Social resilience at the community level; ER = Ecological resilience; SERI = Social-Ecological Resilience Index. The least resilient reserve in each weighting scheme is highlighted in bold.

	SERI values by MPA			Statistical test	
Weighting schemes	RDSE Ponta do Tubarão	RESEX Batoque	RESEX Canto Verde	Kruskal-Wallis	p-value
Equal weight	0.63	**0.50**	0.59	40.17	$p < 0.05$
EmphasisSRi	0.6	**0.50**	0.59	21.813	$p < 0.05$
EmphasisSRc	0.69	**0.52**	0.62	67.78	$p < 0.05$
EmphasisER	0.67	**0.47**	0.57	36.16	$p < 0.05$

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