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Marine and Freshwater Research

Supplementary Material

Evaluation and empirical study of Happy River on the basis of AHP: a case study of Shaoxing City (Zhejiang, China)

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Calculating the weights of evaluation indices

The weight coefficient of each index is determined according to the steps of the AHP. Firstly, several experts are invited to compare the indexes in pairs by using the nine-level scale method. Condly judgment matrix A-B, judgment matrix B₁-C, judgment matrix B₂-C, judgement matrix B₃-C, judgement matrix B₄-C, and judgement matrix B₅-C are obtained after sorting and combing, then the maximum characteristic value of each matrix and the normalized special long vector (λ_{\max}) corresponding to the maximum characteristic value are calculated by Matlab, namely each weight coefficient is obtained, Finally, the consistency of each judgment matrix is checked, and the data obtained are shown in Table S1 to Table S6.

Table S1. A-B judgment matrix and weight coefficient result

	B ₁	B ₂	B ₃	B ₄	B ₅	Weight coefficient
B ₁	1.0	1.2	1.3	1.5	1.6	0.25
B ₂	1/1.2	1	1.3	1.2	1.5	0.22
B ₃	1/1.3	1/1.3	1.0	1.1	1.5	0.20
B ₄	1/1.5	1/1.2	1/1	1.0	1.2	0.18
B ₅	1/1.6	1/1.5	1/1.5	1/1.2	1.0	0.15
Consistency check	$\lambda_{\max}=5.0089$; CI=0.0022; RI=1.1200; CR=0.0020					

Table S2. B₁-C judgment matrix and weight coefficient result

	C ₁₁	C ₁₂	C ₁₃	Weight coefficient
C ₁₁	1.0	3.0	4.0	0.62
C ₁₂	1/3.0	1.0	1/2.0	0.18
C ₁₃	1/4.0	2.0	1.0	0.20
Consistency check	$\lambda_{\max}=3.0536$; CI=0.0268; RI=0.5800; CR=0.0462			

Table S3. B₂-C judgment matrix and weight coefficient result

	C ₂₁	C ₂₂	C ₂₃	C ₂₄	C ₂₅	Weight coefficient
C ₂₁	1.0	1.5	1.3	1.0	1.3	0.24
C ₂₂	1/1.5	1.0	1.1	1/1.4	1/1.1	0.17
C ₂₃	1/1.3	1/1.1	1.0	1/1.3	1.0	0.18
C ₂₄	1.0	1.4	1.3	1.0	1.2	0.23
C ₂₅	1/1.3	1.1	1.0	1/1.2	1.0	0.18
Consistency check	$\lambda_{\max}=5.0058$; CI=0.0015; RI=1.1200; CR=0.0013					

Table S4. B₃-C judgment matrix and weight coefficient result

	C ₃₁	C ₃₂	C ₃₃	C ₃₄	C ₃₅	Weight coefficient
C ₃₁	1.0	1.2	1/1.3	1.2	1.1	0.21
C ₃₂	1/1.2	1.0	1.0	1/1.2	1/1.2	0.18
C ₃₃	1.3	1.0	1.0	1/1.1	1.3	0.22
C ₃₄	1/1.2	1.2	1.1	1.0	1.0	0.20
C ₃₅	1/1.1	1.2	1/1.3	1.0	1.0	0.19
Consistency check	$\lambda_{\max}=5.0354$; CI=0.0089; RI=1.1200; CR=0.0079					

Table S5. B₄-C judgment matrix and weight coefficient result

	C ₄₁	C ₄₂	C ₄₃	C ₄₄	C ₄₅	C ₄₆	Weight coefficient
C ₄₁	1.0	1/1.1	1.0	1.3	1/1.2	1/1.1	0.17
C ₄₂	1.1	1.0	1/1.2	1.3	1/1.3	1.2	0.16
C ₄₃	1.0	1.2	1.0	1.2	1.2	1.2	0.18
C ₄₄	1/1.3	1/1.3	1/1.2	1.0	1.3	1.0	0.16
C ₄₅	1.2	1.3	1/1.2	1/1.3	1.0	1.2	0.17
C ₄₆	1.1	1.2	1/1.2	1.0	1/1.2	1.0	0.16
Consistency check	$\lambda_{\max}=6.0108$; CI=0.0022; RI=1.2400; CR=0.0017						

Table S6. B₅-C judgment matrix and weight coefficient result

	C ₅₁	C ₅₂	C ₅₃	C ₅₄	C ₅₅	Weight coefficient
C ₅₁	1.0	1.4	1.1	1/1.3	1.1	0.21
C ₅₂	1/1.4	1.0	1.2	1.0	1/1.2	0.19
C ₅₃	1/1.1	1/1.2	1.0	1.0	1.4	0.20
C ₅₄	1.3	1.0	1.0	1.0	1.2	0.22
C ₅₅	1/1.1	1.2	1/1.4	1/1.2	1.0	0.18
Consistency check	$\lambda_{\max}=5.0601$; CI=0.0150; RI=1.1200; CR=0.0134					

According to the hierarchical single ranking result of the above judgment matrix, the total ranking is carried out, that is, the final score of each index (the data is rounded), as shown in Table 3.