Supplementary Materials

Table S1. Formulas for the calculation of different indicators used in Productivity-Susceptibility Analysis. The calculations were taken from the Risk-Based Framework worksheet available from the Marine Stewardship Council website (https://www.msc.org).

Indicator	Parameters included within the indicator	Formulas for calculation
Productivity index	Average age at maturity (a), maximum age (b), fecundity (c), maximum size (d), average size at maturity (e), reproductive strategy (f), trophic level (g)	$\text{Average} \frac{a + b + c + d + e + f + g}{7}$
Susceptibility index	Availability (h), encounterability (i), selectivity (j), post-capture mortality (k)	$\text{Multiplicative total} \frac{((h * i * j * k) - 1)}{40} + 1$
PSA score (Vulnerability index)	Productivity index (l), Susceptibility index (m)	$\sqrt{l^2 + m^2}$
Marine Stewardship Council's (MSC) PSA-derived score	PSA Score (n)	$-11.97 * n^2 + 32.28 * n + 78.26$
Risk of exploitation category	MSC PSA-derived score (o)	If $o < 60$ → High If $60 \leq o > 80$ → Medium If $o \geq 80$ → Low

Table S2. Susceptibility risk scores (for Productivity-Susceptibility Analysis) assigned to bacalao (*Mycteroperca olfax*) and related species (groupers and serranids) commonly caught in the Galapagos handline fishery, for each of the hypothetical management scenarios (S2 to S8) aiming to recover bacalao stock. Risk scores marked in pink represent changes from the state condition (S1), and scores marked in dark pink represent changes from S4.

S1: State condition

Scientific name	Susceptibility Scores				Susceptibility index	PSA Score	Risk Category Name
	Availability	Encounterability	Selectivity	Post-capture mortality			
Mycteroperca olfax	3	3	3	3	3.00	3.61	High
Alphestes immaculatus	3	2	2	2	1.58	2.13	Low
Cephalopholis panamensis	3	2	2	2	1.58	2.18	Low
Dermatolepis dermatolepis	3	2	3	2	1.88	2.74	Med
Epinephelus cifuentesi	2	3	3	2	1.88	2.40	Low
Epinephelus labriformis	3	2	2	2	1.58	2.18	Low
Hyporthodus mystacinus	2	2	3	3	1.88	2.87	Med
Paranthias colonus	3	3	2	2	1.88	2.30	Low
Cratinus agassizii	3	1	3	3	1.65	2.35	Low
Hemilutjanus macrophthalmos	3	2	3	2	1.88	2.40	Low
Paralabrax albomaculatus	3	3	3	2	2.33	2.73	Med

S2: Set minimum (≥ 65 cm TL) and maximum (≤ 78 cm TL) landing sizes for bacalao

Scientific name	Susceptibility Scores				Susceptibility index	PSA Score	Risk Category Name
	Availability	Encounterability	Selectivity	Post-capture mortality			
Mycteroperca olfax	3	3	3	2	2.33	3.07	Med
Alphestes immaculatus	3	2	2	2	1.58	2.13	Low
Cephalopholis panamensis	3	2	2	2	1.58	2.18	Low
Dermatolepis dermatolepis	3	2	3	2	1.88	2.74	Med
Epinephelus cifuentesi	2	3	3	2	1.88	2.40	Low
Epinephelus labriformis	3	2	2	2	1.58	2.18	Low
Hyporthodus mystacinus	2	2	3	3	1.88	2.87	Med
Paranthias colonus	3	3	2	2	1.88	2.30	Low
Cratinus agassizii	3	1	3	3	1.65	2.35	Low
Hemilutjanus macrophthalmos	3	2	3	2	1.88	2.40	Low
Paralabrax albomaculatus	3	3	3	2	2.33	2.73	Med

S3: Impose larger hook sizes for handline gear, so the minimum size caught is ~65 cm (age of first maturity for bacalao)

Scientific name	Susceptibility Scores				Susceptibility index	PSA Score	Risk Category Name
	Availability	Encounterability	Selectivity	Post-capture mortality			
Mycteroperca olfax	3	3	2	3	2.33	3.07	Med
Alphestes immaculatus	3	2	1	2	1.28	1.91	Low
Cephalopholis panamensis	3	2	1	2	1.28	1.97	Low
Dermatolepis dermatolepis	3	2	2	2	1.58	2.55	Low
Epinephelus cifuentesi	2	3	2	2	1.58	2.18	Low
Epinephelus labriformis	3	2	1	2	1.28	1.97	Low
Hyporthodus mystacinus	2	2	3	3	1.88	2.87	Med
Paranthias colonus	3	3	1	2	1.43	1.95	Low
Cratinus agassizii	3	1	1	3	1.20	2.05	Low
Hemilutjanus macrophthalmos	3	2	1	2	1.28	1.97	Low
Paralabrax albomaculatus	3	3	1	2	1.43	2.02	Low

S4: Rezoning GMR: additional no-take zones in coastal waters above 50 m, including key nursery habitats for bacalao

Scientific name	Susceptibility Scores				Susceptibility index	PSA Score	Risk Category Name
	Availability	Encounterability	Selectivity	Post-capture mortality			
Mycteroperca olfax	2	3	3	3	2.33	3.07	Med
Alphestes immaculatus	2	2	2	2	1.38	1.98	Low
Cephalopholis panamensis	2	2	2	2	1.38	2.03	Low
Dermatolepis dermatolepis	2	2	3	2	1.58	2.55	Low
Epinephelus cifuentesi	1	3	3	2	1.43	2.07	Low
Epinephelus labriformis	2	2	2	2	1.38	2.03	Low
Hyporthodus mystacinus	1	2	3	3	1.43	2.59	Low
Paranthias colonus	2	3	2	2	1.58	2.06	Low
Cratinus agassizii	2	1	3	3	1.43	2.19	Low
Hemilutjanus macrophthalmos	2	2	3	2	1.58	2.18	Low
Paralabrax albomaculatus	2	3	3	2	1.88	2.36	Low

S5: Rezoning GMR: S4 + all spawning aggregation sites of bacalao

Scientific name	Susceptibility Scores				Susceptibility index	PSA Score	Risk Category Name
	Availability	Encounterability	Selectivity	Post-capture mortality			
Mycteroperca olfax	1	3	3	3	1.65	2.59	Low
Alphestes immaculatus	2	2	2	2	1.38	1.98	Low
Cephalopholis panamensis	2	2	2	2	1.38	2.03	Low
Dermatolepis dermatolepis	2	2	3	2	1.58	2.55	Low
Epinephelus cifuentesi	1	3	3	2	1.43	2.07	Low
Epinephelus labriformis	2	2	2	2	1.38	2.03	Low
Hyporthodus mystacinus	1	2	3	3	1.43	2.59	Low
Paranthias colonus	2	3	2	2	1.58	2.06	Low
Cratinus agassizii	2	1	3	3	1.43	2.19	Low
Hemilutjanus macrophthalmos	2	2	3	2	1.58	2.18	Low
Paralabrax albomaculatus	2	3	3	2	1.88	2.36	Low

S6: S2 + S3

Scientific name	Susceptibility Scores				Susceptibility index	PSA Score	Risk Category Name
	Availability	Encounterability	Selectivity	Post-capture mortality			
Mycteroperca olfax	3	3	2	2	1.88	2.74	Med
Alphestes immaculatus	3	2	1	2	1.28	1.91	Low
Cephalopholis panamensis	3	2	1	2	1.28	1.97	Low
Dermatolepis dermatolepis	3	2	2	2	1.58	2.55	Low
Epinephelus cifuentesi	2	3	2	2	1.58	2.18	Low
Epinephelus labriformis	3	2	1	2	1.28	1.97	Low
Hyporthodus mystacinus	2	2	3	3	1.88	2.87	Med
Paranthias colonus	3	3	1	2	1.43	1.95	Low
Cratinus agassizii	3	1	1	3	1.20	2.05	Low
Hemilutjanus macrophthalmos	3	2	1	2	1.28	1.97	Low
Paralabrax albomaculatus	3	3	1	2	1.43	2.02	Low

S7: S2 + S4

Scientific name	Susceptibility Scores				Susceptibility index	PSA Score	Risk Category Name
	Availability	Encounterability	Selectivity	Post-capture mortality			
Mycteroperca olfax	2	3	3	2	1.88	2.74	Med
Alphestes immaculatus	2	2	2	2	1.38	1.98	Low
Cephalopholis panamensis	2	2	2	2	1.38	2.03	Low
Dermatolepis dermatolepis	2	2	3	2	1.58	2.55	Low
Epinephelus cifuentesi	1	3	3	2	1.43	2.07	Low
Epinephelus labriformis	2	2	2	2	1.38	2.03	Low
Hyporthodus mystacinus	1	2	3	3	1.43	2.59	Low
Paranthias colonus	2	3	2	2	1.58	2.06	Low
Cratinus agassizii	2	1	3	3	1.43	2.19	Low
Hemilutjanus macrophthalmos	2	2	3	2	1.58	2.18	Low
Paralabrax albomaculatus	2	3	3	2	1.88	2.36	Low

S8: S3 + S4

Scientific name	Susceptibility Scores				Susceptibility index	PSA Score	Risk Category Name
	Availability	Encounterability	Selectivity	Post-capture mortality			
Mycteroperca olfax	2	3	2	3	1.88	2.74	Med
Alphestes immaculatus	2	2	1	2	1.18	1.85	Low
Cephalopholis panamensis	2	2	1	2	1.18	1.91	Low
Dermatolepis dermatolepis	2	2	2	2	1.38	2.43	Low
Epinephelus cifuentesi	1	3	2	2	1.28	1.97	Low
Epinephelus labriformis	2	2	1	2	1.18	1.91	Low
Hyporthodus mystacinus	1	2	3	3	1.43	2.59	Low
Paranthias colonus	2	3	1	2	1.28	1.84	Low
Cratinus agassizii	2	1	1	3	1.13	2.01	Low
Hemilutjanus macrophthalmos	2	2	1	2	1.18	1.91	Low
Paralabrax albomaculatus	2	3	1	2	1.28	1.91	Low