

Trawl fishing impacts on the status of seabed fauna in diverse regions of the globe

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SUPPORTING INFORMATION

Region	Survey Description	Year	Gear Type information	Citation/Source
Aleutian Islands (Figure S1)	Bottom-trawl survey of groundfish and invertebrates on the continental shelf and upper continental slope.	2010	Standard Poly Nor'eastern high- opening bottom trawl with 27.2 m headrope, 24.9 m footrope with mud- sweep roller gear. Codend mesh size 8.9 cm stretched with 3.2 cm liner. Standard tow 0.75 nmi (1.4 km); 0.25 h at 3 knots (1.54 m s ⁻¹).	All surveys conducted in strict compliance with NMFS bottom- trawl protocols established by the National Oceanic and Atmospheric Administration. Stauffer, G. (compiler) (2004) NOAA Protocols for Groundfish Bottom Trawl Surveys of the Nation's Fishery Resources. U.S. Dep. Commerce, NOAA Tech. Memo. NMFS-F/SPO-65, 205 p. von Szalay, P.G., Rooper, C.N., Raring, N.W. & Martin, M.H. (2011) Data Report: 2010 Aleutian Islands bottom trawl survey. U.S. Dep. Commer.,NOAA Tech. Memo. NMFS-AFSC-215, 153 p.
Bering Sea (Figure S2)	Bottom-trawl survey of groundfish and invertebrates on the continental shelf and upper continental slope.	2008, 2009, 2010,	Shelf (2008, 2009, 2010): standard 83-112 Eastern otter trawl with 25.3 m (83 ft) headrope, 34.1 m (112 ft) footrope. Codend mesh size 8.9 cm stretched with 3.2 cm liner. Standard tow 1.5 nmi (2.8 km); 0.5 h at 3 knots (1.54 m s ⁻¹). <u>Upper slope (2008, 2010)</u> : standard Poly Nor'eastern high-opening bottom trawl with 27.2 m headrope, 24.9 m footrope with mud-sweep roller gear. Codend mesh size 8.9 cm stretched with 3.2 cm liner. Standard tow 1.25 nmi (2.3 km); 0.5 h at 2.5 knots (1.28 m s ⁻¹).	 All surveys conducted in strict compliance with NMFS bottom- trawl protocols established by the National Oceanic and Atmospheric Administration. Stauffer, G. (compiler) (2004) NOAA Protocols for Groundfish Bottom Trawl Surveys of the Nation's Fishery Resources. U.S. Dep. Commerce, NOAA Tech. Memo. NMFS-F/SPO-65, 205 p. Lauth, R.R. & Acuna, E. (2009) Results of the 2008 eastern Bering Sea continental shelf bottom trawl survey of groundfish and invertebrate resources. U.S. Dep. Commer., NOAA Tech. Memo.NMFS-AFSC-195, 229 p. Lauth, R.R. (2010) Results of the 2009 eastern Bering Sea continental shelf bottom trawl survey of groundfish and invertebrate resources. U.S. Dep. Commer., NOAA Tech. Memo.NMFS-AFSC-195, 229 p. Lauth, R.R. (2010) Results of the 2009 eastern Bering Sea continental shelf bottom trawl survey of groundfish and invertebrate resources. U.S. Dep. Commer., NOAA Tech. Memo. NMFS-AFSC-204, 228 p. Lauth, R.R. (2011) Results of the 2010 eastern and northern Bering Sea continental shelf bottom trawl survey of groundfish and invertebrate fauna. U.S. Dep. Commer., NOAA Tech. Memo. NMFS-AFSC-227, 256 p. Hoff, G.H & Britt, L.L. (2009) Results of the 2008 eastern Bering Sea upper continental slope survey of groundfish and invertebrate resources. U.S. Dep. Commer., NOAA Tech. Memo. NMFS-AFSC-197, 294 p. Hoff, G.H & Britt, L.L. (2011) Results of the 2010 eastern Bering Sea upper continental slope survey of groundfish and invertebrate resources. U.S. Dep. Commer., NOAA Tech. Memo. NMFS-AFSC-197, 294 p. Hoff, G.H & Britt, L.L. (2011) Results of the 2010 eastern Bering Sea upper continental slope survey of groundfish and invertebrate resources. U.S. Dep. Commer., NOAA Tech. Memo. NMFS-AFSC-224, 300 p.

Table S1. Benthic survey information for each region. For survey maps see Figures S1 - S13.

Region	Survey Description	Year	Gear Type information	Citation/Source
Gulf of Alaska (Figure S3)	Bottom-trawl survey of groundfish and invertebrates on the continental shelf and upper continental slope.	2009	Standard Poly Nor'eastern high- opening bottom trawl with 27.2 m headrope, 24.9 m footrope with mud- sweep roller gear. Codend mesh size 8.9 cm stretched with 3.2 cm liner. Standard tow 0.75 nmi (1.4 km); 0.25 h at 3 knots (1.54 m s ⁻¹).	All surveys conducted in strict compliance with NMFS bottom- trawl protocols established by the National Oceanic and Atmospheric Administration. Stauffer, G. (compiler) (2004) NOAA Protocols for Groundfish Bottom Trawl Surveys of the Nation's Fishery Resources. U.S. Dep. Commerce, NOAA Tech. Memo. NMFS-F/SPO-65, 205 p von Szalay, P.G., Raring, N.W., Shaw, F. R., Wilkins, M. E. & Martin, M.H. (2010) Data Report: 2009 Gulf of Alaska bottom trawl survey. U.S. Dep. Commer., NOAA Tech. Memo. NMFS- AFSC-208, 245 p.
West Coast USA (Figure S4)	West Coast Groundfish Bottom Trawl Surveys (2003–Present)	2008, 2009, 2010	Vessels are equipped with a standard four-panel, single-bridle, Aberdeen- type trawl spread by 5×7 -ft (1.5 \times 2.1-m) steel V doors weighing 590 kg. The headrope and footrope measure 85 and 25.9 and 31.7 m, respectively.	Keller, A. A., J. R. Wallace, and R. D. Methot. 2017. The Northwest Fisheries Science Center's West Coast Groundfish Bottom Trawl Survey: History, Design, and Description. U.S. Department of Commerce, NOAA Technical Memorandum NMFS-NWFSC-136. DOI: 10.7289/V5/TM-NWFSC-136.
Kattegat / Western Baltic Sea (Figure S5)	Macrobenthos community data aggregated for the Baltic Sea	2000– 2013	Mostly Van Veen Grab (0.1 m ²), sieved on 1 mm screen, 1-3 replicates per station	Gogina, M., Nygard, H., Blomqvist, M., Daunys, D., Josefson, A. B., Kotta, J., Maximov, A., Warzocha, J., Yermakov, V., Gra ⁻ we, U., and Zettler, M. L. The Baltic Sea scale inventory of benthic faunal communities. – ICES Journal of Marine Science, 73: 1196–1213.
North Sea (Figure S6)	Survey EC Project 98/021, Monitoring Biodiversity of Epibenthos and Demersal Fish in the North Sea and Skagerrak, Monitoring Report 2001 to the Commission of the European Community	2000	2 m beam trawl fitted with a 20 mm mesh and a liner of 2 mm knotless mess fitted inside the codend. The beam trawl was towed for 5 minutes at about 1knot.	Callaway, R., Alsvag, J., de Boois, I., Cotter, J., Ford, A., Hinz, H., Jennings, S., Kroncke, I., Lancaster, J., Piet, G., Prince, P., and Ehrich, S. 2002. Diversity and community structure of epibenthic invertebrates and fish in the North Sea. – ICES Journal of Marine Science, 59: 1199–1214.
	North Sea Benthos Project 2000	1999– 2002	Van Veen Grab (0.1 m ²) Sieving was done on 1mm screens. (In some cases 0.1m ² Day or Hamon grabs)	Rees, H. L., Eggleton, J. D., Rachor, E., and Vanden Berghe, E. (Eds). 2007. Structure and dynamics of the North Sea benthos. ICES Cooperative Research Report No. 288. 258 pp.

Region	Survey Description	Year	Gear Type information	Citation/Source
Benguela /	Survey region contains Southern	2011	Otter trawl; four-panel 180 ft	Durholtz, M.D. et al. 2011. Cruise report, FRS Africana, V270. FISHERIES/2011/MAR/SWG-DEM/02 January 2011 West
Agulhas	Benguela and Agulhas ecoregions of		German otter trawl, 9 m sweeps and	Coast Demersal Abundance Survey.
South Africa	South Africa. Bottom trawl survey by		1.5 t Morgere multipurpose otter	Fairweather T.P. et al 2011. Cruise Report FRS Africana V 273.
(Figure S7)	Department of Agriculture, Forestry and		boards" as per Atkinson et al. (2011)	FISHERIES/2011/JUL/SWG-DEM/27 April 2011 South Coast
	Fisheries – Republic of South Africa		Marine Ecology Progress Series.	Demersai Abundance Survey.
	and South African Environmental			Atkinson, L.J., Field, J.G. and Hutchings, L., 2011. Effects of
	Observation Network (SAEON).			multivariate analysis of benthic assemblages. <i>Marine Ecology</i> <i>Progress Series</i> , 430, pp.241-255.
Namibia	Annual Surveys of the Hake Stocks	2008,	A Gisund Super two-panel bottom	Kainge, P., Kathena, J., Iitembu, J., Van der Plas, A., Surveys Of The Hake Stocks, Survey No. 2008501: 10 January – 15
(Figure S8)		2009,	trawl with head length 31 m,	February 2008. National Marine Information and Research
		2010	footrope 47 m and the	Centre (NatMIRC) Swakopmund, 2008.
			vertical net opening 4.5 to 5.5 m.	Kainge, P., Kathena, J., Iitembu, J., Van der Plas, A., Surveys Of
				The Hake Stocks, Survey No. 2009501: 10 January – 19 February 2009 National Marine Information and Research
				Centre (NatMIRC) Swakopmund, 2009.
				Kainga D. Kathang I. Litambu I. Van dar Dias A. Surraya Of
				The Hake Stocks Survey No. 2010501: 12 January – 21
				February 2010. National Marine Information and Research Centre (NatMIRC) Swakopmund, 2010.
Chatham /	Survey area includes New Zealand's	2007	Epibenthic Sled (SEL, 1 m mouth	Compton, T. J., Bowden, D. A., Roland Pitcher, C., Hewitt, J. E.
Challenger	Challenger Plateau and Chatham Rise.		width, 25 mm mesh net)	composition across contrasting continental margins off New
New Zealand	The Ocean Survey 20/20 Chatham–		Beam Trawl	Zealand. Journal of Biogeography, 40 : 75–89.
(Figure S9)	Challenger Hydrographic Biodiversity		Towed video system (deep towed	
	and Seabed Habitats Project.		imaging system, DTIS),	
Creat Damian	Creat Darrian Deef Seehed Die diversity	2002	Drawn Trawd (9 films	Pitcher C.R. Doherty P. Arnold P. Hooper I. Gribble N. et
Great Barrier	Assessment	2003 -	Florida Hi'Elver	al. (2007). Seabed Biodiversity on the Continental Shelf of the
S10)	Assessment	2003	Sled (1.5 m Enibenthic Sled)	Great Barrier Reef World Heritage Area. AIMS/CSIRO/QM/QDPI Final Report to CRC Reef Research.
510)			bled (1.5 in Epidentine bled)	320 pp http://fich.gov.au/reports/Documents/Pitcher.et.al. 2007a_GBR
				Seabed_Biodiversity_Final_Report.pdf

Region	Survey Description	Year	Gear Type information	Citation/Source
Gulf of Carpentaria (Figure S11)	Megabenthos survey Southern Surveyor cruise SS 03/90.	1990	Dredge (3 m Church Dredge) Grab (0.1 m ² Smith-McIntyre grab)	Long, B.G.; Poiner, I.R., Wassenberg, T.J. (1995). Distribution, biomass and community structure of megabenthos of the Gulf of Carpentaria, Australia. <i>Mar Ecol Prog Ser</i> 129, 127-139. http://www.marine.csiro.au/marq/edd_search.Browse_Citation?t xtSession=4682 Long, B.G.; Poiner, I.R. (1994). Infaunal benthic community
				structure and function in the Gulf of Carpentaria, northern Australia. <i>Aust J Mar Freshw Res</i> 45, 293-316. <u>http://www.marine.csiro.au/marq/edd_search.Browse_Citation?t</u> <u>xtSession=4679</u>
South East Australia (Figure S12)	South East Fishery (SEF) Ecosystem Study 1993-1996: Benthic Faunal Survey Data	1993- 1996	Sled (Epi-& infauna combination sled (SEF), Woods Hole Oceanographic Institution (WHOI) Epibenthic Sled) Grab (0.1 m ² Smith-McIntyre)	 Bax, N and Williams, A. (2000). Habitat and fisheries production in the South East Fishery ecosystem - Final report to the Fisheries Research and Development Corporation. CSIRO Marine Reaserch, Hobart. Williams, A. and Bax, N. (2001). Delineating fish-habitat associations for spatially-based management: an example from the south-eastern Australian continental shelf. Marine and
				 Freshwater Research, 52, 513-536. <u>http://www.marine.csiro.au/marq/edd_search.Browse_Citation?t</u> <u>xtSession=5248</u> O'Hara (2002). Unpublished report, <i>Benthic assemblages of</i> <i>Bass Strait</i>. Museum Victoria. Unpublished Wilson, R.S., and Poore, G.C.B. (1987). The Bass Strait Survey: biological sampling stations, 1979-1984. Occasional Papers from
Western Australia (Figure S13)	Southern Surveyor Voyage SS 05/2007 - Voyage of discovery - benthic biodiversity of the deep continental shelf and slope in Australia's "North West Region"	2005	Beam Trawl (CSIRO modified version of the French IRD design light beam-sled) Sled (Epibenthic Sherman sled) Grab (Smith-McIntyre Grab)	the Museum of Victoria 3, 1-14. http://www.marine.csiro.au/marq/edd_search.Browse_Citation?t xtSession=6937 Williams, A., Althaus, F., Dunstan, P.K., Poore, G.C.B., Bax, N.J., Kloser, R.J., McEnnulty, F.R. (2010a). Scales of habitat heterogeneity and megabenthos biodiversity on an extensive Australian continental margin (100–1100 m depths). <i>Marine</i> <i>Ecology</i> 31, 222-236. http://www.marine.csiro.au/marq/edd_search.Browse_Citation?t xtSession=6938
				Williams, A., Dunstan, P., Althaus, F., Barker, B., McEnnulty, F., Gowlett-Holmes, K., Keith, G. (2010b). Characterising the seabed biodiversity and habitats of the deep continental shelf and upper slope off the Kimberley coast, NW Australia. Final report to Woodside Energy Ltd. 30/6/2010. CSIRO Wealth from Oceans, Hobart, Australia. 94pp.

Benthos Class	d	d upper	R	R lower
Anthozoa	0.097	0.229	0.679	0.358
Ascidiacea	0.012	0.193	0.123	0.042
Asteroidea	0.067	0.170	1.429	0.482
Bivalvia	0.207	0.276	1.567	0.923
Gastropoda	0.094	0.190	1.364	0.489
Malacostraca	0.109	0.172	0.818	0.475
Ophiuroidea	0.137	0.239	3.955	0.727
Polychaeta	0.127	0.194	0.879	0.538

Table S2. A table of depletion (*d*) and recovery rates (R) for benthos groups (full description of values in SI methods).

Table S3. Results of benthos-group distributions, model performance, trawl swept area ratio (SAR exposure) and benthos status (Pitcher et al., 2017). Note that benthos-groups are not available for every taxonomic class per region, since data need to be available and sufficient for modelling processes as described in Mazor et al., (2017). Benthos status was also calculated for trawled areas of the study region (column: Benthos Status (Trawl)).

Region	Taxa Class	Group	R ² of model fit	OOB R ²	No. distinct species	No. rare species	Abundance non-rare (distinct)	Abundance of rare	Total Abundance (counts or weights per unit area)	Trawl SAR Exposure %	Trawl SAR Exposure % (Trawl)	Benthos Status	Benthos Status (Lower CI)	Benthos Status (Trawl)	Benthos Status (Lower CI – Trawl)	Sensitivity (d/R)
Aleutian	Anthozoa	2	0.49	8.83	19	4	197.99	1.21	199.20	2.19	24.06	0.9992	0.9985	0.9860	0.9736	0.0522
Islanus	Ascidiacea	1	0.44	8.09	1	8	1.39	0.29	1.69	1.41	16.92	0.9994	0.9982	0.9925	0.9780	0.0365
	Ascidiacea	2	0.46	18.13	9	2	37.78	0.01	37.79	1.98	22.37	0.9991	0.9974	0.9903	0.9716	0.0406
	Asteroidea	1	0.49	5.30	26	38	126.91	1.81	128.71	2.05	23.11	0.9996	0.9988	0.9954	0.9865	0.0162
	Asteroidea	2	0.54	6.84	27	11	211.91	0.45	212.36	3.00	23.30	0.9994	0.9982	0.9954	0.9863	0.0177
	Bivalvia	2	0.58	24.24	3	6	76.48	0.06	76.54	4.30	22.02	0.9974	0.9957	0.9873	0.9784	0.0546
	Malacostrac	1	0.50	14.29	16	10	14.63	0.27	14.90	4.76	25.12	0.9973	0.9953	0.9861	0.9761	0.0527
	a	2	0.66	38.40	12	26	157.39	4.66	162.05	1.29	20.03	0.9993	0.9987	0.9890	0.9810	0.0463
	Onhiuroidea	1	0.56	9.58	3	3	9.24	0.02	9.25	0.66	33.93	0.9999	0.9995	0.9951	0.9734	0.0116
	Opiniuroidea	2	0.61	15.04	2	9	248.34	0.07	248.42	2.50	15.67	0.9996	0.9980	0.9979	0.9886	0.0137
Bering Sea		1	0.57	29.43	6	2	542.86	0.05	542.91	9.66	18.64	0.9962	0.9928	0.9914	0.9838	0.0372
	Anthozoa	2	0.90	45.07	10	9	78.52	8.99	87.51	0.67	32.07	0.9997	0.9994	0.9885	0.9783	0.0403
	7 mmozou	3	0.92	56.26	4	0	2012.86	0.00	2012.86	18.54	35.27	0.9932	0.9870	0.9865	0.9745	0.0375
		4	0.63	36.07	12	4	495.05	1.80	496.85	5.71	17.37	0.9978	0.9958	0.9935	0.9876	0.0364
	Ascidiacea	2	0.96	76.14	2	2	2569.09	0.04	2569.13	9.99	13.91	0.9977	0.9933	0.9967	0.9904	0.0226
	Ascidiacea	3	0.97	81.24	5	1	9950.35	24.14	9974.49	6.13	28.69	0.9985	0.9957	0.9936	0.9814	0.0237
		1	0.98	90.98	4	1	18973.07	0.30	18973.37	4.51	11.99	0.9995	0.9984	0.9984	0.9952	0.0117
	Asteroidea	2	0.97	82.86	6	3	1506.52	0.33	1506.85	6.80	15.31	0.9991	0.9974	0.9981	0.9944	0.0132
		3	0.96	75.97	4	8	1873.96	1.38	1875.35	8.79	17.19	0.9988	0.9964	0.9978	0.9935	0.0135

Region	Taxa Class	Group	R ² of model fit	OOB R ²	No. distinct species	No. rare species	Abundance non-rare (distinct)	Abundance of rare	Total Abundance (counts or weights per unit area)	Trawl SAR Exposure %	Trawl SAR Exposure % (Trawl)	Benthos Status	Benthos Status (Lower CI)	Benthos Status (Trawl)	Benthos Status (Lower CI – Trawl)	Sensitivity (d/R)
		4	0.98	86.86	36	20	894.20	3.24	897.45	4.70	18.59	0.9994	0.9982	0.9979	0.9937	0.0131
	Bivalvia	2	0.93	56.89	24	13	428.44	2.00	430.44	8.51	22.52	0.9970	0.9949	0.9922	0.9868	0.0341
		1	0.73	49.01	15	25	162.73	0.80	163.53	4.22	17.22	0.9992	0.9977	0.9967	0.9908	0.0193
	Gastropoda	2	0.96	78.28	24	16	6272.45	1.87	6274.32	13.17	30.85	0.9977	0.9935	0.9944	0.9843	0.0178
		3	0.94	65.68	23	14	3529.57	10.74	3540.31	21.57	26.58	0.9959	0.9887	0.9954	0.9872	0.0188
		1	0.98	88.80	19	17	802.95	0.63	803.58	1.88	15.48	0.9993	0.9988	0.9942	0.9901	0.0368
		2	0.87	72.50	5	7	226.30	0.02	226.32	8.68	21.45	0.9967	0.9943	0.9924	0.9869	0.0371
	Malacostrac a	3	0.90	80.03	6	8	2189.68	0.05	2189.73	4.19	19.16	0.9986	0.9976	0.9930	0.9879	0.0329
_		4	0.93	83.48	13	4	7352.23	0.01	7352.24	10.69	30.60	0.9961	0.9933	0.9895	0.9820	0.0370
		5	0.97	85.27	16	8	6213.90	1.03	6214.93	13.09	25.46	0.9954	0.9920	0.9917	0.9856	0.0352
	Onhiuroidaa	1	0.72	32.30	4	10	390.75	0.25	391.01	1.79	11.09	0.9998	0.9989	0.9987	0.9932	0.0114
	Opinuloidea	2	0.95	72.54	3	4	6075.34	0.78	6076.12	12.82	22.10	0.9988	0.9937	0.9981	0.9895	0.0091
	Dolychaeta	1	0.59	37.35	4	2	14.17	0.36	14.53	11.77	15.95	0.9955	0.9927	0.9935	0.9894	0.0385
	TOIYCHAEta	2	0.74	44.35	5	5	164.83	1.69	166.52	11.64	23.07	0.9951	0.9920	0.9915	0.9860	0.0406
Great Barrier Boof	Anthozoa	1	0.82	6.79	8	52	715.07	879.65	1594.72	4.15	27.28	0.9985	0.9972	0.9904	0.9818	0.0371
Damer Reer	Allulozoa	2	0.90	42.88	134	204	10689.20	717.61	11406.81	12.07	38.35	0.9958	0.9921	0.9869	0.9752	0.0388
	Ascidiacea	2	0.90	41.98	2	2	16429.20	0.26	16429.46	8.10	31.35	0.9981	0.9943	0.9925	0.9782	0.0289
	Asteroidea	2	0.89	34.41	39	20	3260.74	35.84	3296.59	17.83	32.16	0.9980	0.9941	0.9957	0.9873	0.0118
	Asteroidea	3	0.88	30.80	19	22	2552.54	148.58	2701.12	14.98	38.78	0.9983	0.9951	0.9964	0.9894	0.0115
		1	0.86	20.38	34	63	6691.88	59.50	6751.38	30.13	50.27	0.9905	0.9838	0.9842	0.9732	0.0319
	Bivalvia	2	0.87	21.71	40	17	501.23	1.87	503.10	29.61	68.09	0.9890	0.9813	0.9746	0.9568	0.0335
		3	0.89	32.79	91	73	3448.11	169.95	3618.06	26.04	48.08	0.9917	0.9859	0.9848	0.9742	0.0344
	Gastropoda	1	0.84	8.87	43	111	256.33	59.48	315.81	11.95	41.860	0.9979	0.9941	0.9926	0.9795	0.0176
	Gastropoda	2	0.90	39.82	149	287	1787.82	325.92	2113.74	13.16	38.77	0.9978	0.9939	0.9937	0.9825	0.0181
		1	0.87	27.40	87	114	546.39	29.42	575.80	6.48	31.49	0.9978	0.9963	0.9897	0.9822	0.0369

Region	Taxa Class	Group	R ² of model fit	OOB R ²	No. distinct species	No. rare species	Abundance non-rare (distinct)	Abundance of rare	Total Abundance (counts or weights per unit area)	Trawl SAR Exposure %	Trawl SAR Exposure % (Trawl)	Benthos Status	Benthos Status (Lower CI)	Benthos Status (Trawl)	Benthos Status (Lower CI – Trawl)	Sensitivity (d/R)
	Malacostrac	2	0.89	40.74	81	110	927.38	19.18	946.56	15.19	46.96	0.9849	0.9812	0.9742	0.9727	0.0345
	a	3	0.91	48.51	127	155	2543.14	37.90	2581.05	21.44	44.39	0.9932	0.9883	0.9861	0.9760	0.0327
		1	0.82	6.01	13	17	76.83	9.64	86.46	9.62	43.02	0.9991	0.9953	0.9962	0.9791	0.0091
	Ophiuroidea	2	0.87	25.96	24	18	355.80	13.50	369.30	3.08	30.61	0.9997	0.9986	0.9974	0.9859	0.0104
		3	0.90	40.63	26	25	2134.84	7.54	2142.39	4.55	19.59	0.9996	0.9977	0.9982	0.9903	0.0100
Gulf of		1	0.85	34.40	4	10	188.55	16.66	205.21	0.28	18.15	0.9999	0.9997	0.9907	0.9824	0.0497
Alaska	Anthozoa	2	0.65	53.24	11	20	39.44	8.52	47.95	2.63	14.39	0.9987	0.9976	0.9876	0.9765	0.0428
		4	0.66	35.21	7	4	1115.44	0.42	1115.86	2.50	28.12	0.9989	0.9976	0.9933	0.9872	0.0475
-	Assidians	1	0.55	8.67	2	3	0.49	0.54	1.03	1.66	30.53	0.9994	0.9982	0.9889	0.9676	0.0341
	Ascidiacea	2	0.66	20.26	10	4	34.81	0.21	35.02	1.91	28.88	0.9993	0.9979	0.9898	0.9701	0.0376
		1	0.88	31.32	23	14	341.98	11.81	353.79	2.38	26.15	0.9996	0.9987	0.9954	0.9862	0.0166
	Asteroidea	2	0.64	30.43	22	22	85.54	6.23	91.77	2.57	18.82	0.9996	0.9988	0.9971	0.9915	0.0150
		3	0.89	35.70	12	12	185.11	1.50	186.60	2.76	11.98	0.9996	0.9989	0.9984	0.9953	0.0135
	Bivalvia	2	0.87	27.31	7	15	81.26	0.26	81.52	2.54	26.05	0.9989	0.9981	0.9886	0.9807	0.0486
		1	0.48	20.40	5	12	6.61	0.70	7.31	2.10	26.17	0.9995	0.9987	0.9937	0.9825	0.0217
	Gastropoda	2	0.86	19.50	18	31	81.68	0.86	82.53	3.60	16.70	0.9991	0.9975	0.9963	0.9897	0.0232
		1	0.88	31.62	21	14	39.37	0.48	39.85	1.92	26.18	0.9990	0.9985	0.9870	0.9777	0.0494
	Malacostrac	2	0.74	30.87	9	13	23.21	0.89	24.10	0.24	11.70	0.9999	0.9998	0.9951	0.9916	0.0402
	а	3	0.88	29.97	5	4	684.82	0.35	685.16	2.47	25.68	0.9990	0.9984	0.9901	0.9829	0.0399
		4	0.91	48.51	11	0	151.20	0.00	151.20	2.56	13.32	0.9990	0.9984	0.9949	0.9912	0.0384
	0.1.1.1	1	0.84	11.26	3	1	65.30	0.02	65.31	3.75	26.40	0.9995	0.9974	0.9967	0.9821	0.0113
	Ophiuroidea	2	0.73	41.14	5	5	9.02	0.03	9.05	3.52	15.08	0.9996	0.9977	0.9983	0.9906	0.0109
Gulf of	Anthozoa	2	0.88	34.67	16	19	263.03	145.59	408.63	2.68	21.46	0.9984	0.9969	0.9929	0.9866	0.0336
Gulf of A Carpentaria	Ascidiacea	1	0.26	7.19	1	18	1.18	7.23	8.42	9.02	33.59	0.9978	0.9937	0.9919	0.9764	0.0248

Region	Taxa Class	Group	R ² of model fit	OOB R ²	No. distinct species	No. rare species	Abundance non-rare (distinct)	Abundance of rare	Total Abundance (counts or weights per unit area)	Trawl SAR Exposure %	Trawl SAR Exposure % (Trawl)	Benthos Status	Benthos Status (Lower CI)	Benthos Status (Trawl)	Benthos Status (Lower CI – Trawl)	Sensitivity (d/R)
		2	0.84	14.14	7	4	57.56	1.42	58.99	2.33	25.80	0.9994	0.9983	0.9935	0.9811	0.0245
		3	0.79	13.33	2	2	14.90	7.24	22.16	1.59	24.66	1.0000	0.9999	0.9999	0.9999	0.0243
	Asteroidea	2	0.90	55.27	8	12	29.47	58.29	87.77	2.43	20.19	0.9997	0.9992	0.9978	0.9936	0.0113
	Bivolvio	1	0.86	19.06	19	31	36.57	86.27	122.85	4.02	33.65	0.9987	0.9987	0.9889	0.9890	0.0330
	Divalvia	2	0.88	32.97	16	16	20.03	3.76	23.80	4.33	34.64	0.9984	0.9984	0.9872	0.9872	0.0368
	Gastropoda	2	0.90	41.96	21	45	24.34	4.77	29.11	3.80	30.40	0.9994	0.9982	0.9950	0.9861	0.0168
	Malacostrac	1	0.88	27.13	40	53	39.43	9.08	48.52	4.17	35.74	0.9983	0.9972	0.9872	0.9780	0.0362
	а	2	0.89	39.73	62	75	86.74	12.19	98.94	4.21	33.70	0.9986	0.9976	0.9889	0.9809	0.0331
Ophi Biv (inf	Onhiuroidea	1	0.89	33.70	5	18	4.74	2.85	7.60	4.22	33.74	0.9996	0.9976	0.9969	0.9833	0.0091
	Opiniuroidea	2	0.88	36.45	7	2	4.13	0.05	4.18	3.80	30.40	0.9997	0.9983	0.9975	0.9863	0.0084
	Bivalvia (infauna)	1	0.85	18.44	3	68	658.37	399.00	1057.37	4.11	32.86	0.9984	0.9972	0.9889	0.9811	0.0347
	Malacostrac a (infauna)	1	0.89	38.05	25	212	1748.30	961.37	2709.67	4.33	34.60	0.9984	0.9972	0.9884	0.9801	0.0271
	Polychaeta	1	0.66	33.62	3	59	337.00	490.50	827.50	4.55	33.74	0.9980	0.9968	0.9868	0.9784	0.0367
	(infauna)	2	0.93	59.24	26	126	2211.20	1017.50	3228.70	4.43	30.40	0.9980	0.9967	0.9874	0.9794	0.0362
Kattergat/ Western	Bivalvia	1	0.45	13.31	28	15	1642.93	19.76	1662.70	136.17	243.83	0.9411	0.9022	0.8897	0.8168	0.0310
Baltic Sea	Dirairia	2	0.48	18.88	10	1	32852.16	0.41	32852.58	157.69	247.16	0.9331	0.8891	0.9017	0.8368	0.0401
	Gastropoda	1	0.40	17.49	11	7	243.64	0.88	244.52	59.61	168.94	0.9816	0.9506	0.9334	0.8228	0.0165
	Cusuopodu	2	0.32	13.98	6	7	342.22	5.58	347.81	111.41	274.59	0.9674	0.9136	0.9610	0.8956	0.0203
	Ophiuroidea	3	0.76	29.89	1	1	493.62	0.01	493.63	13.32	69.91	0.9978	0.9883	0.9920	0.9567	0.0090
	Polychaeta	1	0.54	17.56	47	50	1247.80	9.83	1257.63	83.82	211.08	0.9455	0.9129	0.8754	0.8020	0.0343
	Toryenaeta	2	0.22	9.94	24	10	824.74	3.21	827.95	127.18	262.70	0.9216	0.8754	0.9018	0.8429	0.0446
Namibia	M 1	1	0.51	18.18	4	7	1735.23	27.01	1762.24	132.16	295.25	0.9588	0.9314	0.9285	0.8771	0.0298
	Malacostrac	2	0.26	5.30	10	5	2403.33	15.66	2418.99	124.71	218.56	0.9592	0.9299	0.9079	0.8468	0.0312
		3	0.58	31.52	5	6	3098.46	10.86	3109.32	66.24	139.39	0.9783	0.9629	0.9128	0.8502	0.0314

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North Sea		1	0.61	30.07	9	7	8.65	1.07	9.71	184.45	158.56	0.9733	0.9229	0.9736	0.9243	0.0133
(Epitualia)	Asteroidea	2	0.91	48.73	2	0	110.78	0.00	110.78	99.19	103.53	0.9809	0.9442	0.9801	0.9416	0.0215
		3	0.81	40.45	1	0	39.95	0.00	39.95	150.67	196.74	0.9750	0.9283	0.9716	0.9179	0.0225
	Bivolvio	1	0.74	18.53	6	4	1.83	0.09	1.92	150.51	122.19	0.9194	0.8721	0.9451	0.9125	0.0399
	Divalvia	3	0.69	25.64	4	10	7.78	2.27	10.05	68.89	225.32	0.9529	0.9250	0.9051	0.8494	0.0422
	Gastropoda	1	0.82	20.71	5	4	2.12	0.03	2.15	169.86	133.39	0.9612	0.8970	0.9694	0.9201	0.0187
	Gastropoda	2	0.74	46.24	8	24	94.60	0.78	95.38	118.59	186.90	0.9727	0.9290	0.9571	0.8859	0.0265
		1	0.89	37.00	5	14	7.40	0.06	7.46	124.18	134.70	0.9370	0.8963	0.9316	0.8873	0.0594
	Malacostrac	2	0.60	35.77	9	8	60.19	0.34	60.53	119.32	130.29	0.9398	0.9009	0.9342	0.8917	0.0546
	а	3	0.63	34.42	11	8	13.23	0.29	13.52	209.90	120.43	0.9163	0.8633	0.9527	0.9225	0.0386
		4	0.75	41.54	9	13	12.95	0.09	13.05	107.10	252.57	0.9578	0.9309	0.8986	0.8343	0.0452
	Onhiuroidaa	1	0.78	22.90	3	3	5.57	0.14	5.71	121.89	118.79	0.9867	0.9313	0.9830	0.9088	0.0101
	Opiliuloidea	2	0.82	45.22	2	0	67.75	0.00	67.75	114.03	132.09	0.9837	0.9128	0.9856	0.9251	0.0158
	Polychaeta	2	0.46	15.43	2	2	12.85	0.03	12.88	202.50	247.71	0.9110	0.8656	0.8897	0.8331	0.0429
North Sea	Anthozoa	1	0.65	32.68	4	10	1107.90	167.00	1274.90	89.15	103.83	0.9500	0.9084	0.9417	0.8931	0.0697
(iiiiauiia)	Allulozoa	2	0.75	48.91	5	4	2330.58	28.00	2358.58	133.35	139.86	0.9326	0.8809	0.9292	0.8748	0.0492
	Ascidiacea	1	0.56	19.59	1	18	46.17	115.90	162.07	63.26	80.37	0.9773	0.9367	0.9714	0.9199	0.0413
	Ascidiacea	2	0.61	28.67	3	4	147.42	40.84	188.26	144.19	155.32	0.9545	0.8783	0.9510	0.8686	0.0293
	Asteroidea	1	0.32	8.92	1	0	87.02	0.00	87.02	134.02	160.47	0.9770	0.9336	0.9757	0.9295	0.0143
	Asteroidea	2	0.58	16.39	2	0	779.00	0.00	779.00	150.63	143.41	0.9785	0.9376	0.9770	0.9333	0.0165
		1	0.84	72.72	10	30	2299.76	625.47	2925.23	149.09	123.52	0.9411	0.9032	0.9346	0.8905	0.0433
	Bivalvia	2	0.82	67.93	26	34	5801.41	346.48	6147.89	174.64	129.00	0.9227	0.8762	0.9427	0.9051	0.0415
	Divalvia	3	0.79	54.23	18	6	20987.42	38.01	21025.43	117.58	159.60	0.9378	0.8958	0.9371	0.8965	0.0609
		4	0.85	69.79	27	20	29157.45	437.49	29594.94	125.36	183.74	0.9444	0.9079	0.9188	0.8699	0.0491
	Gastropoda	1	0.62	31.86	4	35	350.50	216.34	566.84	108.35	122.43	0.9743	0.9293	0.9710	0.9202	0.0279

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		2	0.42	35.30	6	50	253.46	312.87	566.33	166.91	116.02	0.9636	0.9035	0.9718	0.9231	0.0202
		3	0.72	44.79	2	4	744.62	32.50	777.12	112.88	143.86	0.9726	0.9254	0.9679	0.9132	0.0279
		4	0.80	56.46	6	20	1210.71	100.52	1311.22	140.40	176.28	0.9687	0.9156	0.9616	0.8979	0.0226
		1	0.96	76.72	40	81	12774.85	848.57	13623.42	117.80	115.48	0.9491	0.9157	0.9387	0.8972	0.0542
		2	0.78	52.63	11	39	3649.62	152.55	3802.17	101.37	131.34	0.9462	0.9099	0.9435	0.9063	0.0626
	Malacostrac a	3	0.93	62.17	33	16	15547.63	130.29	15677.92	119.96	123.15	0.9437	0.9049	0.9421	0.9022	0.0527
	-	4	0.76	63.22	61	124	5857.33	735.59	6592.92	201.83	131.74	0.9125	0.8592	0.9455	0.9085	0.0407
		5	0.85	64.27	13	17	5117.05	64.84	5181.89	126.00	212.78	0.9480	0.9127	0.9076	0.8510	0.0425
(1	0.77	54.16	4	1	2805.13	28.00	2833.13	121.02	142.46	0.9843	0.9190	0.9816	0.9048	0.0160
	Ophiuroidea	2	0.91	50.38	6	3	5729.89	35.02	5764.91	152.81	160.12	0.9818	0.9065	0.9810	0.9018	0.0113
		3	0.94	65.74	4	0	24168.57	0.00	24168.57	134.27	139.33	0.9863	0.9263	0.9857	0.9234	0.0108
		1	0.78	65.22	89	84	46636.68	1050.81	47687.49	161.17	109.29	0.9289	0.8890	0.9419	0.9073	0.0459
	Dolyahaata	2	0.79	60.67	31	24	50646.57	93.82	50740.39	104.31	114.68	0.9447	0.9117	0.9428	0.9092	0.0583
	Folychaeta	3	0.93	58.58	32	26	57107.58	199.23	57306.81	108.98	167.97	0.9458	0.9139	0.9259	0.8841	0.0528
		4	0.67	53.02	144	158	56519.91	1265.72	57785.63	178.76	189.22	0.9177	0.8732	0.9127	0.8654	0.0445
Chatham (Challenger		1	0.86	25.64	25	7	29144.21	17.60	29161.81	2.86	24.44	0.9987	0.9974	0.9900	0.9810	0.0405
New	Anthozoa	2	0.45	23.91	17	8	5455.38	34.50	5489.88	10.66	27.50	0.9951	0.9908	0.9888	0.9787	0.0417
Zealand		2	0.92	55.80	8	16	487.90	73.27	561.18	5.89	15.28	0.9973	0.9949	0.9939	0.9884	0.0410
	Asteroidea	1	0.86	20.67	6	56	110.79	509.73	620.52	0.33	21.81	1.0000	0.9999	0.9971	0.9914	0.0135
	Asteroidea	2	0.89	34.08	6	18	337.82	64.65	402.47	4.88	15.05	0.9993	0.9978	0.9980	0.9941	0.0139
_	Astoroidae	1	0.34	17.66	7	8	202.09	38.93	241.03	1.29	19.75	0.9998	0.9994	0.9974	0.9922	0.0132
	Asteroidea	2	0.65	25.69	15	4	2123.74	13.87	2137.62	5.08	16.25	0.9992	0.9978	0.9979	0.9937	0.0136
	Bivolvio	1	0.86	28.40	5	44	67.80	185.95	253.75	10.73	26.33	0.9955	0.9923	0.9900	0.9831	0.0387
	Divalvia	2	0.90	42.60	2	3	123.11	5.25	128.36	2.33	19.34	0.9991	0.9984	0.9931	0.9883	0.0368
	Gastropoda	1	0.87	22.16	10	80	335.97	257.47	593.44	3.29	26.39	0.9998	0.9995	0.9949	0.9858	0.0194

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		2	0.90	43.98	5	1	842.76	0.59	843.35	6.59	18.42	0.9986	0.9960	0.9964	0.9900	0.0196
		3	0.75	24.53	5	3	1036.18	12.58	1048.77	3.01	20.62	0.9993	0.9981	0.9960	0.9889	0.0194
		1	0.87	22.14	8	52	254.63	141.96	396.59	9.55	27.36	0.9959	0.9930	0.9896	0.9820	0.0387
	Malacostrac a	1	0.90	42.78	14	10	3407.21	45.52	3452.73	0.89	14.74	0.9996	0.9994	0.9947	0.9908	0.0374
		2	0.79	58.82	6	6	1117.81	19.11	1136.91	0.82	18.81	0.9997	0.9994	0.9930	0.9880	0.0373
		1	0.85	10.75	8	47	755.80	449.95	1205.75	5.28	13.94	0.9994	0.9967	0.9986	0.9925	0.0101
	Ophiuroidea	1	0.66	34.15	3	4	192.09	42.79	234.88	0.95	21.52	0.9999	0.9994	0.9978	0.9883	0.0100
		2	0.91	49.26	4	6	826.77	13.96	840.74	0.69	11.73	0.9999	0.9996	0.9988	0.9937	0.0099
		1	0.84	7.20	6	80	341.54	523.45	864.99	1.68	20.61	0.9992	0.9987	0.9911	0.9854	0.0409
	Dolychaeta	1	0.86	25.42	2	2	36.22	0.00	36.22	0.19	30.18	0.9999	0.9998	0.9877	0.9799	0.0404
	Polychaeta –	2	0.81	21.80	1	0	2090.31	0.00	2090.31	0.00	19.20	1.0000	1.0000	0.9924	0.9876	0.0439
		2	0.87	28.07	18	27	1523.59	87.25	1610.84	9.46	13.19	0.9956	0.9928	0.9945	0.9910	0.0411
Benguela	Anthozoa	1	0.60	8.82	7	4	1499.66	23.41	1523.07	10.24	82.52	0.9962	0.9928	0.9708	0.9448	0.0381
South	Antilozoa	2	0.91	62.30	7	7	15777.93	135.20	15913.13	134.43	243.91	0.9565	0.9184	0.9238	0.8572	0.0308
Africa	Ascidiacea	2	0.21	7.64	2	2	101.10	25.75	126.85	25.45	63.21	0.9937	0.9817	0.9853	0.9572	0.0234
		1	0.28	12.90	3	7	595.24	10.70	605.93	8.67	71.93	0.9960	0.9882	0.9919	0.9760	0.0113
	Asteroidea	2	0.85	49.09	2	1	513.14	0.15	513.29	7.35	96.35	0.9992	0.9975	0.9894	0.9686	0.0108
	7 isteroided	3	0.91	48.50	2	1	2541.61	19.47	2561.08	129.32	167.31	0.9864	0.9596	0.9829	0.9494	0.0102
		4	0.92	62.66	12	3	4156.44	13.08	4169.52	27.70	103.92	0.9971	0.9913	0.9894	0.9686	0.0101
	Gastropoda	1	0.91	56.34	11	9	794.77	4.14	798.91	67.87	34.63	0.9895	0.9707	0.9941	0.9836	0.0155
	Gustropodu	2	0.90	46.40	6	11	649.42	10.48	659.90	17.56	161.43	0.9968	0.9911	0.9758	0.9325	0.0162
		1	0.81	33.23	8	9	1036.91	187.42	1224.33	7.75	15.71	0.9973	0.9954	0.9954	0.9856	0.0317
]	Malacostrac	2	0.89	78.55	11	10	11577.00	153.90	11730.90	63.15	26.06	0.9806	0.9666	0.9916	0.9458	0.0316
	а	3	0.96	81.53	5	0	15153.22	0.00	15153.22	0.40	106.53	0.9999	0.9998	0.9685	0.9920	0.0343
		4	0.91	59.75	12	4	96315.68	5.91	96321.59	24.68	46.08	0.9925	0.9871	0.9865	0.9768	0.0292

Region	Taxa Class	Group	R ² of model fit	OOB R ²	No. distinct species	No. rare species	Abundance non-rare (distinct)	Abundance of rare	Total Abundance (counts or weights per unit area)	Trawl SAR Exposure %	Trawl SAR Exposure % (Trawl)	Benthos Status	Benthos Status (Lower CI)	Benthos Status (Trawl)	Benthos Status (Lower CI – Trawl)	Sensitivity (d/R)
		1	0.27	8.00	1	1	2276.73	0.29	2277.02	21.76	48.46	0.9980	0.9892	0.9959	0.9775	0.0084
	Ophiuroidea	2	0.72	9.33	1	5	2.06	4.48	6.54	54.31	131.90	0.9955	0.9757	0.9896	0.9435	0.0083
		3	0.73	40.21	4	0	163.48	0.00	163.48	18.51	73.59	0.9985	0.9918	0.9942	0.9688	0.0076
	Dolyahaata	1	0.56	11.51	4	3	303.65	3.55	307.19	14.22	87.67	0.9951	0.9920	0.9710	0.9528	0.0341
	Folycliaeta	2	0.95	72.86	1	0	298.72	0.00	298.72	42.82	82.05	0.9859	0.9770	0.9738	0.9572	0.0337
South East	Bivalvia	2	0.80	19.97	5	35	16.60	23.01	39.61	13.23	45.68	0.9958	0.9929	0.9856	0.9808	0.0345
Australia	Gastropoda	1	0.61	41.96	3	207	2.34	86.89	89.24	12.07	46.38	0.9981	0.9937	0.9925	0.9791	0.0173
	Malacostrac a	1	0.82	57.82	18	127	24.25	30.12	54.37	11.59	44.84	0.9963	0.9937	0.9858	0.9756	0.0326
		2	0.59	7.86	10	105	108.22	47.29	155.52	7.36	36.52	0.9977	0.9960	0.9885	0.9802	0.0349
		3	0.74	40.39	25	161	43.20	39.32	82.53	6.22	39.97	0.9980	0.9966	0.9873	0.9782	0.0341
		4	0.73	38.82	24	142	29.38	53.56	82.94	16.79	54.11	0.9947	0.9909	0.9831	0.9709	0.0336
	Ophiuroidea	1	0.18	6.44	1	5	1.00	2.15	3.15	18.07	54.04	0.9986	0.9921	0.9956	0.9763	0.0086
		2	0.71	11.21	8	24	7.86	2.33	10.19	14.66	49.94	0.9988	0.9936	0.9960	0.9779	0.0087
		3	0.75	19.65	11	22	29.13	3.01	32.14	11.03	44.87	0.9991	0.9951	0.9963	0.9800	0.0087
	Polychaeta	1	0.37	8.41	4	19	18.16	3.79	21.96	13.69	49.43	0.9954	0.9925	0.9832	0.9727	0.0362
		2	0.78	26.04	4	50	12.15	5.34	17.50	13.02	50.11	0.9956	0.9928	0.9830	0.9723	0.0362
		3	0.82	33.92	15	16	21.06	6.89	27.95	15.38	52.36	0.9948	0.9916	0.9823	0.9711	0.0362
		4	0.74	22.11	20	59	30.31	12.24	42.56	11.12	46.05	0.9962	0.9938	0.9843	0.9743	0.0363
Western	Anthozoa	1	0.51	12.10	6	225	12.04	136.98	149.02	2.16	28.34	0.9993	0.9987	0.9907	0.9823	0.0345
Australia (Epifauna)	Anuiozoa	2	0.55	29.36	4	9	45636.69	5428.65	51065.35	0.37	23.79	0.9998	0.9997	0.9931	0.9869	0.0370
	Asteroidea	1	0.82	21.79	10	0	4.01	0.00	4.0143	1.27	25.71	0.9998	0.9996	0.9972	0.9917	0.0121
	Bivalvia	1	0.36	23.94	7	244	10.14	791.52	801.66	2.34	25.21	0.9993	0.9988	0.9922	0.9867	0.0333
		2	0.74	48.53	1	0	84.66	0.00	84.66	0.38	26.07	0.9999	0.9998	0.9919	0.9863	0.0326
	Gastropoda	1	0.70	16.00	8	300	2.08	1653.76	1655.84	1.35	39.26	0.9998	0.9994	0.9937	0.9823	0.0166
	Gastropoda	2	0.93	74.29	6	65	43.92	8.63	52.56	0.51	21.33	0.9999	0.9998	0.9966	0.9906	0.0166

Region	Taxa Class	Group	R ² of model fit	OOB R ²	No. distinct species	No. rare species	Abundance non-rare (distinct)	Abundance of rare	Total Abundance (counts or weights per unit area)	Trawl SAR Exposure %	Trawl SAR Exposure % (Trawl)	Benthos Status	Benthos Status (Lower CI)	Benthos Status (Trawl)	Benthos Status (Lower CI – Trawl)	Sensitivity (d/R)
	Malacostrac a	1	0.95	74.29	73	741	224.89	1978.74	2203.64	0.12	25.62	0.9999	0.9999	0.9919	0.9862	0.0331
		2	0.88	48.5	44	223	130.13	84.48	214.62	0.56	23.88	0.9998	0.9997	0.9926	0.9872	0.0330
	Orhiuroidaa	1	0.61	29.51	19	232	1360.98	151.93	1512.92	3.55	28.75	0.9997	0.9984	0.9976	0.9873	0.0087
	Opinuroidea	2	0.93	68.47	15	60	21.11	10.75	31.87	0.56	23.17	0.9999	0.9998	0.9981	0.9899	0.0084
	Dolvohooto	1	0.85	25.15	2	43	18.79	5.25	24.04	0.01	9.33	0.9999	0.9999	0.9968	0.9949	0.0346
	Polychaeta	2	0.42	26.50	2	9	2.31	3.64	5.95	4.14	26.93	0.9986	0.9977	0.9909	0.9851	0.0366
Western Australia (Infuana)	Malacostrac	1	0.77	37.81	0	494	0.00	1423.00	1423.00	0.15	23.79	0.9999	0.9999	0.9926	0.9873	0.0346
	а	2	0.79	40.48	3	158	106.00	675.00	781.00	0.86	28.34	0.9997	0.9996	0.9913	0.9850	0.0334
	Polychaeta	1	0.65	13.92	1	29	37.00	155.00	192.00	1.20	24.11	0.9996	0.9993	0.9918	0.9866	0.0381
		2	0.68	13.48	2	11	61.00	46.00	107.00	0.10	17.29	0.9999	0.9999	0.9943	0.9907	0.0365
		3	0.78	30.20	3	12	146.00	101.00	247.00	0.73	23.98	0.9998	0.9996	0.9918	0.9867	0.0382
West Coast	Anthozoa	2	0.92	56.45	9	1	3372.91	1.07	3373.98	6.15	9.29	0.9979	0.9960	0.9962	0.9928	0.0361
USA		3	0.56	18.78	8	2	15.70	0.36	16.07	0.58	21.81	0.9998	0.9996	0.9915	0.9839	0.0412
		4	0.93	61.61	18	5	2739.14	3.64	2742.78	13.01	8.22	0.9949	0.9904	0.9972	0.9947	0.0392
	Asteroidea	1	0.67	51.62	6	3	1519.13	0.28	1519.41	10.25	11.28	0.9988	0.9964	0.9986	0.9958	0.0124
		2	0.88	34.34	16	8	1243.04	10.97	1254.00	6.81	7.98	0.9991	0.9975	0.9990	0.9969	0.0131
		3	0.91	48.85	16	3	3551.60	0.45	3552.05	6.15	16.35	0.9992	0.9976	0.9979	0.9937	0.0130
		4	0.68	56.92	15	6	1779.51	18.17	1797.67	9.05	14.10	0.9988	0.9965	0.9983	0.9951	0.0130
		1	0.45	7.88	1	5	4.22	2.16	6.37	18.87	27.20	0.9964	0.9899	0.9948	0.9855	0.0192
	Gastropoda	3	0.90	44.05	8	3	568.45	2.30	570.74	7.04	31.41	0.9988	0.9965	0.9939	0.9830	0.0186
		4	0.94	63.19	9	4	600.69	0.33	601.01	22.56	13.28	0.9956	0.9878	0.9977	0.9935	0.0192
		1	0.50	30.29	16	10	152.19	2.58	154.77	15.98	37.10	0.9940	0.9897	0.9862	0.9762	0.0367
	Malacostrac	2	0.95	73.01	15	3	4706.20	14.98	4721.18	15.89	19.17	0.9942	0.9901	0.9930	0.9880	0.0361
	а	3	0.77	58.29	14	11	875.64	1.92	877.56	4.41	11.77	0.9985	0.9974	0.9960	0.9931	0.0345
		4	0.87	77.98	8	6	10839.80	1.99	10841.79	10.40	13.15	0.9967	0.9944	0.9959	0.9929	0.0336

Region	Taxa Class	Group	R ² of model fit	OOB R ²	No. distinct species	No. rare species	Abundance non-rare (distinct)	Abundance of rare	Total Abundance (counts or weights per unit area)	Trawl SAR Exposure %	Trawl SAR Exposure % (Trawl)	Benthos Status	Benthos Status (Lower CI)	Benthos Status (Trawl)	Benthos Status (Lower CI – Trawl)	Sensitivity (d/R)
	Ophiuroidea	1	0.83	15.40	5	4	271.38	0.16	271.54	9.41	8.13	0.9991	0.9952	0.9992	0.9958	0.0093
		2	0.41	5.42	3	0	44.86	0.00	44.86	2.60	7.50	0.9998	0.9987	0.9993	0.9961	0.0096
		4	0.86	29.08	2	0	196.14	0.00	196.14	5.01	24.91	0.9995	0.9974	0.9977	0.9874	0.0095



Figure S1. Aleutian Islands study region that was used for predicting benthic invertebrate distributions. Samples of benthic invertebrates were taken at survey sites (see Table S1 for survey details) and the area of the study region that is trawled (>0) follows Amoroso et al. (2018).



Figure S2. The Bering Sea study region that was used for predicting benthic invertebrate distributions. Samples of benthic invertebrates were taken at survey sites (see Table S1 for survey details), and the area of the study region that is commercially trawled (>0) follows Amoroso et al. (2018).



Figure S3. The Gulf of Alaska study region that was used for predicting benthic invertebrate distributions. Samples of benthic invertebrates were taken at survey sites (see Table S1 for survey details), and the area of the study region that is commercially trawled (>0) follows Amoroso et al. (2018).



Figure S4. West Coast USA study region that was used for predicting benthic invertebrate distributions. Samples of benthic invertebrates were taken at survey sites (see Table S1 for survey details), and the area of the study region that is commercially trawled (>0) follows Amoroso et al. (2018).



Figure S5. The Kattegat/Baltic Sea study region that was used for predicting benthic invertebrate distributions. Samples of benthic invertebrates were taken at survey sites (see Table S1 for survey details), and the area of the study region that is commercially trawled (>0) follows Amoroso et al. (2018).



Figure S6. The North Sea study region that was used for predicting benthic invertebrate distributions. Samples of benthic invertebrates were taken for infauna and epifauna at survey sites (see Table S1 for survey details), and the area of the study region that is commercially trawled (>0) follows Amoroso et al. (2018).



Figure S7. Southern Benguela and Agulhas ecoregions of South Africa (Benguela–Agulhas SA) study region that was used for predicting benthic invertebrate distributions. Samples of benthic invertebrates were taken at survey sites (see Table S1 for survey details), and the area of the study region that is commercially trawled (>0) follows Amoroso et al. (2018).



Figure S8. Namibia study region that was used for predicting benthic invertebrate distributions. Samples of benthic invertebrates were taken at survey sites (see Table S1 for survey details), and the area of the study region that is commercially trawled (>0) follows Amoroso et al. (2018).



Figure S9. The Challenger Plateau and Chatham Rise New Zealand (Chatham–Challenger NZ) study region that was used for predicting benthic invertebrate distributions. Samples of benthic invertebrates were taken at survey sites across Challenger Plateau and Chatham Rise (see Table S1 for survey details), where sites in green indicate those using the Deep Tow Imaging System (DTIS) used for benthic imaging. The area of the study region that is commercially trawled (>0) follows Amoroso et al. (2018).



Figure S10. The Great Barrier Reef study region that was used for predicting benthic invertebrate distributions. Samples of benthic invertebrates were taken at survey sites (see Table S1 for survey details). As described in Amoroso et al. (2018) the trawl data cannot be presented without breaching confidentiality of fishers as there are a very low number of trawl vessels operating in this region (for more details on processing trawl effort data see Amoroso et al. 2018).



Figure S11. Gulf of Carpentaria study region that was used for predicting benthic invertebrate distributions. Samples of benthic invertebrates were taken at survey sites for both epifauna and infauna (see Table S1 for survey details). As described in Amoroso et al. (2018) the trawl data cannot be presented without breaching confidentiality of fishers as there are a very low number of trawl vessels operating in this region (for more details on processing trawl effort data see Amoroso et al. 2018).



Figure S12. South East Australia study region that was used for predicting benthic invertebrate distributions. Samples of benthic invertebrates were taken at survey sites for infauna and epifauna (see Table S1 for survey details). As described in Amoroso et al. (2018) the trawl data cannot be presented without breaching confidentiality of fishers as there are a very low number of trawl vessels operating in this region (for more details on processing trawl effort data see Amoroso et al. 2018).



Figure S13. Western Australia study region that was used for predicting benthic invertebrate distributions. Samples of benthic invertebrates were taken at survey sites for infauna and epifauna (see Table S1 for survey details). As described in Amoroso et al. (2018) the trawl data cannot be presented without breaching confidentiality of fishers as there are a very low number of trawl vessels operating in this region (for more details on processing trawl effort data see Amoroso et al. 2018).



Figure S14. Performance of benthos-group distribution models by region showing R^2 of overall fit of predicted against observed values (green) and cross-validated out-of-bag R^2 values (% Var OOB; purple). The median value is indicated by a black line.



Figure S15. Performance of benthos-group distribution models by taxa showing R^2 of overall fit of predicted against observed values (green) and cross-validated out-of-bag R^2 values (%Var OOB purple). The median value is indicated by a black line.



Figure S16. Importance of environmental predictors across all benthos-group models (grey bars) and per region (coloured lines). These were obtained by scaling variable importance (% IncMSE) to a) proportion of model OOB R^2 , and b) percent contribution of model OOB R^2 . See Table 2 for a list of the predictors and their descriptions.



Figure S17. Importance of environmental predictors across all benthos-group models (grey bars) and per taxa Class (represented by coloured lines). These were obtained by scaling variable importance (%IncMSE) to a) proportion of model OOB R^2 , and b) percent contribution of model OOB R^2 . See Table 2 for a list of the predictors and their codes and descriptions.





Figure S18. Box plots show the changes to trawl (SAR exposure) and relative status of benthos-groups using mean values and lower confidence interval for recovery when considering only trawled grounds (trawl effort >0) in our study regions (Figure S1 – S13). The black lines represent the median value.

SI Methods: Calculating depletion and recovery

Trawl depletion rates differ by gear types and by habitats. To account for this, the benthos class-level average depletion rates from Sciberras et al. (2018) were scaled for different gear types in proportion to the average gear depletion rates from Hiddink et al. (2017). The gear scaling of depletion was relative to the weighted-mean depletion rate of gears, where the weightings were the gear frequencies in the Sciberras et al. (2018) analysis. Similarly, the benthos class-level average depletion rates were also scaled for different habitat types according to the depletion rates for gravel, sand and mud averaged across gears from Pitcher et al. (in review, Table S3), where the habitat scaling of depletion was relative to the weighted-mean depletion of habitat frequencies in the Sciberras et al. (2018) analysis. Recovery rates were derived from the taxonomic class-level trawl-impact log response-ratios (lnRR) in Figure S1 of Hiddink et al., (2020), using the approach developed in Hiddink et al. (2017) and Pitcher et al. (in review). In this case, the equation for estimating recovery rates *R* was: $R=dF/(1-\exp(bF))$, where *d* is the Class-level depletion value from Sciberras et al. (2018) (Table S.X), *b* is the lnRR standardised by trawl intensity (as swept-area ratio, SAR), and *F* is the trawl intensity (SAR) for which *R* is to be determined (here, $F=10^{-6}$ to estimate *R* for effectively untrawled biota). The average SAR of studies analysed in Figure S1 of Hiddink et al. (2020) was 3.36, thus $b=\ln RR/3.36$.

Recovery rates also vary with the sediment composition of habitats. To account for this, the benthos class-level average recovery rates were scaled for the percentage of gravel, sand and mud fractions of sediments according to the relationship developed by Pitcher et al. (in review, Table S4, Fig. S3B and Fig. S4). The habitat scaling of recovery was relative to the estimated recovery rate corresponding to the average sediment composition of studies included in the Hiddink et al., (2020) analysis (i.e. R=0.437 at 28.8% gravel, 52.3% sand and 18.8% mud). Thus, the equation for sediment scaling ratio for recovery rates R was:

R_scaling_ratio = $(F/(1-10^{(a^{(\%}gravel+1)+b^{(\%}sand+1)+c^{(\%}mud+1))^*F)}) / 0.437$, where $F=10^{-6}$ and a = -0.0145, b = -0.0083, c = -0.0061 (Pitcher et al. in review, Table S4). The R scaling ratio ranged between ~0.67 for 100% gravel sediments up to ~1.56 for 100% mud sediments, with sand dominated sediments being intermediate.