

Table S1 List of species identified during the experiment

	Phylum	Species	Authority
1	Porifera	Unidentified Porifera sp. 1	Grant, 1836
2	Cnidaria	Unidentified Actiniaria sp. 1	Hertwig, 1882
3	Nemertea	<i>Parborlasia corrugatus</i>	(McIntosh, 1876)
4	Nemertea	<i>Prosorhochmus nelsoni</i>	Sánchez, 1973
5	Annelida	<i>Cirratulus cirratus</i>	(O. F. Müller, 1776)
6	Annelida	<i>Eulalia</i> sp.	Savigny, 1822
7	Annelida	<i>Eunoe rhizoicola</i>	Hartmann-Schröder, 1962
8	Annelida	<i>Harmothoe ernesti</i>	Augener, 1931
9	Annelida	<i>Lumbrineris</i> sp.	Blainville, 1828
10	Annelida	<i>Platynereis australis</i>	(Schmarda, 1861)
11	Annelida	Scalibregmatidae	Malmgren, 1867
12	Annelida	<i>Terebellidae</i>	Johnston, 1846
13	Annelida	Unidentified Flabelligeridae sp. 1	de Saint-Joseph, 1894
14	Annelida	Unidentified Phyllodocidae sp. 1	Örsted, 1843
15	Annelida	Unidentified Sabellidae sp. 1	Latreille, 1825
16	Annelida	Unidentified Syllidae sp. 1	Grube, 1850
17	Annelida	<i>Urechis chilensis</i>	(Diesing, 1859)
18	Annelida	<i>Golfingia margaritacea</i>	Sars, 1851
19	Arthropoda	<i>Ampelisca</i> sp.	Krøyer, 1842
20	Arthropoda	<i>Amphilocheus</i> sp. 1	Spence Bate, 1862
21	Arthropoda	<i>Amphilocheus</i> sp. 2	Spence Bate, 1862
22	Arthropoda	<i>Apohyale hirtipalma</i>	(Dana, 1852)
23	Arthropoda	<i>Apohyale</i> sp.	Bousfield & Hendrycks, 2002
24	Arthropoda	<i>Austroregia regis</i>	(Stebbing, 1914)
25	Arthropoda	<i>Elasmopus</i> sp. 1	Costa, 1853
26	Arthropoda	<i>Elasmopus</i> sp. 2	Costa, 1853
27	Arthropoda	<i>Epimeria</i> sp.	Costa in Hope, 1851
28	Arthropoda	<i>Erikus lovrichi</i>	Alonso, 2012
29	Arthropoda	Gammaroidea sp. 1	Latreille, 1802 (Bousfield, 1977)
30	Arthropoda	Gammaroidea sp. 2	Latreille, 1802 (Bousfield, 1977)
31	Arthropoda	Gammaroidea sp. 3	Latreille, 1802 (Bousfield, 1977)
32	Arthropoda	<i>Gnathiphimedia urodentata</i>	Bellan-Santini & Ledoyer, 1986
33	Arthropoda	<i>Gondogeneia antarctica</i>	Chevreaux, 1906
34	Arthropoda	<i>Gondogeneia patagonica</i>	Alonso, 1986
35	Arthropoda	<i>Gondogeneia redfearnii</i>	Thurston, 1974
36	Arthropoda	<i>Heterophoxus despard</i>	Alonso, 2012
37	Arthropoda	<i>Jassa</i> sp.	Leach, 1814

38	Arthropoda	<i>Oradarea surera</i>	Alonso, 2012
39	Arthropoda	<i>Orchomenella</i> sp.	Sars, 1890
40	Arthropoda	<i>Paradexamine pacifica</i>	(Thomson, 1879)
41	Arthropoda	<i>Parawaldeckia kidderi</i>	(S.I. Smith, 1876)
42	Arthropoda	<i>Pariphimedia normani</i>	(Cunningham, 1871)
43	Arthropoda	<i>Sunamphitoe femorata</i>	(Krøyer, 1845)
44	Arthropoda	<i>Tryphosites chevreuxi</i>	Stebbing, 1914
45	Arthropoda	Unidentified Stenothoidae sp. 1	Boeck, 1871
46	Arthropoda	<i>Balanus laevis</i>	Bruguère, 1789
47	Arthropoda	<i>Diastylis argenta</i>	Calman, 1912
48	Arthropoda	<i>Betaeus truncatus</i>	Dana, 1852
49	Arthropoda	<i>Campylonotus vagans</i>	Spence Bate, 1888
50	Arthropoda	<i>Eurypodius latreillii</i>	Guérin, 1828
51	Arthropoda	<i>Halicarcinus planatus</i>	Fabricius, 1775
52	Arthropoda	<i>Lithodes santolla</i>	(Molina, 1782)
53	Arthropoda	<i>Munida gregaria</i>	(Fabricius, 1793)
54	Arthropoda	<i>Nauticaris magellanica</i>	(A. Milne-Edwards, 1891)
55	Arthropoda	<i>Pagurus comptus</i>	White, 1847
56	Arthropoda	<i>Paralomis granulosa</i>	(Hombron & Jacquinot, 1846)
57	Arthropoda	<i>Peltarion spinulosum</i>	(White, 1843)
58	Arthropoda	<i>Aega falklandica</i>	Kussakin, 1967
59	Arthropoda	<i>Exosphaeroma gigas</i>	(Leach, 1818)
60	Arthropoda	<i>Ischyromene eatoni</i>	(Miers, 1875)
61	Arthropoda	<i>Joeropsis bidens</i>	Menzies, 1962
62	Arthropoda	<i>Limnoria</i> sp.	Leach, 1814
63	Arthropoda	<i>Munna instructa</i>	Cleret, 1971
64	Arthropoda	<i>Serolis</i> sp.	Leach, 1818
65	Arthropoda	Unidentified Isopoda sp. 1	Latreille, 1816
66	Arthropoda	Unidentified Ostracoda sp. 1	Latreille, 1802
67	Arthropoda	<i>Achelia assimilis</i>	(Haswell, 1885)
68	Arthropoda	<i>Zeuxo marmoratus</i>	(Nordenstam, 1930)
69	Mollusca	<i>Brachidontes granulatus</i>	(Hanley, 1843)
70	Mollusca	<i>Entodesma cuneatum</i>	(Gray, 1828)
71	Mollusca	<i>Laternula elliptica</i>	(P. P. King, 1832)
72	Mollusca	<i>Neilonella sulculata</i>	(A. Gould, 1852)
73	Mollusca	<i>Nucula pisum</i>	G. B. Sowerby I, 1833
74	Mollusca	Unidentified Veneridae sp. 1	Rafinesque, 1815
75	Mollusca	<i>Zygochlamys patagonica</i>	(P. P. King, 1832)
76	Mollusca	<i>Zygochlamys</i> sp. 1	Ihering, 1907
77	Mollusca	<i>Robsonella fontaniana</i>	(d'Orbigny, 1835)

78	Mollusca	<i>Cerithiopsis caelata</i>	(Gould, 1849)
79	Mollusca	<i>Crepidula</i> sp.	Lamarck, 1799
80	Mollusca	<i>Dendropoma</i> sp.	Mörch, 1861
81	Mollusca	<i>Fissurella crassa</i>	Lamarck, 1822
82	Mollusca	<i>Fissurella latimarginata</i>	G. B. Sowerby I, 1835
83	Mollusca	<i>Fissurella nigra</i>	Lesson, 1831
84	Mollusca	<i>Fissurella oriens</i>	G. B. Sowerby I, 1834
85	Mollusca	<i>Fissurella picta</i>	(Gmelin, 1791)
86	Mollusca	<i>Fissurella</i> sp. 1	Bruguière, 1789
87	Mollusca	<i>Fissurella</i> sp. 2	Bruguière, 1789
88	Mollusca	<i>Fusitriton magellanicus</i>	(Röding, 1798)
89	Mollusca	<i>Fusitriton</i> sp. 1	Cossmann, 1903
90	Mollusca	<i>Gargamella immaculata</i>	Bergh, 1984
91	Mollusca	<i>Laevilitorina caliginosa</i>	(A. Gould, 1849)
92	Mollusca	<i>Lamellaria</i> sp.	Montagu, 1816
93	Mollusca	<i>Lottia</i> sp.	Gray, 1833
94	Mollusca	<i>Margarella antarctica</i>	(E. Lamy, 1906)
95	Mollusca	<i>Margarella violacea</i>	(P. P. King, 1832)
96	Mollusca	<i>Nacella deaurata</i>	(Gmelin, 1791)
97	Mollusca	<i>Nacella magellanica</i>	(Gmelin, 1791)
98	Mollusca	<i>Nacella mytilina</i>	(Helbling, 1779)
99	Mollusca	<i>Nacella</i> sp.	Schumacher, 1817
100	Mollusca	<i>Nassarius gayi</i>	(Kiener, 1834)
101	Mollusca	<i>Pareuthria atrata</i>	(E. A. Smith, 1881)
102	Mollusca	<i>Pareuthria fuscata</i>	(Bruguière, 1789)
103	Mollusca	<i>Pareuthria</i> sp. 1	(Bruguière, 1789)
104	Mollusca	<i>Savatieria coppingeri</i>	(E. A. Smith, 1881)
105	Mollusca	<i>Scurria</i> sp. 1	Gray, 1847
106	Mollusca	<i>Tegula atra</i>	(Lesson, 1831)
107	Mollusca	<i>Tegula</i> sp. 1	Lesson, 1833
108	Mollusca	<i>Trophon geversianus</i>	(Pallas, 1774)
109	Mollusca	<i>Trophon plicatus</i>	([Lightfoot], 1786)
110	Mollusca	Unidentified Fissurellidae sp. 1	J. Fleming, 1822
111	Mollusca	Unidentified Gastropoda sp. 1	Cuvier, 1795
112	Mollusca	<i>Xanthochorus cassidiformis</i>	(Blainville, 1832)
113	Mollusca	<i>Xymenopsis muriciformis</i>	(P. P. King, 1832)
114	Mollusca	<i>Diaulula hispida</i>	(d'Orbigny, 1834)
115	Mollusca	<i>Thecacera darwini</i>	Pruvot-Fol, 1950
116	Mollusca	<i>Tritonia</i> sp.	Cuvier, 1798
117	Mollusca	Unidentified Nudibranchia sp. 1	Cuvier, 1817

118	Mollusca	<i>Callochiton puniceus</i>	(Gould, 1846)
119	Mollusca	<i>Chaetopleura peruviana</i>	(Lamarck, 1819)
120	Mollusca	<i>Chaetopleura</i> sp.	Shuttleworth, 1853
121	Mollusca	<i>Chiton magnificus</i>	Deshayes, 1827
122	Mollusca	<i>Chiton</i> sp. 1	Linnaeus, 1758
123	Mollusca	<i>Chiton</i> sp. 2	Linnaeus, 1758
124	Mollusca	<i>Ischnochiton pusio</i>	(G. B. Sowerby I, 1832)
125	Mollusca	<i>Ischnochiton striolatus</i>	(Gray, 1828)
126	Mollusca	<i>Leptochiton medinae</i>	(Plate, 1899)
127	Mollusca	<i>Plaxiphora aurata</i>	(Spalowsky, 1795)
128	Mollusca	<i>Tonicia argyrosticta</i>	(Philippi, 1845)
129	Mollusca	<i>Tonicia</i> sp. 1	Gray, 1847
130	Brachiopoda	<i>Magellania venosa</i>	(Dixon, 1789)
131	Echinodermata	<i>Anasterias antarctica</i>	(Lütken, 1857)
132	Echinodermata	<i>Asterina fimbriata</i>	Perrier, 1875
133	Echinodermata	<i>Cosmasterias lurida</i>	(Philippi, 1858)
134	Echinodermata	<i>Henricia obesa</i>	(Sladen, 1889)
135	Echinodermata	<i>Labidiaster radius</i>	Loven in Lütken, 1871
136	Echinodermata	<i>Odontaster penicillatus</i>	(Philippi, 1870)
137	Echinodermata	<i>Porania antarctica</i>	E. A. Smith, 1876
138	Echinodermata	<i>Arbacia dufresnii</i>	(Blainville, 1825)
139	Echinodermata	<i>Loxechinus albus</i>	(Molina, 1782)
140	Echinodermata	<i>Pseudechinus magellanicus</i>	(Philippi, 1857)
141	Echinodermata	<i>Chiridota pisanii</i>	Ludwig, 1886
142	Echinodermata	<i>Pentactella perrieri</i>	(Ekman, 1927)
143	Echinodermata	<i>Psolus antarcticus</i>	(Philippi, 1857)
144	Echinodermata	<i>Psolus</i> sp.	Oken, 1815
145	Echinodermata	Unidentified Holothuroidea sp. 1	de Blainville, 1834
146	Echinodermata	Unidentified Synallactidae sp. 1	Ludwig, 1894
147	Echinodermata	<i>Ophiactis asperula</i>	(Philippi, 1858)
148	Echinodermata	<i>Ophiophragmus</i> sp.	Lyman, 1865
149	Chordata	Unidentified Teleostei sp. 1	Cope, 1871
150	Chordata	Unidentified Teleostei sp. 2	Cope, 1871
151	Chordata	<i>Pyura</i> sp. 1	Molina, 1782

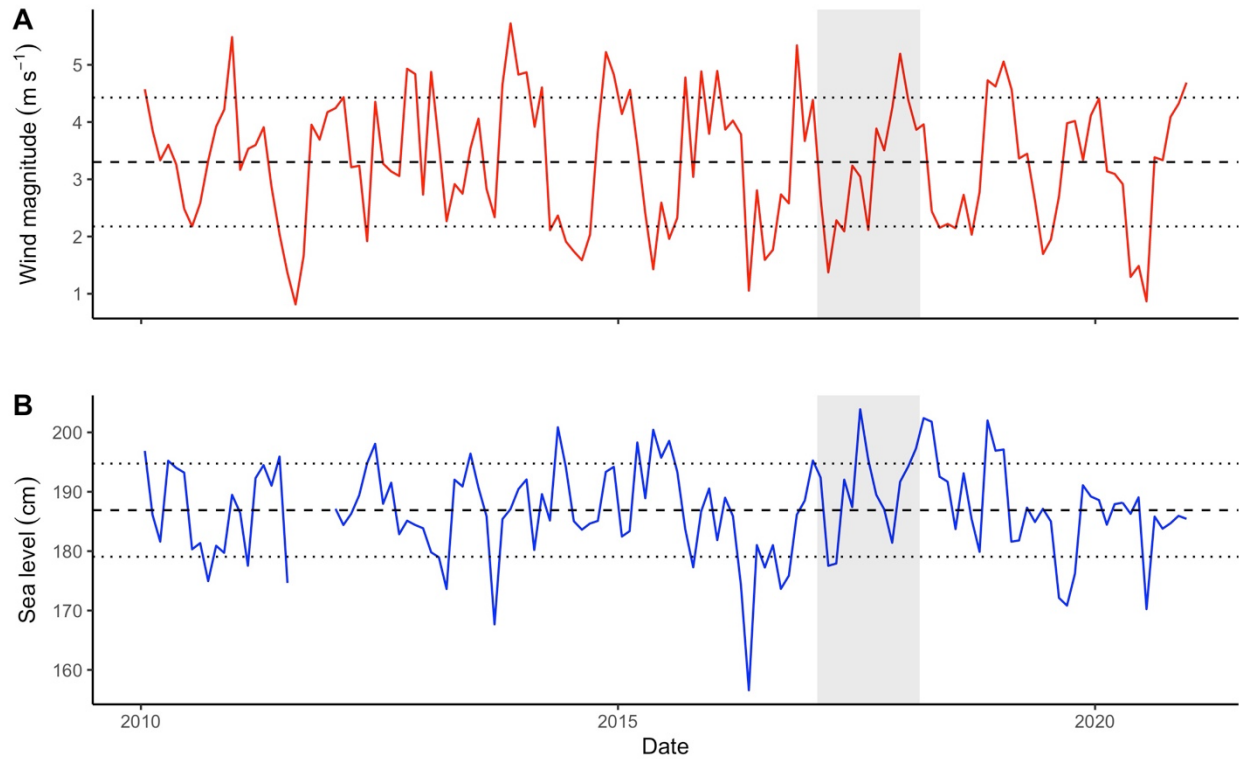


Fig. S1 Ten-year time series of (A) wind magnitude (m s^{-1}) and (B) sea level (cm) at *Bahía el Águila*, south Chile. The grey area delimits the period of the experiment (February 2017 – February 2018). Wind magnitude data were downloaded as monthly averages from ERA5 reanalysis for the global climate (<https://cds.climate.copernicus.eu>). Sea level data were provide by *Servicio Hidrográfico y Oceanográfico de la Armada de Chile (SHOA)*. Long-term means and standard deviations are depicted as dashed and dotted lines, respectively.

Table S2 Summary of linear models assessing the effects of *Macrocystis* removal on community-level biomass (g 0.25 m⁻²) and ln-transformed density (ind. 0.25 m⁻²) over time. Times 0, 1, 2, and 3 represent February 2017, June 2017, November 2017, February 2018, respectively.

<i>Predictors</i>	Biomass			ln(Density)		
	<i>Estimates</i>	<i>CI</i>	<i>P</i>	<i>Estimates</i>	<i>CI</i>	<i>P</i>
Controls at time 0	18.38	-4.14 – 40.89	0.109	4.14	3.82 – 4.46	<0.001
Removal effect at time 0	8.11	-23.73 – 39.96	0.615	-0.26	-0.72 – 0.21	0.278
Time 0 - Time 1 of controls	62.14	30.29 – 93.98	<0.001	-0.53	-1.07 – 0.00	0.051
Time 0 - Time 2 of controls	92.31	60.46 – 124.15	<0.001	-0.73	-1.17 – -0.28	0.002
Time 0 - Time 3 of controls	88.22	56.38 – 120.07	<0.001	-1.10	-1.61 – -0.60	<0.001
Removal effect * Time 1	-0.99	-46.02 – 44.04	0.965	0.75	0.04 – 1.46	0.039
Removal effect * Time 2	-88.17	-133.21 – -43.14	<0.001	-0.06	-0.70 – 0.59	0.865
Removal effect * Time 3	-95.04	-140.08 – -50.01	<0.001	0.51	-0.18 – 1.19	0.145
Observations	144			106		
R ²	0.390			0.325		

Table S3 Statistical summary of a generalised (negative binomial) linear model used to investigate the effects of *Macrocystis* removal on species composition over time. Parameter P-values were obtained after 999 resampling iterations. Times 0, 1, 2, and 3 represent February 2017, June 2017, November 2017, February 2018, respectively.

<i>Predictors</i>	<i>Wald value</i>	<i>P</i>
Controls at time 0	21.21	<0.01
Removal effect at time 0	7.36	0.18
Time 0 - Time 1 of controls	7.55	<0.01
Time 0 - Time 2 of controls	8.97	<0.01
Time 0 - Time 3 of controls	9.13	<0.01
Removal effect * Time 1	5.76	0.03
Removal effect * Time 2	6.90	0.01
Removal effect * Time 3	4.68	0.14

Table S4 Original and realised sampling scheme, due to harsh weather, in the manipulative field experiment at each sampling date.

Sampling date	Treatment	Patches		Plots	
		Original	Sampled	Original	Sampled
February 2017	Control	3	3	15	15
	<i>Macrocystis</i> removed	3	3	15	13
June 2017	Control	3	2	15	8
	<i>Macrocystis</i> removed	3	3	15	15
November 2017	Control	3	3	15	15
	<i>Macrocystis</i> removed	3	3	15	15
February 2018	Control	3	2	15	10
	<i>Macrocystis</i> removed	3	3	15	15

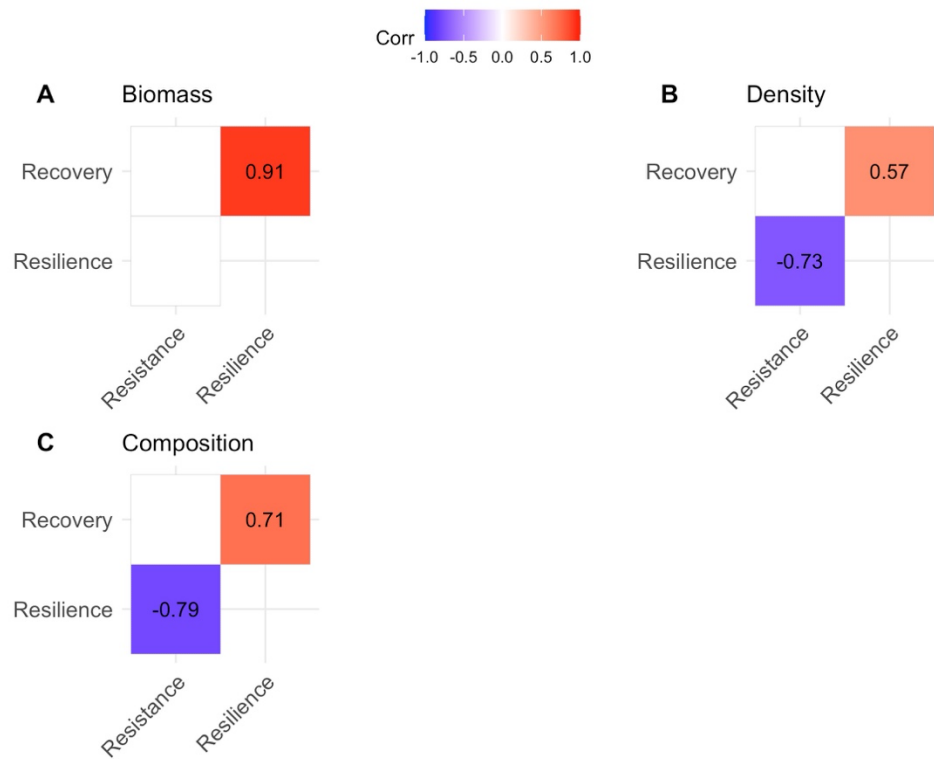


Fig. S2 Pearson product-moment correlations computed between stability responses to the experimental removal of *Macrocystis pyrifera* removal. Only correlations with $P < 0.05$ are shown. Empty tiles indicate statistically non-significant correlations.