

Changes in deep reef benthic community composition across a latitudinal and environmental gradient in temperate Eastern Australia

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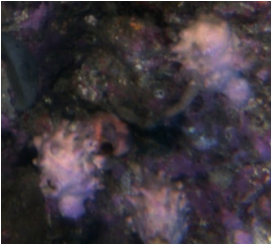
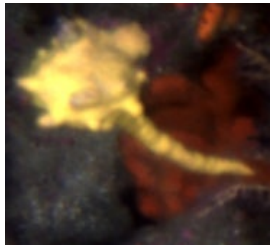
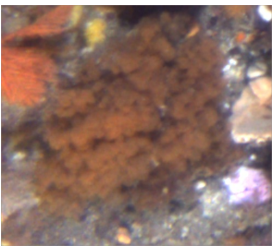


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Supporting Information

Table S1. Characteristics of the different AUV survey regions, including the names of individual survey sites, their latitudinal coordinates, depth range, the approximate transect length, and the transect grid types used for image collection. The AUV surveys rely on a combination of (i) broad-scale, sparse grid transects at the scale of 500 m to 1000 m and, (ii) smaller-scale, full coverage dense grid transects of 25 x 25 m.

Region	Sites	Latitudinal range	Depth range (m)	Approx. transect length (km)	Grid type(s)
Southern Queensland	Henderson/Moreton Is.	27.082 - 27.135°S.	30.0 – 38.1 m	9.3 km	2 (partial) broad scale, 6 dense grid
Solitary Islands	South Solitary Is., Patch	30.202 - 30.462°S.	30.0 – 55.4 m	27.52 km	2 (partial) sparse, 7 dense
Port Stephens	Broughton Is., Fingal (Shark Is.)	32.621 - 32.757°S.	30.0 – 41.5 m	7.75 km	3 (partial) sparse, 2 dense
Sydney (Long Bay)	Long Bay	33.983 - 33.994°S	30.0 – 47.9 m	2.4 km	1 (partial) sparse
Batemans Bay	Batemans Bay North, Potato Point	35.530 - 36.093°S.	30.0 – 49.0 m	20.7 km	1 broad scale, two (partial) sparse, 6 dense
Flinders Island	Flinders Island	40.431 - 40.610°S	30.0 – 87.3 m	23.1 km	6 broad scale
Eastern Tasmania	Bicheno & Governor Is., The Nuggets, Mistaken Cape, The Lanterns	41.866 – 43.134°S	30.0 – 62.2 m	14.27 km	5 (full) sparse, 7 dense, 2 partial sections of sparse

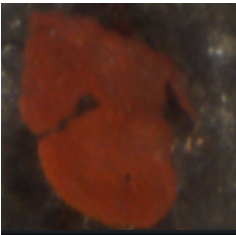
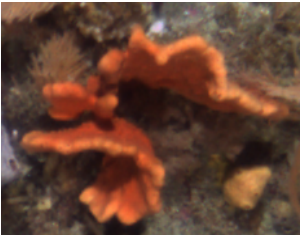

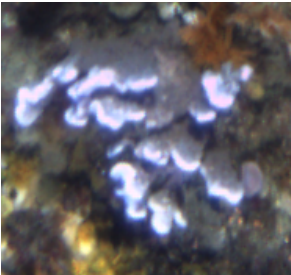

Table S2. List of pre-selected targeted invertebrate types

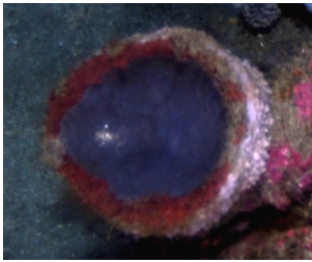




	Broad group	Specifier	Shape	Colour	Morph. Level	Sub-Group Level	CATAMI Level
	Ascidian	Solitary	Stalked	Purple	ASSP	Stalked solitary ascidian	ASS
	Ascidian	Solitary	Stalked	Yellow	ASSY		
	Bryozoan	N/A	Soft	Orange	BRYSO	Soft bryozoan	BRY
	Bryozoan	N/A	Soft	Brown	BRYSB		
	Bryozoan	Foliaceous	Soft	Black	BRYSBF		

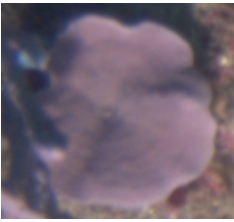
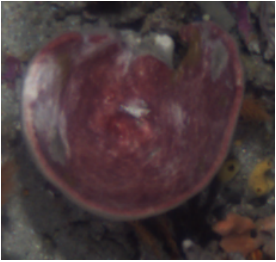
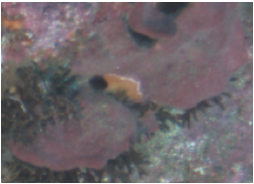
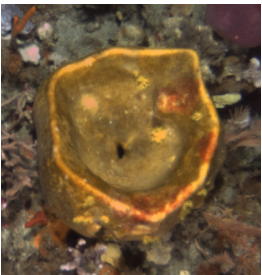
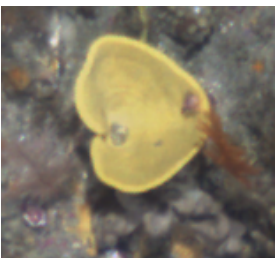
	Broad group	Specifier	Shape	Colour	Morph. Level	Sub-Group Level	CATAMI Level
	Bryozoan	Fenestrate	Hard	White	BRYHFW	Hard bryozoan	BRY
 <i>(Antipathes spp.)</i>	Cnidarian	Black coral	3D branching – Bottlebrush	Blue	CBNBBC	Black coral	CBNB
	Cnidarian	Octocoral	3D branching – Arborescent	Brown	CBBNAB	Octocoral	CBBN
	Cnidarian	Octocoral	3D branching – Arborescent	White	CBFRWF	Octocoral	CBFR
	Cnidarian	Gorgonian	2D fan - rigid	Pink	CBFRP	Rigid gorgonian	

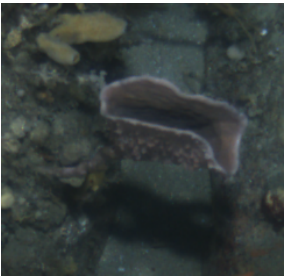
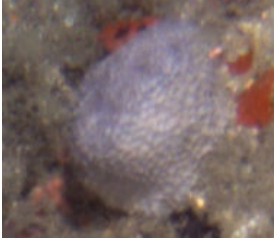
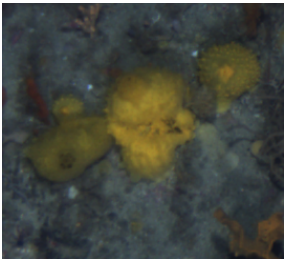
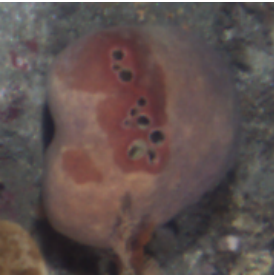
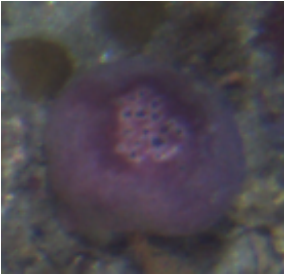
	Broad group	Specifier	Shape	Colour	Morph. Level	Sub-Group Level	CATAMI Level
	Cnidarian	Gorgonian	2D fan - rigid	White	CBFRW	Rigid gorgonian	CBFR
	Cnidarian	Gorgonian	Soft – fern frond	Orange	CBFFCO	Soft gorgonian	CBFF
	Cnidarian	Gorgonian	Soft - fern frond	Pink/ White	CBFFCP		
	Sponge	Branching	Thick	Purple/ Grey	SPEBPTK	Purple branching	SPEB
	Sponge	Branching	Thin	Purple/ Grey	SPEBPTN		
	Sponge	Branching	Short	Orange	SPEBSO	Orange branching	

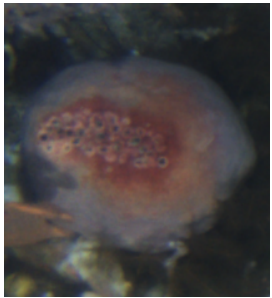
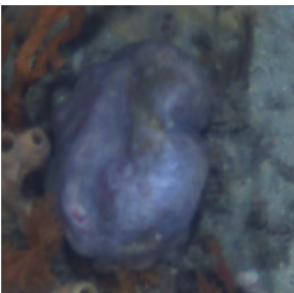
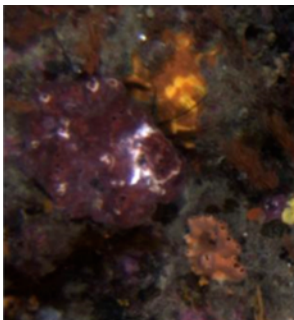

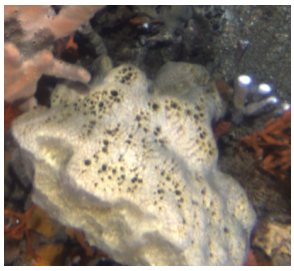
	Broad group	Specifier	Shape	Colour	Morph. Level	Sub-Group Level	CATAMI Level
	Sponge	Branching	Tall	Orange	SPEBTO	Orange branching	SPEB
	Sponge	Branching	N/A	Brown	SPEBB	Brown branching	
	Sponge	Laminar	Top (oscles)	Grey	SPELGT	Laminar top (oscles)	SPEL
	Sponge	Laminar	Top (oscles)	Orange	SPELOT		
	Sponge	Laminar	Side (oscles)	Orange	SPELSiO		

	Broad group	Specifier	Shape	Colour	Morph. Level	Sub-Group Level	CATAMI Level
	Sponge	Laminar	Stalked	Orange	SPELStO	Laminar stalked	SPEL
	Sponge	Laminar	Ribbon	Orange	SPELOR	Laminar ribbon	
	Sponge	Palmate	N/A	Orange	SPEPO	Palmate orange	SPEP
	Sponge	Palmate	N/A	Purple / Grey	SPEPP	Palmate purple/grey	
	Sponge	Cup	Thin	Blue	SPHCBTN	Blue cup sponge	SPHC

	Broad group	Specifier	Shape	Colour	Morph. Level	Sub-Group Level	CATAMI Level
	Sponge	Cup	Thick	Blue	SPHCBTK	Blue cup sponge	SPHC
	Sponge	Cup	Frisly	N/A	SPHCF	Frisly cup sponge	
	Sponge	Cup	Thick	Grey	SPHCGTK	Grey cup sponge	
	Sponge	Cup	Thin	Grey	SPHCGTN		
	Sponge	Cup	Thick	Purple	SPHCPTK	Purple cup sponge	

	Broad group	Specifier	Shape	Colour	Morph. Level	Sub-Group Level	CATAMI Level
	Sponge	Cup	Thin	Purple	SPHCPTN	Purple cup sponge	SPHC
	Sponge	Cup	Thick	Red	SPHCRTK	Red cup sponge	
	Sponge	Cup	Thin	Red	SPHCRTN		
	Sponge	Cup	Thick	Yellow	SPHCYTK	Yellow cup sponge	
	Sponge	Cup	Thin	Yellow	SPHCYTN		

	Broad group	Specifier	Shape	Colour	Morph. Level	Sub-Group Level	CATAMI Level
	Sponge	Cup	Stalked	N/A	SPHCS	Stalked cup sponge	SPHC
	Sponge	Ball	N/A	Grey	SPMRG	Grey ball sponge	SPMR
	Sponge	Ball	Papillate	Yellow	SPMRYP	Yellow papillate ball sponge	
	Sponge	Massive	Concentrated oscules	Pink	SPMSIP	Simple massive sponge (concentrated oscules)	SPMSI
	Sponge	Massive	Concentrated oscules	Purple	SPMSIPR		

	Broad group	Specifier	Shape	Colour	Morph. Level	Sub-Group Level	CATAMI Level
	Sponge	Massive	Concentrated oscules	Grey	SPMSIR	Simple massive sponge (concentrated oscules)	SPMSI
	Sponge	Massive	Shapeless	Blue / Grey	SPMSISG	Shapeless massive sponge	
	Sponge	Massive	Shapeless	Red/Purple	SPMSISR		
	Sponge	Massive	Shapeless	Orange/ Red	SPMSISO		
	Sponge	Massive	Shapeless	White	SPMSISW		

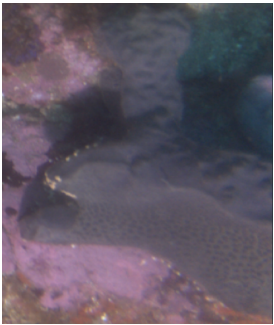

	Broad group	Specifier	Shape	Colour	Morph. Level	Sub-Group Level	CATAMI Level
	Sponge	Massive	Shapeless	Blue	SPMSISB	Shapeless massive sponge	SPMSI
	Sponge	Tubular	Glass	White	SPHTGS	Glass sponge	SPHT

Table S3. ‘The BEST solution’ results of the DistLM analysis for each alternate selection criterion and procedure and classification level to determine best model to be used for dbRDA analysis.

Selection criterion	Selection Procedure	Classification level	No. Variables	Criterion value	R ²	Selections
AIC_c	Step-wise	CATAMI	11	1134.7	0.53988	1,3,4,7-10,12-15
		GROUP	9	1213.1	0.44812	1,6-8,11-15
		MORPH	9	1240.2	0.43314	1,7-9,11-15
	Best	CATAMI	11	1134.3	0.54097	1,3,4,7,8,10-15
		GROUP	9	1213.1	0.44812	1,6-8,11-15
		MORPH	9	1240.2	0.43314	1,7-9,11-15
BIC	Step-wise	CATAMI	6	1162.9	0.48311	1,7,12-15
		GROUP	6	1240.4	0.40119	1,7,12-15
		MORPH	6	1266.8	0.38752	1,7,12-15
	Best	CATAMI	8	1162.9	0.51473	1,7,8,11-15
		GROUP	6	1240.4	0.40119	1,7,12-15
		MORPH	6	1266.8	0.38752	1,7,12-15