



Catalogue of CSIRO Torres Strait Datasets

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1 Summary

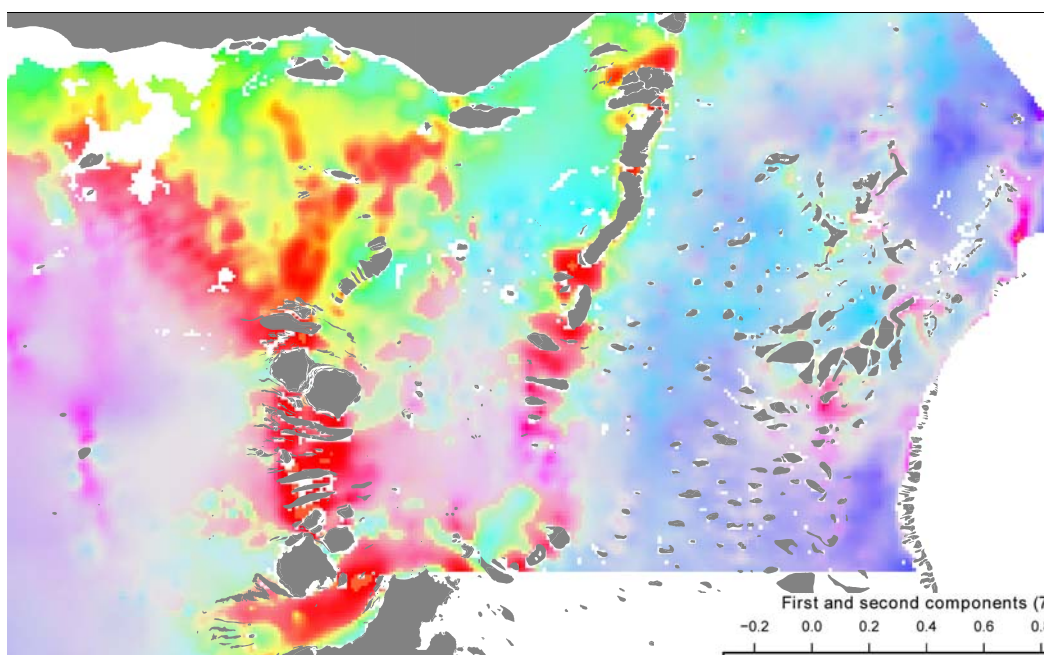
CSIRO holds extensive data from recent and past research in the Torres Strait. As part of the Torres Strait e-Atlas, CSIRO will develop and make available map layers and data products from these data holdings. The number and specifics of which datasets will be developed will be prioritised by the Torres Strait end-users in discussion with CSIRO and the e-Atlas team to ensure the most useful datasets are developed within the resource limits of the project.

This milestone report presents a catalogue of information for the most significant and updated data sets, metadata and map compositions for the Torres Strait region, which may be suitable for inclusion in the Torres Strait eAtlas. The datasets included in this catalogue are described more fully in three previous reports. Pitcher et al 2004 collated all CSIRO seabed survey datasets prior to 2004 and integrated them to a common level of seabed habitat classification. Those datasets providing the broadest coverage of Torres Strait are included here. Pitcher et al 2007 conducted new surveys of the Torres Strait seabed habitats and constituent biodiversity. Datasets providing distributions of seabed species, species-groups, assemblages and habitat types are included here. Haywood et al 2007 collated all CSIRO coral reef survey datasets prior to 2007 and integrated them to a common level of classification. Those datasets providing the broadest coverage of Torres Strait coral reef fish & coral assemblages and habitats are included here.

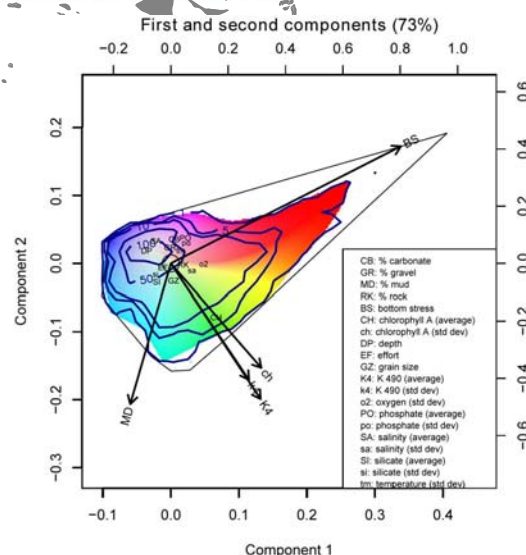
Subject to further discussions and prioritisation by CSIRO, TSRA and eAtlas staff, the identified high priority datasets selected will be developed to provide the most useful presentation and format, and then made available to the Torres Strait e-Atlas.

2 Catalogue of CSIRO Torres Strait Datasets

2.1 Biophysical characterisation of Torres Strait seabed



Description: characterisation of the Torres Strait seabed, based on relationships between many benthic species and 20 environmental variables. Similar colours represent similar environments with similar biological composition. Inset right: colour key from a bi-plot of the first and second principal components of the biologically weighted environmental data. Contours (blue lines) show density of seabed grid cells at 1, 5, 10, 50 and 100%. Labeled arrows indicate importance (by length) of major environmental influences on species composition patterns. Red aligns with high current stress and green with high K490 and chlorophyll A. Cyan aligns with mud. Common environment types, near the mode of the density have less saturated colours (grey).



Reference: Figure 2.8-15 in Pitcher, C.R., Condie, S., Ellis, N., McLeod, I., Haywood, M., Gordon, S.R., Skewes, T.D., Dunn, J., Dennis, D.M., Cotterell, E., Austin, M., Venables, W., Taranto, T. (2004). Torres Strait Seabed & Water-Column Data Collation, Bio-physical Modeling and Characterization. Final Report to the National Oceans Office. CSIRO Marine Research. Pp. 117. ISBN 1 876996 83 8.

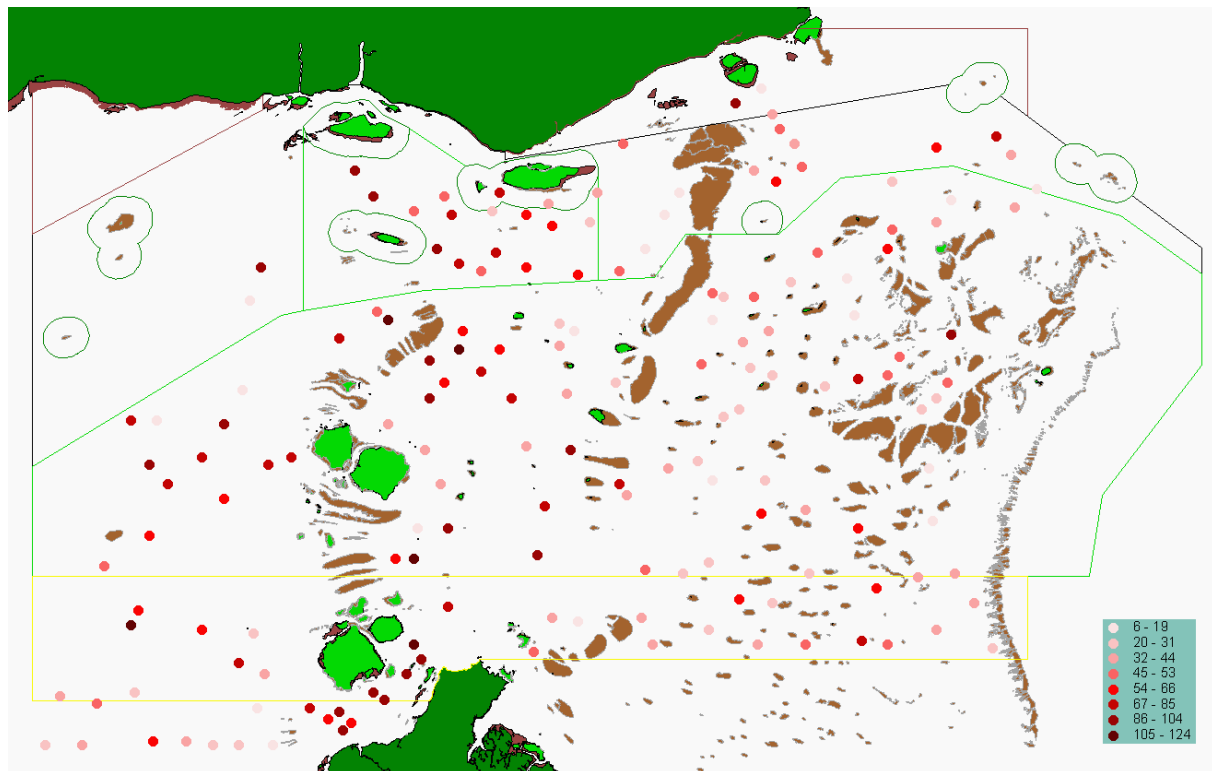
http://www.crctorres.com/research/NOO_TS_Characterisation_Final_Report_Nov2004.pdf

<http://www.environment.gov.au/coasts/mbp/publications/north/pubs/torres-characterisation.pdf>

Data sources: Biological data: multiple CSIRO trawl and benthic surveys in the far northern Great Barrier Reef, 2001-2005. Environmental data: compilation from multiple sources over multiple years: CSIRO, Geoscience Australia, auSeabed (OSI, Sydney University), James Cook University, NASA Ocean Colour, CARS, QDPI/QFS.

Contact: C. Roland Pitcher, CSIRO Marine and Atmospheric Research, Brisbane. roland.pitcher@csiro.au

2.2 Species richness of benthic invertebrates



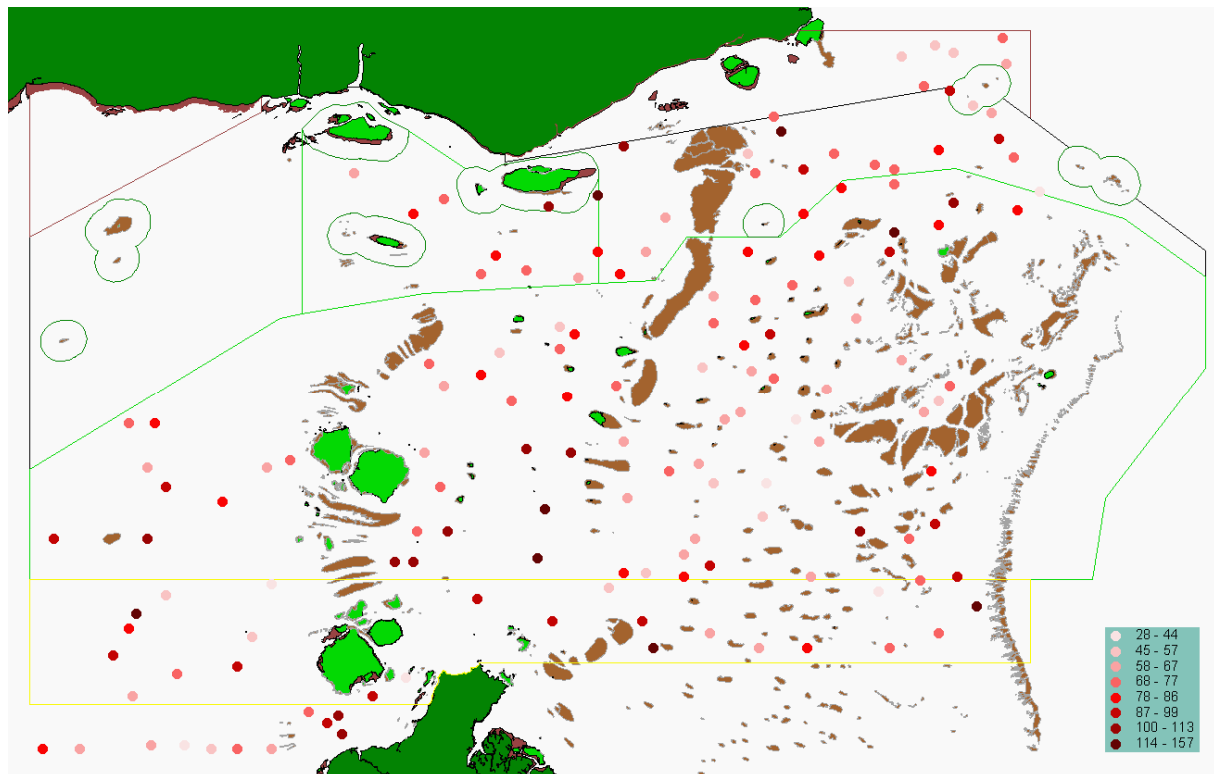
Description: Species richness of benthic invertebrates in epibenthic sled samples, by location in the TSPZ

Reference: Figure 3-3 in Pitcher, C.R., Haywood, M., Hooper, J., Coles, R., Bartlett, C., Browne, M., Cannard, T., Carini, G., Carter, A., Cheers, S., Chetwynd, D., Colefax, A., Cook, S., Davie, P., Ellis, N., Fellegara, I., Forcey, K., Furey, M., Gledhill, D., Hendriks, P., Jacobsen, I., Johnson, J., Jones, M., Last, P., Marks, S., McLeod, I., Sheils, J., Sheppard, J., Smith, G., Strickland, C., Van der Geest, C., Venables, W., Wassenberg, T., Yearsley, G. (2007). Mapping and Characterisation of Key Biotic & Physical Attributes of the Torres Strait Ecosystem. CSIRO/QM/QDPI Task Final Report to CRC Torres Strait. 142pp. ISBN 978-1-921232-89-3
http://www.cmar.csiro.au/e-print/open/2007/pitcher_c_r_a.pdf

Data sources: CSIRO survey voyage on research vessel James Kirby March–April 2005

Contact: C. Roland Pitcher, CSIRO Marine and Atmospheric Research, Brisbane. roland.pitcher@csiro.au

2.3 Species richness of benthic fishes and mobile invertebrates



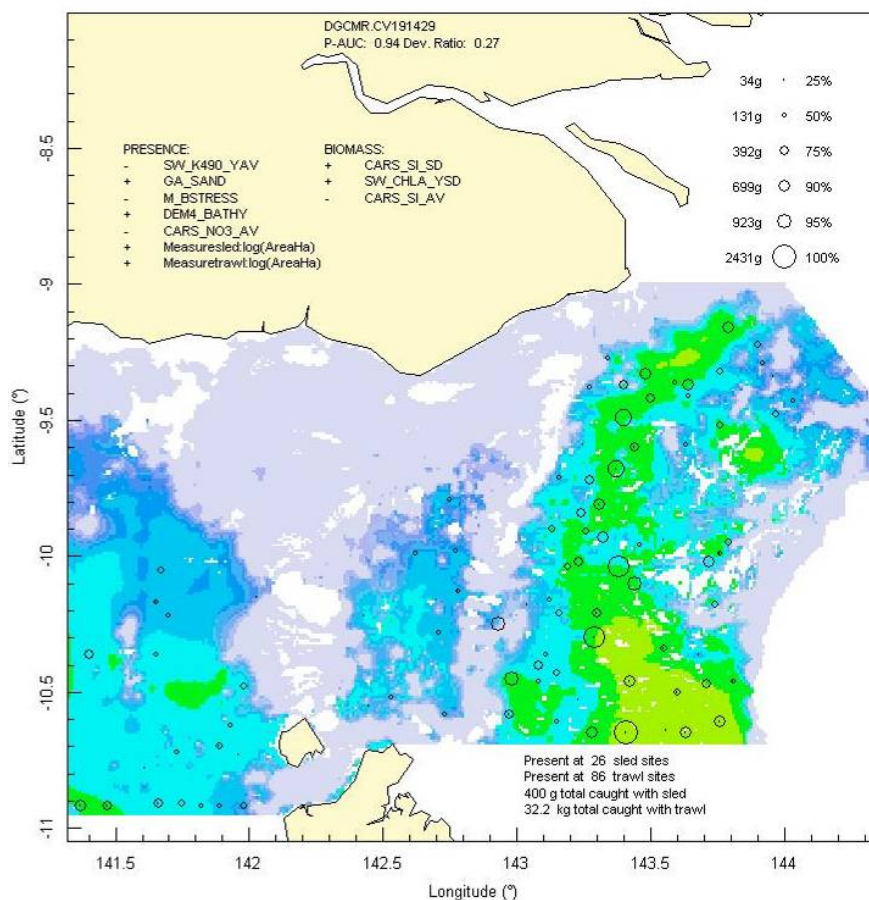
Description: Species richness of benthic fishes and mobile invertebrates in demersal trawl samples, by location in the TSPZ

Reference: Figure 3-4 in Pitcher, C.R., Haywood, M., Hooper, J., Coles, R., Bartlett, C., Browne, M., Cannard, T., Carini, G., Carter, A., Cheers, S., Chetwynd, D., Colefax, A., Cook, S., Davie, P., Ellis, N., Fellegara, I., Forcey, K., Furey, M., Gledhill, D., Hendriks, P., Jacobsen, I., Johnson, J., Jones, M., Last, P., Marks, S., McLeod, I., Sheils, J., Sheppard, J., Smith, G., Strickland, C., Van der Geest, C., Venables, W., Wassenberg, T., Yearsley, G. (2007). Mapping and Characterisation of Key Biotic & Physical Attributes of the Torres Strait Ecosystem. CSIRO/QM/QDPI Task Final Report to CRC Torres Strait. 142pp. ISBN 978-1-921232-89-3 http://www.cmar.csiro.au/e-print/open/2007/pitchercr_a.pdf

Data sources: CSIRO survey voyage on fisheries research vessel Gwendoline May January-February 2004

Contact: C. Roland Pitcher, CSIRO Marine and Atmospheric Research, Brisbane. roland.pitcher@csiro.au

2.4 Predicted distribution of Torres Strait seabed species



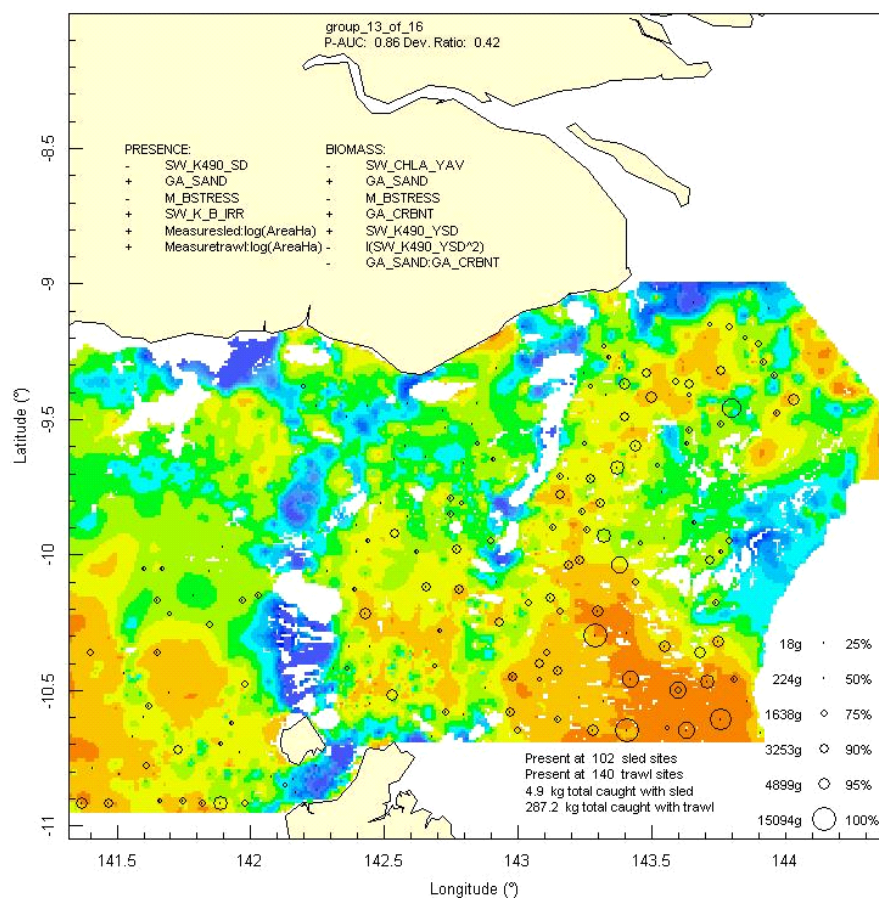
Description: Example predicted biomass distribution of a single species, in this case for the benthic fish: *Sorsogona tuberculata* (Tuberculated flathead). [NOTE: distribution maps are available for ~256 species as follows: Algae=15; Bryozoans=11; Corals=15; Crustaceans=37; Echinoderms=34; Fishes=87; Molluscs=28; Seagrasses=7; Sponges=20]

Reference: Figure 3-5 in Pitcher, C.R., Haywood, M., Hooper, J., Coles, R., Bartlett, C., Browne, M., Cannard, T., Carini, G., Carter, A., Cheers, S., Chetwynd, D., Colefax, A., Cook, S., Davie, P., Ellis, N., Fellegara, I., Forcey, K., Furey, M., Gledhill, D., Hendriks, P., Jacobsen, I., Johnson, J., Jones, M., Last, P., Marks, S., McLeod, I., Sheils, J., Sheppard, J., Smith, G., Strickland, C., Van der Geest, C., Venables, W., Wassenberg, T., Yearsley, G. (2007). Mapping and Characterisation of Key Biotic & Physical Attributes of the Torres Strait Ecosystem. CSIRO/QM/QDPI Task Final Report to CRC Torres Strait. 142pp. ISBN 978-1-921232-89-3 http://www.cmar.csiro.au/e-print/open/2007/pitchercr_a.pdf

Data sources: CSIRO survey voyages on fisheries research vessel Gwendoline May January-February 2004 and research vessel James Kirby March-April 2005.

Contact: C. Roland Pitcher, CSIRO Marine and Atmospheric Research, Brisbane. roland.pitcher@csiro.au

2.5 Predicted distribution of Torres Strait seabed species groups



Description: Example predicted biomass distribution for a group of species with similar distributions, in this case group #13 of 16. The top 10 of 19 species include:

CLASS	GENUS	SPECIES	Σp
Crustacea	<i>Portunus</i>	<i>rubromarginatus</i>	0.25
Actinopterygii	<i>Nemipterus</i>	<i>furcosus</i>	0.46
Actinopterygii	<i>Sorsogona</i>	<i>tuberculata</i>	0.55
Actinopterygii	<i>Upeneus</i>	<i>tragula</i>	0.64
Actinopterygii	<i>Pristotis</i>	<i>obtusirostris</i>	0.73
Actinopterygii	<i>Apogon</i>	sp.9(dg)	0.78
Actinopterygii	<i>Lagocephalus</i>	<i>sceleratus</i>	0.84
Actinopterygii	<i>Synodus</i>	<i>tectus</i> group	0.88
Actinopterygii	<i>Lutjanus</i>	<i>vitta</i>	0.91
Crustacea	<i>Thenus</i>	<i>australiensis</i>	0.93

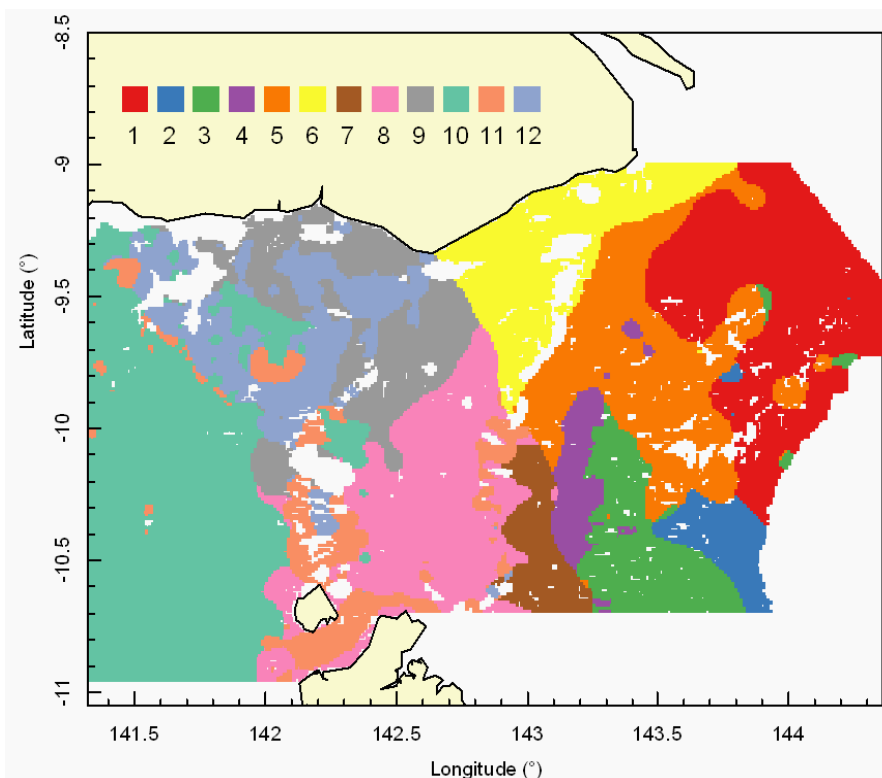
Σp =cumulative proportion of biomass. [NOTE: distribution maps are available for ~16 species groups, for which names of all constituent species are available.]

Reference: Figure 3-20 in Pitcher, C.R., Haywood, M., Hooper, J., Coles, R., Bartlett, C., Browne, M., Cannard, T., Carini, G., Carter, A., Cheers, S., Chetwynd, D., Colefax, A., Cook, S., Davie, P., Ellis, N., Fellegara, I., Forcey, K., Furey, M., Gledhill, D., Hendriks, P., Jacobsen, I., Johnson, J., Jones, M., Last, P., Marks, S., McLeod, I., Sheils, J., Sheppard, J., Smith, G., Strickland, C., Van der Geest, C., Venables, W., Wassenberg, T., Yearsley, G. (2007). Mapping and Characterisation of Key Biotic & Physical Attributes of the Torres Strait Ecosystem. CSIRO/QM/QDPI Task Final Report to CRC Torres Strait. 142pp. ISBN 978-1-921232-89-3 http://www.cmar.csiro.au/e-print/open/2007/pitchercr_a.pdf

Data sources: CSIRO survey voyages on fisheries research vessel Gwendoline May January-February 2004 and research vessel James Kirby March–April 2005.

Contact: C. Roland Pitcher, CSIRO Marine and Atmospheric Research, Brisbane. roland.pitcher@csiro.au

2.6 Predicted distribution of seabed assemblages of Torres Strait



Description: Predicted distributions of 12 seabed assemblages based on analysis of the compositional similarity of ~256 species at sampled sites. [NOTE: Detailed descriptions of each of the 12 Assemblage types are available]

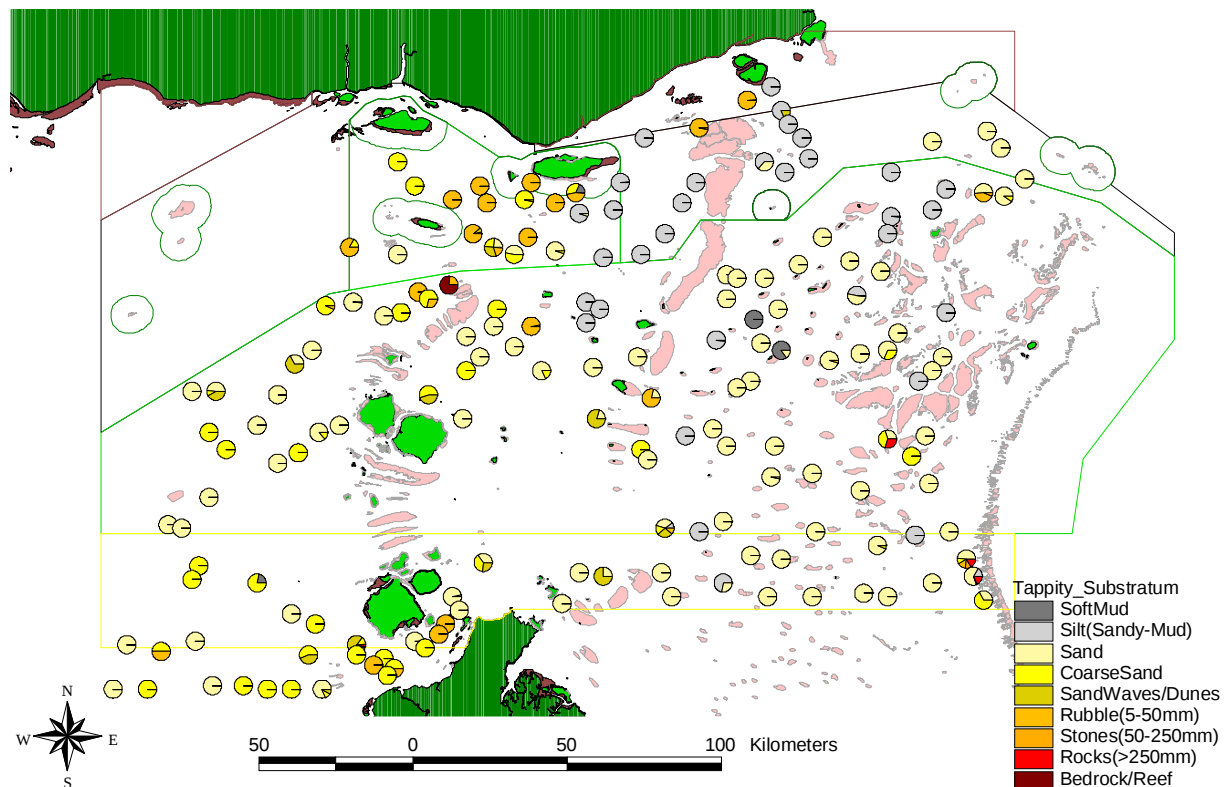
Reference: Figure 3-24 in Pitcher, C.R., Haywood, M., Hooper, J., Coles, R., Bartlett, C., Browne, M., Cannard, T., Carini, G., Carter, A., Cheers, S., Chetwynd, D., Colefax, A., Cook, S., Davie, P., Ellis, N., Fellegara, I., Forcey, K., Furey, M., Gledhill, D., Hendriks, P., Jacobsen, I., Johnson, J., Jones, M., Last, P., Marks, S., McLeod, I., Sheils, J., Sheppard, J., Smith, G., Strickland, C., Van der Geest, C., Venables, W., Wassenberg, T., Yearsley, G. (2007). Mapping and Characterisation of Key Biotic & Physical Attributes of the Torres Strait Ecosystem. CSIRO/QM/QDPI Task Final Report to CRC Torres Strait. 142pp. ISBN 978-1-921232-89-3

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Contact: C. Roland Pitcher, CSIRO Marine and Atmospheric Research, Brisbane. roland.pitcher@csiro.au

2.7 Observed distribution of seabed substratum types in Torres Strait



Description: Distribution of seabed substratum types, summarized as percent of transects length observed by towed video camera.

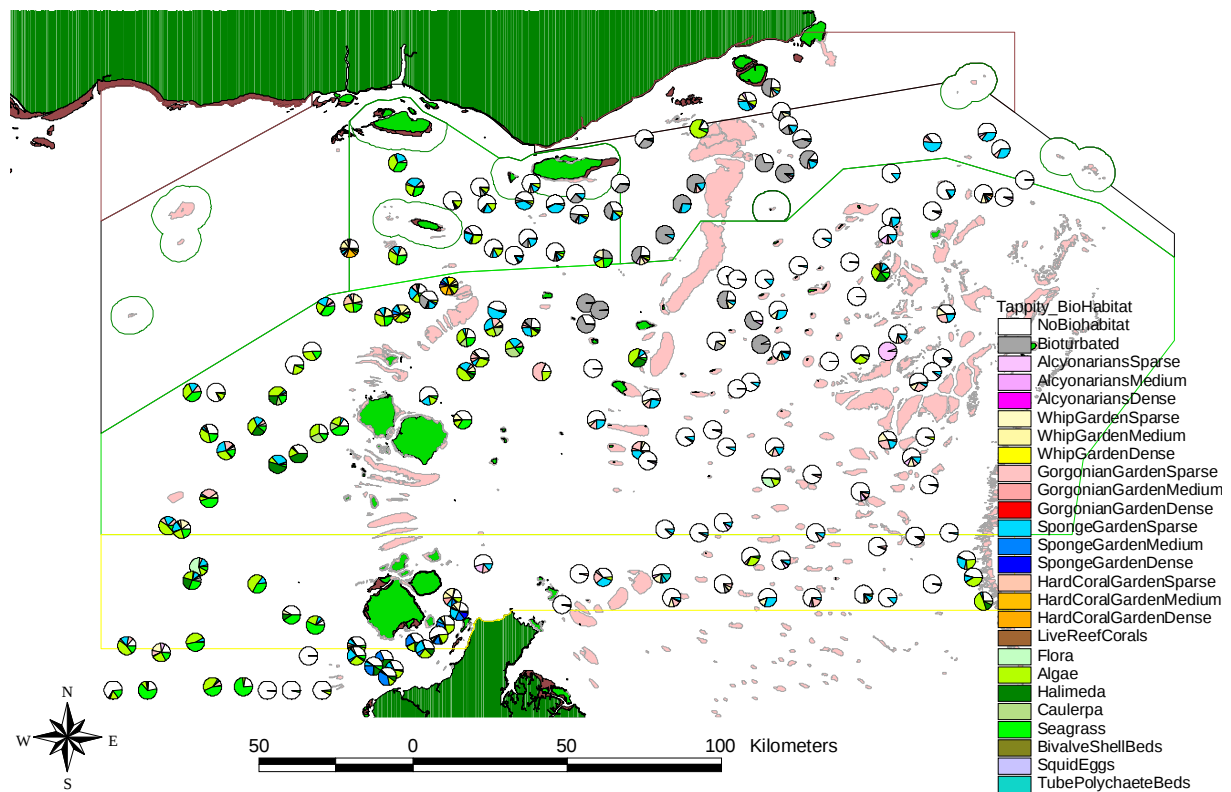
Reference: Figure 3-27 in Pitcher, C.R., Haywood, M., Hooper, J., Coles, R., Bartlett, C., Browne, M., Cannard, T., Carini, G., Carter, A., Cheers, S., Chetwynd, D., Colefax, A., Cook, S., Davie, P., Ellis, N., Fellegara, I., Forcey, K., Furey, M., Gledhill, D., Hendriks, P., Jacobsen, I., Johnson, J., Jones, M., Last, P., Marks, S., McLeod, I., Sheils, J., Sheppard, J., Smith, G., Strickland, C., Van der Geest, C., Venables, W., Wassenberg, T., Yearsley, G. (2007). Mapping and Characterisation of Key Biotic & Physical Attributes of the Torres Strait Ecosystem. CSIRO/QM/QDPI Task Final Report to CRC Torres Strait. 142pp. ISBN 978-1-921232-89-3

http://www.cmar.csiro.au/e-print/open/2007/pitchercr_a.pdf

Data sources: CSIRO survey voyage on research vessel James Kirby March–April 2005.

Contact: C. Roland Pitcher, CSIRO Marine and Atmospheric Research, Brisbane. roland.pitcher@csiro.au

2.8 Observed distribution of seabed biological habitat types in Torres Strait



Description: Distribution of broad biological seabed habitat types, summarized as percent of transects length observed by towed video camera.

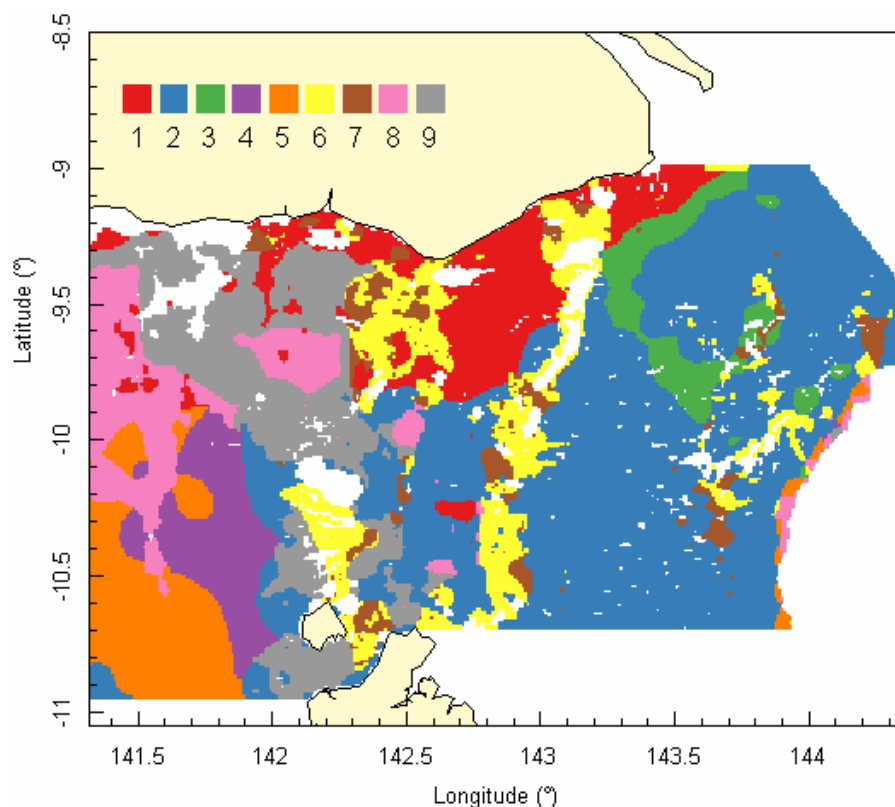
Reference: Figure 3-28 in Pitcher, C.R., Haywood, M., Hooper, J., Coles, R., Bartlett, C., Browne, M., Cannard, T., Carini, G., Carter, A., Cheers, S., Chetwynd, D., Colefax, A., Cook, S., Davie, P., Ellis, N., Fellegara, I., Forcey, K., Furey, M., Gledhill, D., Hendriks, P., Jacobsen, I., Johnson, J., Jones, M., Last, P., Marks, S., McLeod, I., Sheils, J., Sheppard, J., Smith, G., Strickland, C., Van der Geest, C., Venables, W., Wassenberg, T., Yearsley, G. (2007). Mapping and Characterisation of Key Biotic & Physical Attributes of the Torres Strait Ecosystem. CSIRO/QM/QDPI Task Final Report to CRC Torres Strait. 142pp. ISBN 978-1-921232-89-3

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Data sources: CSIRO survey voyage on research vessel James Kirby March–April 2005.

Contact: C. Roland Pitcher, CSIRO Marine and Atmospheric Research, Brisbane. roland.pitcher@csiro.au

2.9 Predicted distribution of seabed habitat types of Torres Strait



Description: Predicted distributions of 9 seabed habitat types based on analysis of the similarity of constituent habitat elements observed by towed video at sampled sites. [NOTE: Detailed descriptions of each of the 9 habitat types are available]

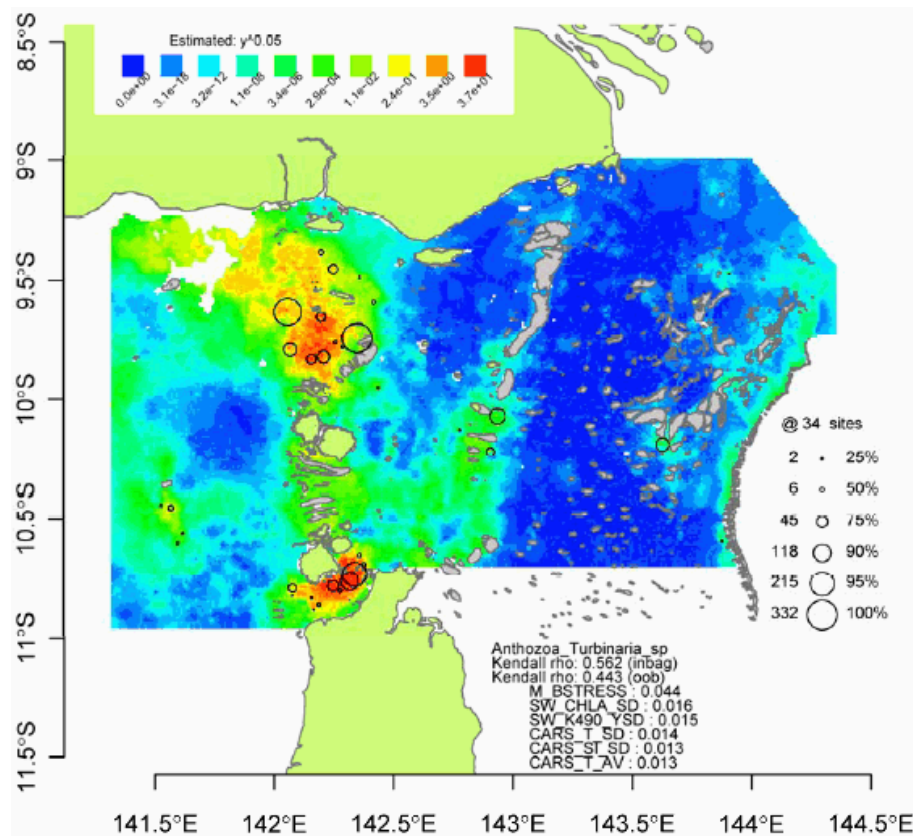
Reference: Figure 3-39 in Pitcher, C.R., Haywood, M., Hooper, J., Coles, R., Bartlett, C., Browne, M., Cannard, T., Carini, G., Carter, A., Cheers, S., Chetwynd, D., Colefax, A., Cook, S., Davie, P., Ellis, N., Fellegara, I., Forcey, K., Furey, M., Gledhill, D., Hendriks, P., Jacobsen, I., Johnson, J., Jones, M., Last, P., Marks, S., McLeod, I., Sheils, J., Sheppard, J., Smith, G., Strickland, C., Van der Geest, C., Venables, W., Wassenberg, T., Yearsley, G. (2007). Mapping and Characterisation of Key Biotic & Physical Attributes of the Torres Strait Ecosystem. CSIRO/QM/QDPI Task Final Report to CRC Torres Strait. 142pp. ISBN 978-1-921232-89-3

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Data sources: CSIRO survey voyage on research vessel James Kirby March–April 2005.

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2.10 Predicted distribution of Torres Strait seabed species from video



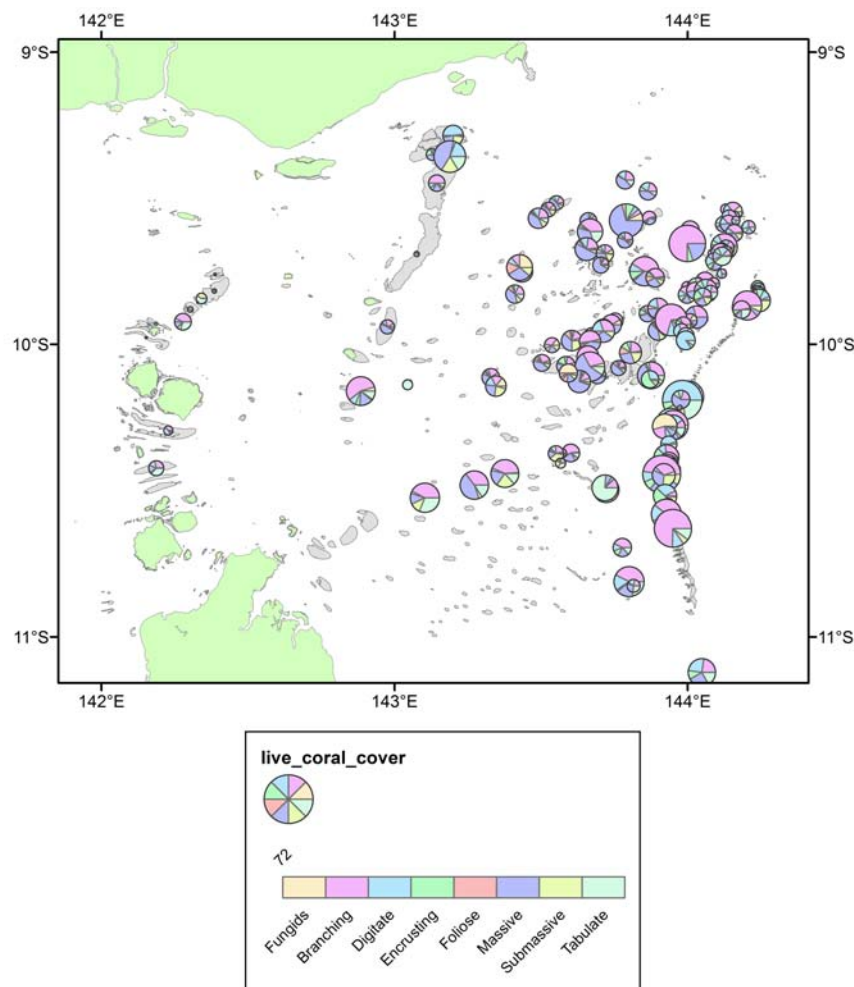
Description: Example predicted abundance distribution of a single species observed by towed video, in this case for the seabed hard coral: *Turbinaria* sp. ('Flowerpot' coral). [NOTE: distribution maps are available for ~62 species counted from towed video transects and for ~30 taxa for which percent cover was estimated.]

Reference: Figure 5 in Haywood, M. D. E., Browne, M., Skewes, T. D., Rochester, W. A., McLeod, I. M., Pitcher, C. R., Dennis, D. M., Dunn, J. R., Cheers, S. J., and Wassenberg, T. J. (2007). Improved knowledge of Torres Strait seabed biota and reef habitats. CSIRO Marine and Atmospheric Research project 1.3.1 report to Marine and Tropical Sciences Research Facility. 96pp
http://www.cmar.csiro.au/e-print/open/2007/haywoodmde_.pdf
<http://www.rrrc.org.au/publications/downloads/131-CSIRO-Haywood-et-al-2007-Improved-knowledge-of-TS-biota.pdf>

Data sources: CSIRO survey voyages on research vessel James Kirby March–April 2005.

Contact: C. Roland Pitcher, CSIRO Marine and Atmospheric Research, Brisbane. roland.pitcher@csiro.au

2.11 Observed average cover of live coral on Torres Strait reefs



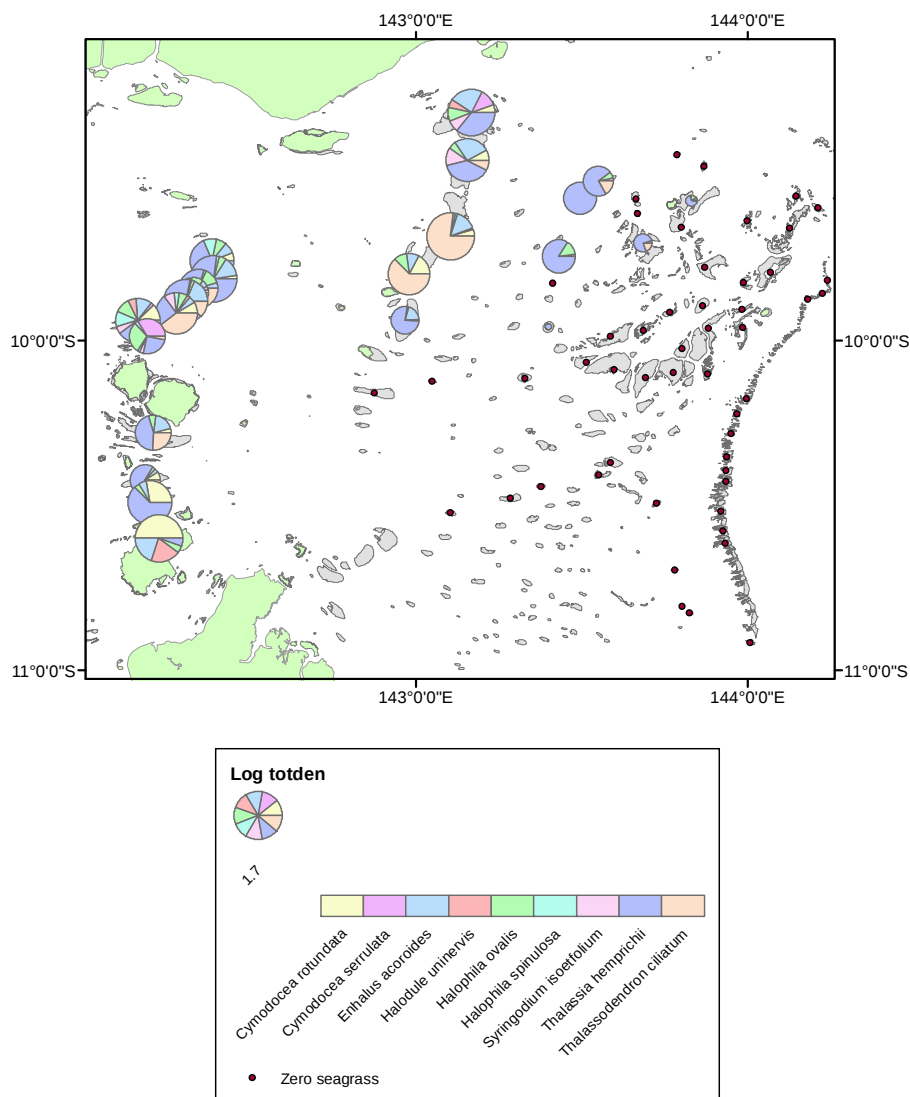
Description: Mean percentage cover of live coral on Torres Strait Reefs from diver surveys. Visual estimates of % cover for all sites averaged by reef. Sites were generally randomly allocated to reef top and edge habitats. [Note: similar data views available for several other substrate categories (6)].

Reference: Figure 39 – 50 in Haywood, M. D. E., Browne, M., Skewes, T. D., Rochester, W. A., McLeod, I. M., Pitcher, C. R., Dennis, D. M., Dunn, J. R., Cheers, S. J., and Wassenberg, T. J. (2007). Improved knowledge of Torres Strait seabed biota and reef habitats. CSIRO Marine and Atmospheric Research project 1.3.1 report to Marine and Tropical Sciences Research Facility. 96pp
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<http://www.rrrc.org.au/publications/downloads/131-CSIRO-Haywood-et-al-2007-Improved-knowledge-of-TS-biota.pdf>

Data sources: CSIRO survey voyages 1995 - 2007. Long et al. (1997), 1510 sites; Pitcher et al. (1997), 139 sites; Skewes et al. (2003), 424 sites; Skewes et al. (2006), 123 sites; Skewes et al. (2006), 49 sites.

Contact: Timothy Skewes, CSIRO Marine and Atmospheric Research, Brisbane. tim.skewes@csiro.au

2.12 Observed average cover of seagrass on Torres Strait reefs.



Description: Mean percentage cover of seagrass on Torres Strait Reef tops from diver surveys. Visual estimates of % cover for all sites averaged by reef. Sites were generally randomly allocated to reef top habitats.

Reference: Figure 55 in Haywood, M. D. E., Browne, M., Skewes, T. D., Rochester, W. A., McLeod, I. M., Pitcher, C. R., Dennis, D. M., Dunn, J. R., Cheers, S. J., and Wassenberg, T. J. (2007). Improved knowledge of Torres Strait seabed biota and reef habitats. CSIRO Marine and Atmospheric Research project 1.3.1 report to Marine and Tropical Sciences Research Facility. 96pp

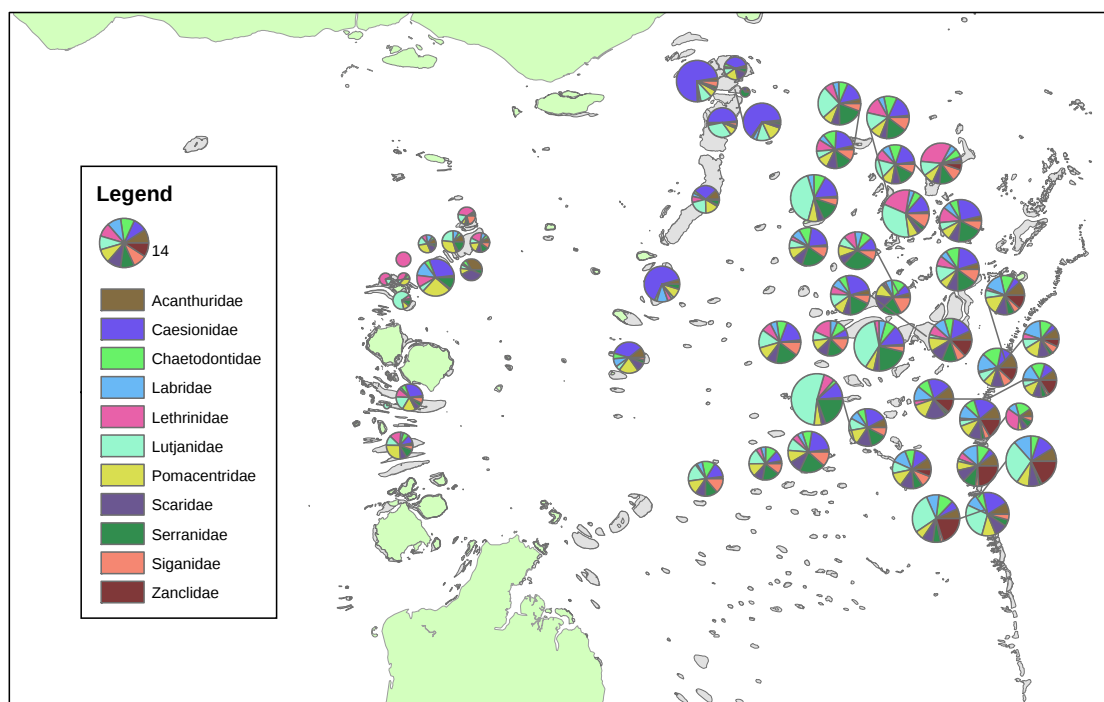
http://www.cmar.csiro.au/e-print/open/2007/haywoodmde_.pdf

<http://www.rrrc.org.au/publications/downloads/131-CSIRO-Haywood-et-al-2007-Improved-knowledge-of-TS-biota.pdf>

Data sources: CSIRO survey voyages 1995 - 2007. Long et al. (1997), 1510 sites; Pitcher et al. (1997), 139 sites; Skewes et al. (2003), 424 sites; Skewes et al. (2006), 123 sites; Skewes et al. (2006), 49 sites.

Contact: Timothy Skewes, CSIRO Marine and Atmospheric Research, Brisbane. tim.skewes@csiro.au

2.13 Distribution and density of fish families on Torres Strait reefs.



Description: A total of 231 reef edge sites were surveyed on 57 different reefs in 1995-96 extending from the Ribbon reefs in the east to the reefs north of Prince of Wales Island in the west. Fish counts were recorded using standard UVC techniques.

Reference: Figure 53 in Haywood, M. D. E., Browne, M., Skewes, T. D., Rochester, W. A., McLeod, I. M., Pitcher, C. R., Dennis, D. M., Dunn, J. R., Cheers, S. J., and Wassenberg, T. J. (2007). Improved knowledge of Torres Strait seabed biota and reef habitats. CSIRO Marine and Atmospheric Research project 1.3.1 report to Marine and Tropical Sciences Research Facility. 96pp

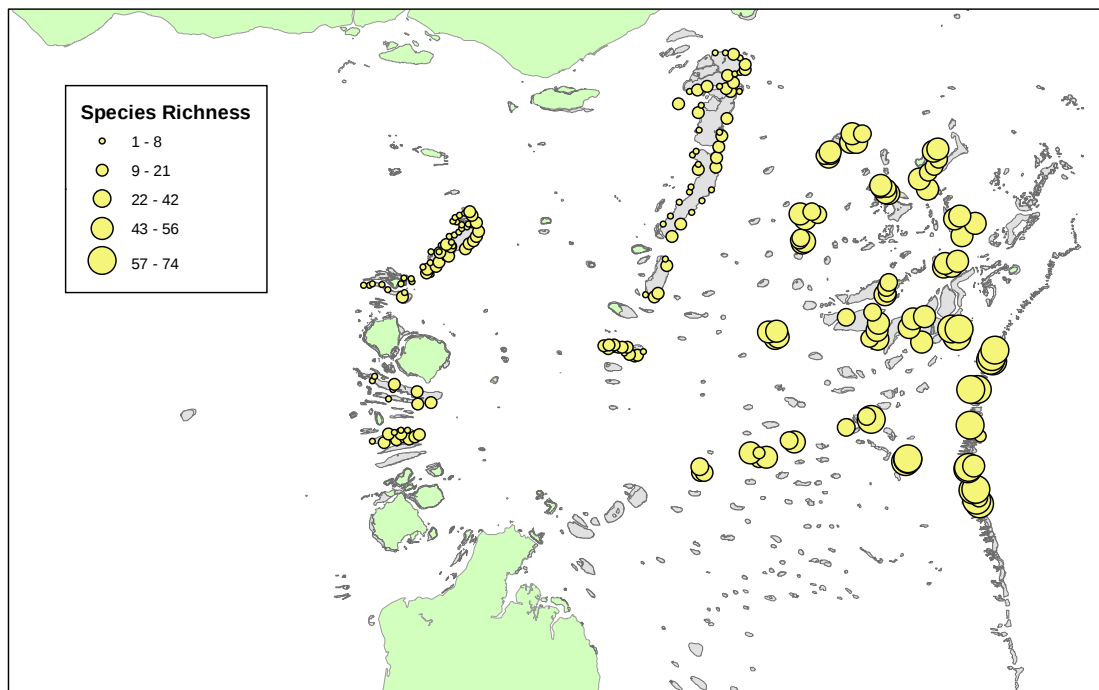
http://www.cmar.csiro.au/e-print/open/2007/haywoodmde_.pdf

<http://www.rrrc.org.au/publications/downloads/131-CSIRO-Haywood-et-al-2007-Improved-knowledge-of-TS-biota.pdf>

Data sources: CSIRO survey voyages 1995 - 96. Long et al. (1997), 231 sites.

Contact: Timothy Skewes, CSIRO Marine and Atmospheric Research, Brisbane. tim.skewes@csiro.au

2.14 Species richness of reef fish communities on Torres Strait reef sites.



Description: A total of 231 reef edge sites were surveyed on 57 different reefs in 1995-96 extending from the Ribbon reefs in the east to the reefs north of Prince of Wales Island in the west. Fish counts were recorded using standard UVC techniques.

Reference: Figure 51 in Haywood, M. D. E., Browne, M., Skewes, T. D., Rochester, W. A., McLeod, I. M., Pitcher, C. R., Dennis, D. M., Dunn, J. R., Cheers, S. J., and Wassenberg, T. J. (2007). Improved knowledge of Torres Strait seabed biota and reef habitats. CSIRO Marine and Atmospheric Research project 1.3.1 report to Marine and Tropical Sciences Research Facility. 96pp

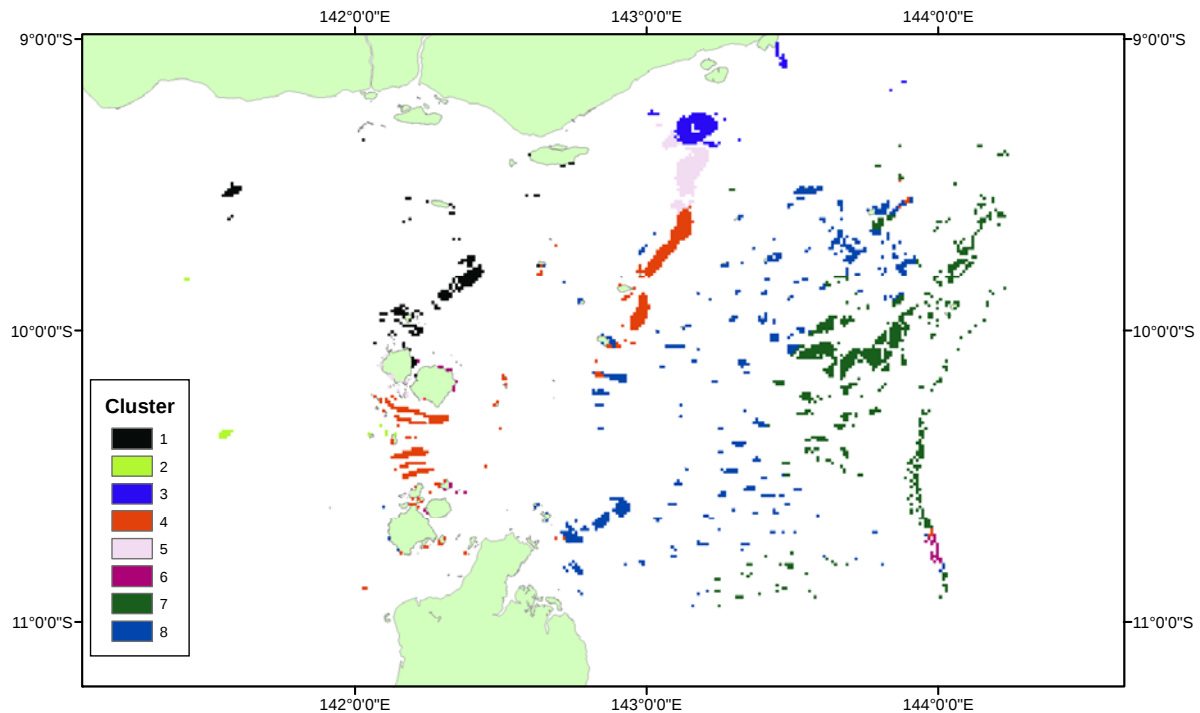
http://www.cmar.csiro.au/e-print/open/2007/haywoodmde_.pdf

<http://www.rrrc.org.au/publications/downloads/131-CSIRO-Haywood-et-al-2007-Improved-knowledge-of-TS-biota.pdf>

Data sources: CSIRO survey voyages 1995 - 2007. Long et al. (1997), 231 sites.

Contact: Timothy Skewes, CSIRO Marine and Atmospheric Research, Brisbane. tim.skewes@csiro.au

2.15 Torres Strait reef cluster membership based on biologically important environmental variables.



Description: Reef areas were clustered using physical covariates that explained the highest degree of variation in the biological patterns among reefs (annual mean K490, annual mean surface salinity, annual surface salinity standard deviation, annual mean surface temperature, annual surface temperature standard deviation, wave period, wave height, wave direction and epibenthic current stress). In order to reduce the number of variables in the analysis to make the computations more manageable and to ensure the clustering dataset was orthogonal, a non-metric Multi Dimensional Scaling (nMDS) of the covariates was done prior to clustering.

Reference: Figure 66 in Haywood, M. D. E., Browne, M., Skewes, T. D., Rochester, W. A., McLeod, I. M., Pitcher, C. R., Dennis, D. M., Dunn, J. R., Cheers, S. J., and Wassenberg, T. J. (2007). Improved knowledge of Torres Strait seabed biota and reef habitats. CSIRO Marine and Atmospheric Research project 1.3.1 report to Marine and Tropical Sciences Research Facility. 96pp

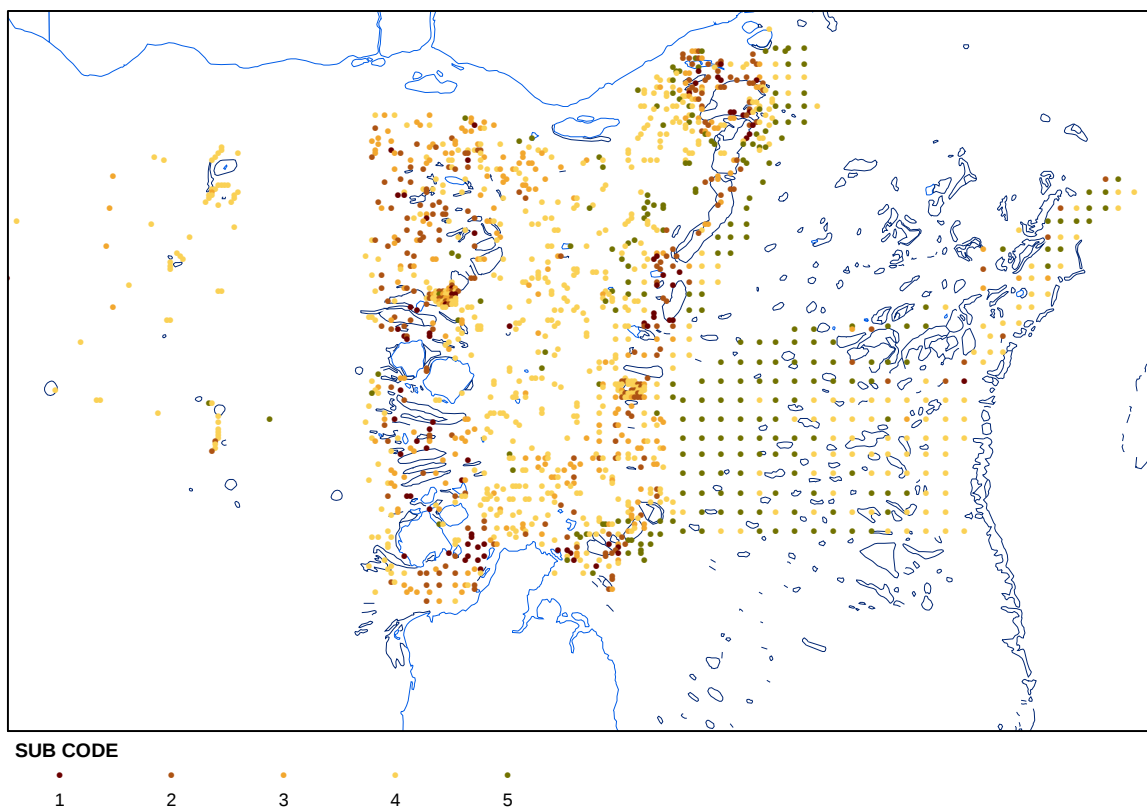
http://www.cmar.csiro.au/e-print/open/2007/haywoodmde_.pdf

<http://www.rrrc.org.au/publications/downloads/131-CSIRO-Haywood-et-al-2007-Improved-knowledge-of-TS-biota.pdf>

Data sources: Biological data from CSIRO survey voyages 1995 - 2007. Long et al. (1997), 1510 sites; Pitcher et al. (1997), 139 sites; Skewes et al. (2003), 424 sites; Skewes et al. (2006), 123 sites; Skewes et al. (2006), 49 sites. Physical datasets from a variety of internal (CSIRO) and external sources (Pitcher et al. 2004; Pitcher et al. 2007).

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2.16 Observed seabed substratum type



Description: Distribution of substratum types from biological surveys prior to 2004. During most diver transects and towed-video surveys, the substratum type was recorded and later summarized to common substrate classification: 1= >50% hard substrate, 2= 10-50% hard substrate, 3= rubble (<10% hard & >15% rubble), 4= sand (muddy sand & sand), 5= mud (mud & sandy mud).

Reference: Figure 2.4-2a in Pitcher, C.R., Condie, S., Ellis, N., McLeod, I., Haywood, M., Gordon, S.R., Skewes, T.D., Dunn, J., Dennis, D.M., Cotterell, E., Austin, M., Venables, W., Taranto, T. (2004). Torres Strait Seabed & Water-Column Data Collation, Bio-physical Modeling and Characterization. Final Report to the National Oceans Office. CSIRO Marine Research. Pp. 117. ISBN 1 876996 83 8.

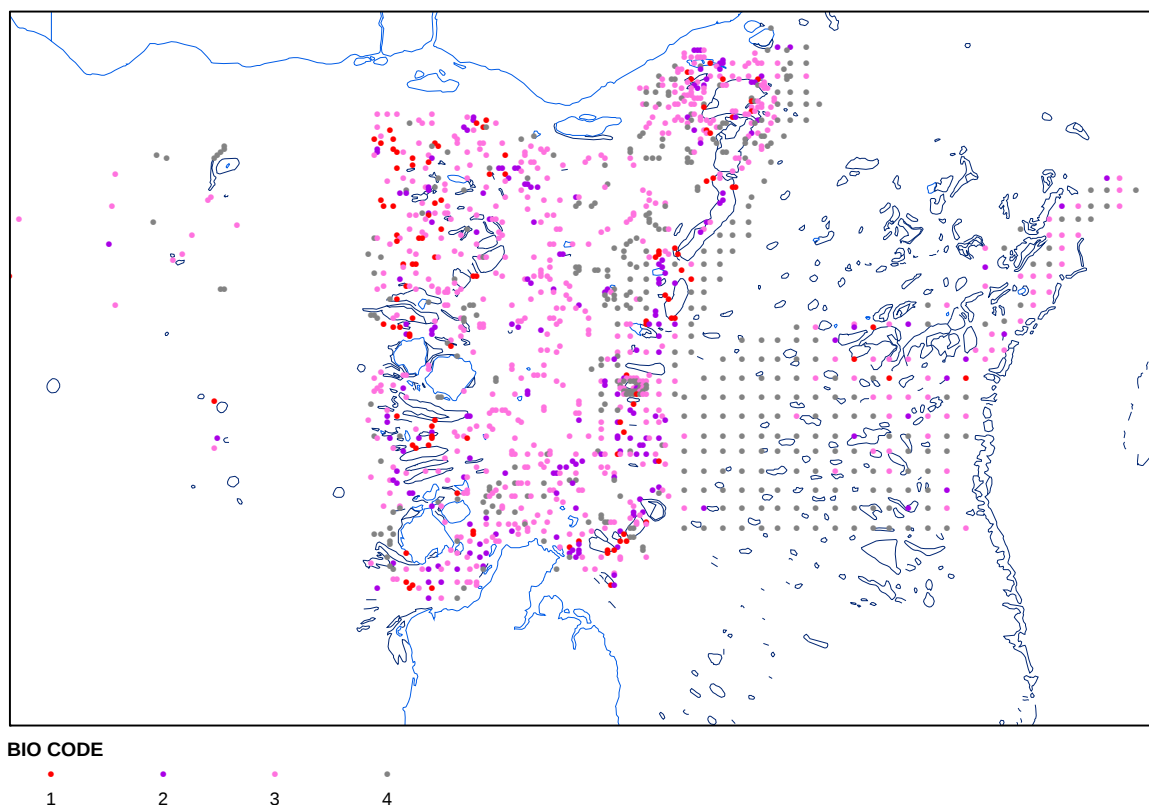
http://www.crctorres.com/research/NOO_TS_Characterisation_Final_Report_Nov2004.pdf

<http://www.environment.gov.au/coasts/mbp/publications/north/pubs/torres-characterisation.pdf>

Data sources: various CSIRO diver transects and towed video surveys from 1987 to 2002.

Contact: Ian McLeod, CSIRO Marine and Atmospheric Research, Brisbane. ian.mcleod@csiro.au

2.17 Observed seabed epibenthic garden habitat



Description: Distribution of epibenthic gardens from biological surveys prior to 2004. During most diver transects and towed-video surveys, the epibenthic garden habitat was recorded and later summarized to common classification: 1= dense fauna, 2= sparse fauna, 3= very sparse fauna, 4= no fauna.

Reference: Figure 2.4-2b in Pitcher, C.R., Condie, S., Ellis, N., McLeod, I., Haywood, M., Gordon, S.R., Skewes, T.D., Dunn, J., Dennis, D.M., Cotterell, E., Austin, M., Venables, W., Taranto, T. (2004). Torres Strait Seabed & Water-Column Data Collation, Bio-physical Modeling and Characterization. Final Report to the National Oceans Office. CSIRO Marine Research. Pp. 117. ISBN 1 876996 83 8.

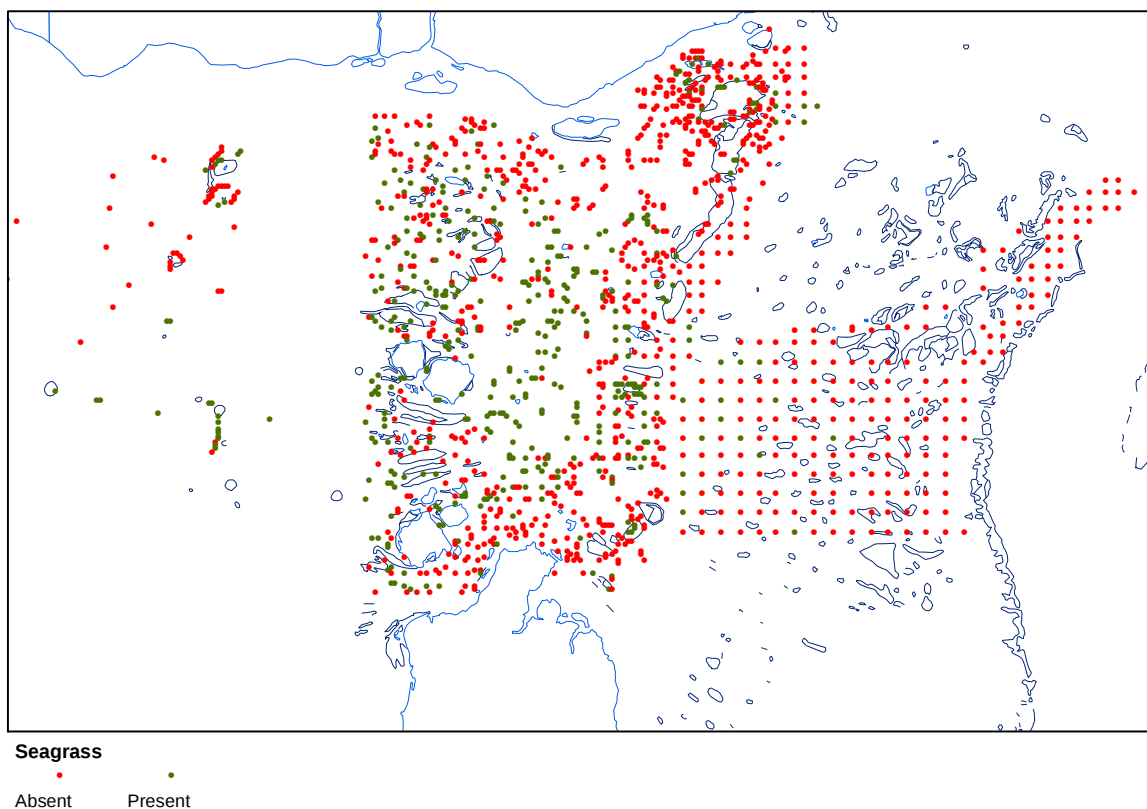
http://www.crctorres.com/research/NOO_TS_Characterisation_Final_Report_Nov2004.pdf

<http://www.environment.gov.au/coasts/mbp/publications/north/pubs/torres-characterisation.pdf>

Data sources: various CSIRO diver transects and towed video surveys from 1987 to 2002.

Contact: Ian McLeod, CSIRO Marine and Atmospheric Research, Brisbane. ian.mcleod@csiro.au

2.18 Observed presence/absence of seabed seagrass habitat



Description: Distribution of seabed seagrass habitat from biological surveys prior to 2004. During most diver transects and towed-video surveys, the presence/absence of seagrass was recorded and later summarized to common level of classification.

Reference: Figure 2.4-5a in Pitcher, C.R., Condie, S., Ellis, N., McLeod, I., Haywood, M., Gordon, S.R., Skewes, T.D., Dunn, J., Dennis, D.M., Cotterell, E., Austin, M., Venables, W., Taranto, T. (2004). Torres Strait Seabed & Water-Column Data Collation, Bio-physical Modeling and Characterization. Final Report to the National Oceans Office. CSIRO Marine Research. Pp. 117. ISBN 1 876996 83 8.

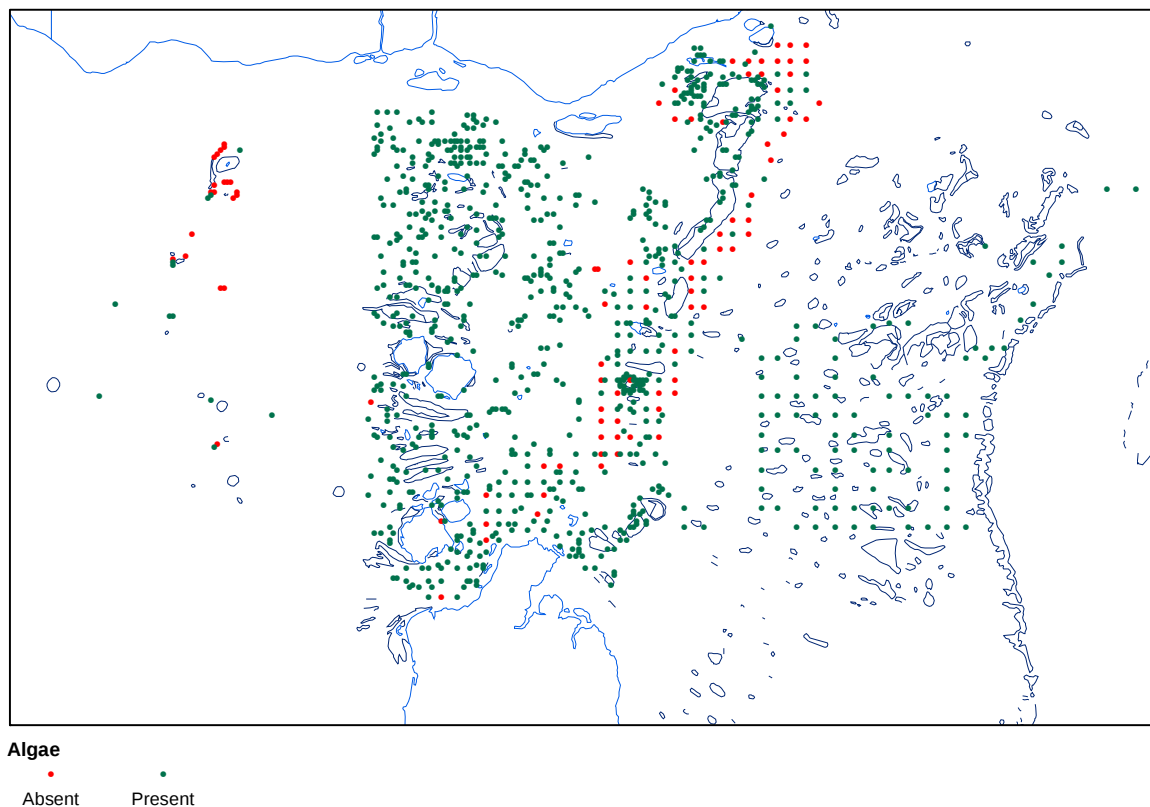
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<http://www.environment.gov.au/coasts/mbp/publications/north/pubs/torres-characterisation.pdf>

Data sources: various CSIRO diver transects and towed video surveys from 1987 to 2002.

Contact: Ian McLeod, CSIRO Marine and Atmospheric Research, Brisbane. ian.mcleod@csiro.au

2.19 Observed presence/absence of seabed algal habitat



Description: Distribution of seabed algal habitat from biological surveys prior to 2004. During most diver transects and towed-video surveys, the presence/absence of algae was recorded and later summarized to common level of classification.

Reference: Figure 2.4-5b in Pitcher, C.R., Condie, S., Ellis, N., McLeod, I., Haywood, M., Gordon, S.R., Skewes, T.D., Dunn, J., Dennis, D.M., Cotterell, E., Austin, M., Venables, W., Taranto, T. (2004). Torres Strait Seabed & Water-Column Data Collation, Bio-physical Modeling and Characterization. Final Report to the National Oceans Office. CSIRO Marine Research. Pp. 117. ISBN 1 876996 83 8.

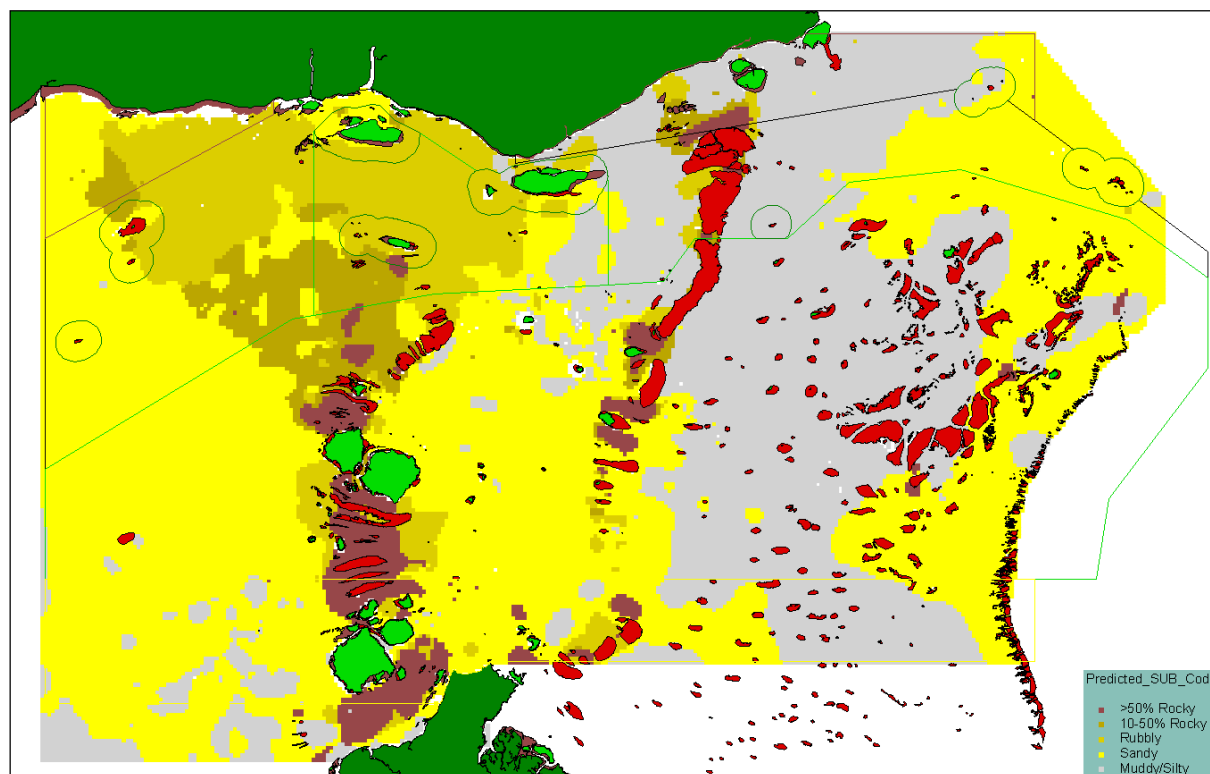
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<http://www.environment.gov.au/coasts/mbp/publications/north/pubs/torres-characterisation.pdf>

Data sources: various CSIRO diver transects and towed video surveys from 1987 to 2002.

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2.20 Predicted distribution of seabed substratum type



Description: Predicted distribution of substratum types from biological surveys prior to 2004 (see Map#16) based on linear discriminant functions applied to a gridded dataset of environmental variables.

Reference: Figure 2.7-1 in Pitcher, C.R., Condie, S., Ellis, N., McLeod, I., Haywood, M., Gordon, S.R., Skewes, T.D., Dunn, J., Dennis, D.M., Cotterell, E., Austin, M., Venables, W., Taranto, T. (2004). Torres Strait Seabed & Water-Column Data Collation, Bio-physical Modeling and Characterization. Final Report to the National Oceans Office. CSIRO Marine Research. Pp. 117. ISBN 1 876996 83 8.

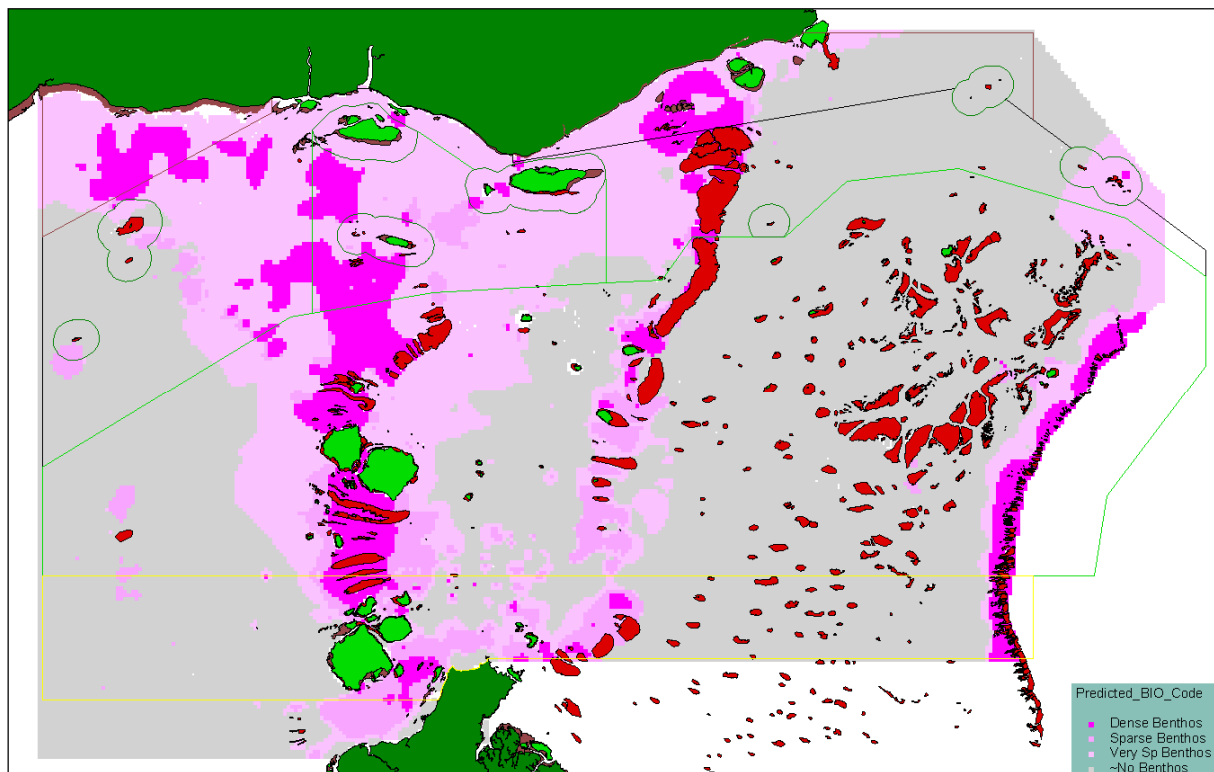
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<http://www.environment.gov.au/coasts/mbp/publications/north/pubs/torres-characterisation.pdf>

Data sources: various CSIRO diver transects and towed video surveys from 1987 to 2002.

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2.21 Predicted distribution of seabed epibenthic garden habitat



Description: Predicted distribution of epibenthic gardens from biological surveys prior to 2004 (see Map#19) based on linear discriminant functions applied to a gridded dataset of environmental variables.

Reference: Figure 2.7-2 in Pitcher, C.R., Condie, S., Ellis, N., McLeod, I., Haywood, M., Gordon, S.R., Skewes, T.D., Dunn, J., Dennis, D.M., Cotterell, E., Austin, M., Venables, W., Taranto, T. (2004). Torres Strait Seabed & Water-Column Data Collation, Bio-physical Modeling and Characterization. Final Report to the National Oceans Office. CSIRO Marine Research. Pp. 117. ISBN 1 876996 83 8.

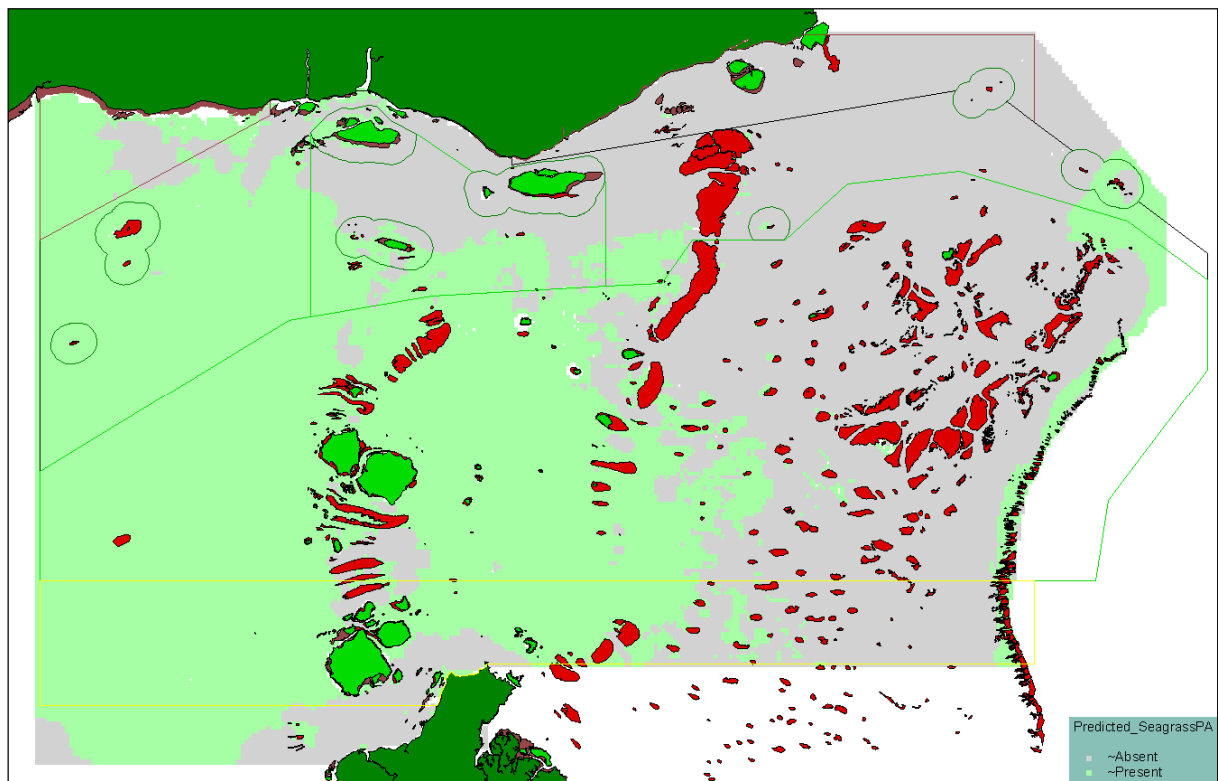
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<http://www.environment.gov.au/coasts/mbp/publications/north/pubs/torres-characterisation.pdf>

Data sources: various CSIRO diver transects and towed video surveys from 1987 to 2002.

Contact: C. Roland Pitcher, CSIRO Marine and Atmospheric Research, Brisbane. roland.pitcher@csiro.au

2.22 Predicted distribution of the presence/absence of seabed seagrass.



Description: Predicted distribution of Seagrass presence/absence from biological surveys prior to 2004 (see Map#18) based on linear discriminant functions applied to a gridded dataset of environmental variables.

Reference: Figure 2.7-4 in Pitcher, C.R., Condie, S., Ellis, N., McLeod, I., Haywood, M., Gordon, S.R., Skewes, T.D., Dunn, J., Dennis, D.M., Cotterell, E., Austin, M., Venables, W., Taranto, T. (2004). Torres Strait Seabed & Water-Column Data Collation, Bio-physical Modeling and Characterization. Final Report to the National Oceans Office. CSIRO Marine Research. Pp. 117. ISBN 1 876996 83 8.

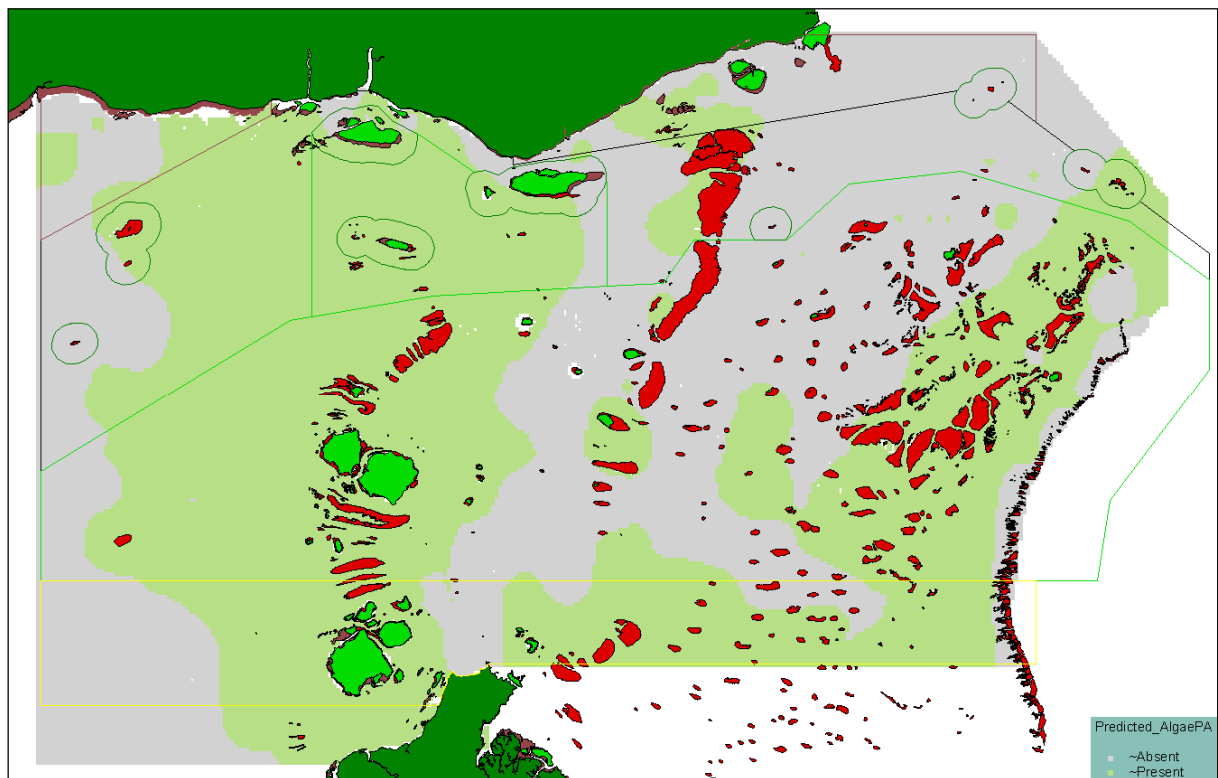
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Data sources: various CSIRO diver transects and towed video surveys from 1987 to 2002.

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2.23 Predicted distribution of the presence/absence of seabed algae



Description: Predicted distribution of Algae presence/absence from biological surveys prior to 2004 (see Map#19) based on linear discriminant functions applied to a gridded dataset of environmental variables.

Reference: Figure 2.7-3 in Pitcher, C.R., Condie, S., Ellis, N., McLeod, I., Haywood, M., Gordon, S.R., Skewes, T.D., Dunn, J., Dennis, D.M., Cotterell, E., Austin, M., Venables, W., Taranto, T. (2004). Torres Strait Seabed & Water-Column Data Collation, Bio-physical Modeling and Characterization. Final Report to the National Oceans Office. CSIRO Marine Research. Pp. 117. ISBN 1 876996 83 8.

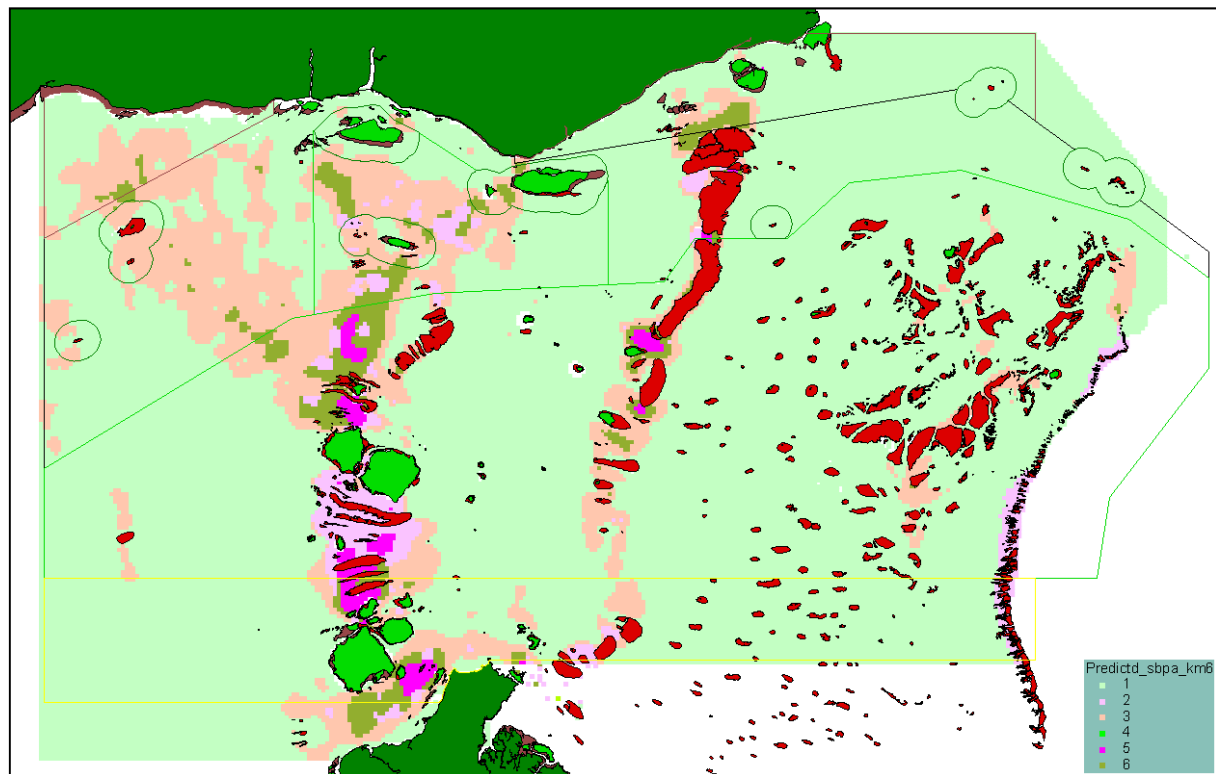
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Data sources: various CSIRO diver transects and towed video surveys from 1987 to 2002.

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2.24 Predicted seabed habitat cluster membership distribution



Description: Mapping of predicted habitat cluster membership based on linear discriminant functions applied to a gridded dataset of environmental variables, and observed habitat data in Maps 16 to 19. Habitat clusters were characterized as follows:

- 1: muddy/sandy, very sparse/no benthos, ~90% likelihood algae, ~40% likelihood seagrass
- 2: rubble/some hard substrate, dense/sparse benthos, ~95% likelihood algae, ~25% likelihood seagrass
- 3: sandy, sparse/very sparse benthos, ~65% likelihood algae, ~20% likelihood seagrass
- 4: rubble/some hard substrate, very sparse benthos, ~95% likelihood algae, ~55% likelihood seagrass
- 5: mostly hard substrate, dense/sparse benthos, ~100% likelihood algae, ~10% likelihood seagrass
- 6: some hard substrate, very sparse benthos, ~95% likelihood algae, ~5% likelihood seagrass

Reference: Figure 2.7-5 in Pitcher, C.R., Condie, S., Ellis, N., McLeod, I., Haywood, M., Gordon, S.R., Skewes, T.D., Dunn, J., Dennis, D.M., Cotterell, E., Austin, M., Venables, W., Taranto, T. (2004). Torres Strait Seabed & Water-Column Data Collation, Bio-physical Modeling and Characterization. Final Report to the National Oceans Office. CSIRO Marine Research. Pp. 117. ISBN 1 876996 83 8.

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Data sources: various CSIRO diver transects and towed video surveys from 1987 to 2002.

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