



Australian Government

Department of the Environment, Water, Heritage and the Arts



Marine and Tropical Sciences Research Facility

e-Atlas

The way forward

Dr. Eric Lawrey

Australian Institute of Marine Science





What is the e-Atlas?

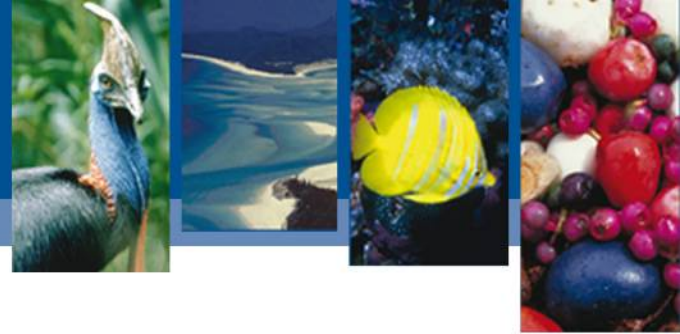
- Multi-institution knowledge repository for capturing environmental research on the region
 - Metadata
 - Articles
 - Maps
 - Tools
- Capture what research has been done and encourage collaboration
- Holds the metadata for the MTSRF program
- All MTSRF projects are required to contribute to the e-Atlas

The screenshot shows the e-Atlas website interface. At the top, there is a navigation bar with links for 'Log in | Register | About the e-Atlas | Contact Us'. Below this is the e-Atlas logo and the text 'Australia's Tropical Land And Seas'. A secondary navigation bar includes 'Browse by: Topic | Institution | Funding' and 'Interactive Maps | Recent Activity'. The main content area is divided into two columns. The left column features a 'Featured Article' titled 'Water quality guidelines for the Great Barrier Reef' by Katharina Fabricius, posted on 05 January 2009. It includes a summary and two maps of the Great Barrier Reef. The right column features a 'Featured Dataset' titled 'Reef fish life history' by Colin Simpfendorfer, posted on 08 February 2010. It includes a list of species and a 'Register now' button. A 'Contribute to the Atlas' section is visible on the right side of the page.



What can you do with the e-Atlas?

- Find summaries of research projects
- Find synthesis articles on environmental topics
- Contact other researchers
- Download KMLs to display with your data
- Compare datasets in e-Atlas mapping client
- View maps in GIS application
- Download public datasets



Quick demo

- Navigation
 - By topic
 - By institution
- Registration
 - Content creation
- Maps
 - Side-by-side
 - KMLs
- Content Administration
 - My Content

[Home](#) > [Browse by Topics](#)

Topics

Biology And Biodiversity

- Coral Reefs
- Freshwater Systems
- Jellyfish Of The GBR
- Mangroves
- Rainforests
- Seafloor
- Seagrass
- Species Of Conservation Concern
- Wetlands

Human Use And Economics

- Fishing And Harvest
- Shipping
- Socio-economy
- Tourism

Threats And Risk Assessment

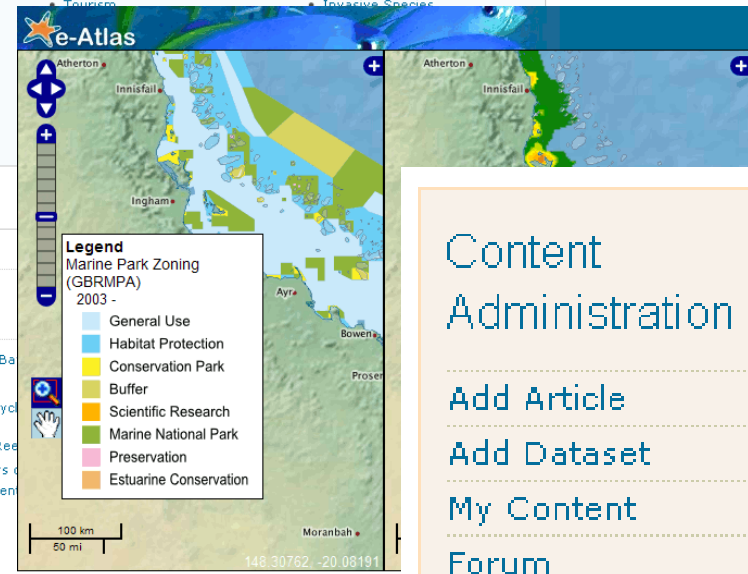
- Climate Change
- Diseases
- Fishing
- Invasive Species

Biology and biodiversity

[What is Biodiversity?](#)

Coral reefs

- [Basic water quality of Cockle Bay](#)
- [Coral reef health database](#)
- [Impacts of a severe tropical cyclone on offshore coral reefs](#)
- [Jellyfish of the Great Barrier Reef](#)
- [Large-scale manta tow surveys of crown of thorns starfish and benthoic AIMS LTMP](#)
- [Reef fish life history](#)



[Content Administration](#)

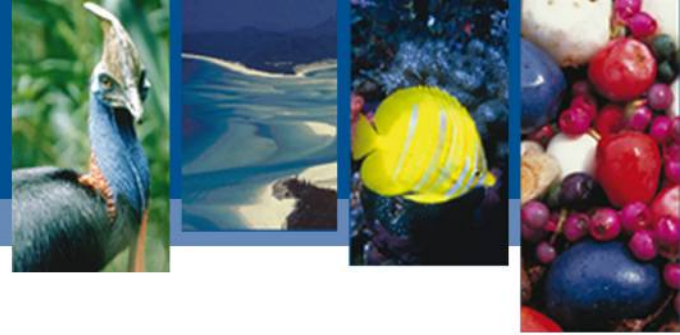
[Add Article](#)

[Add Dataset](#)

[My Content](#)

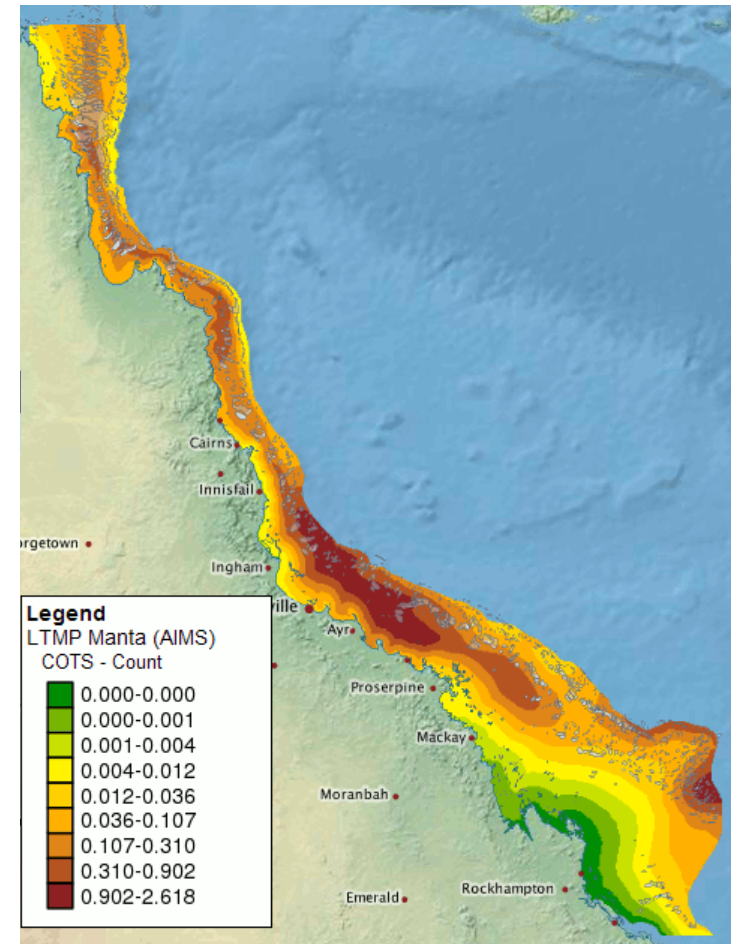
[Forum](#)

[View all Contents](#)



Maps / Data

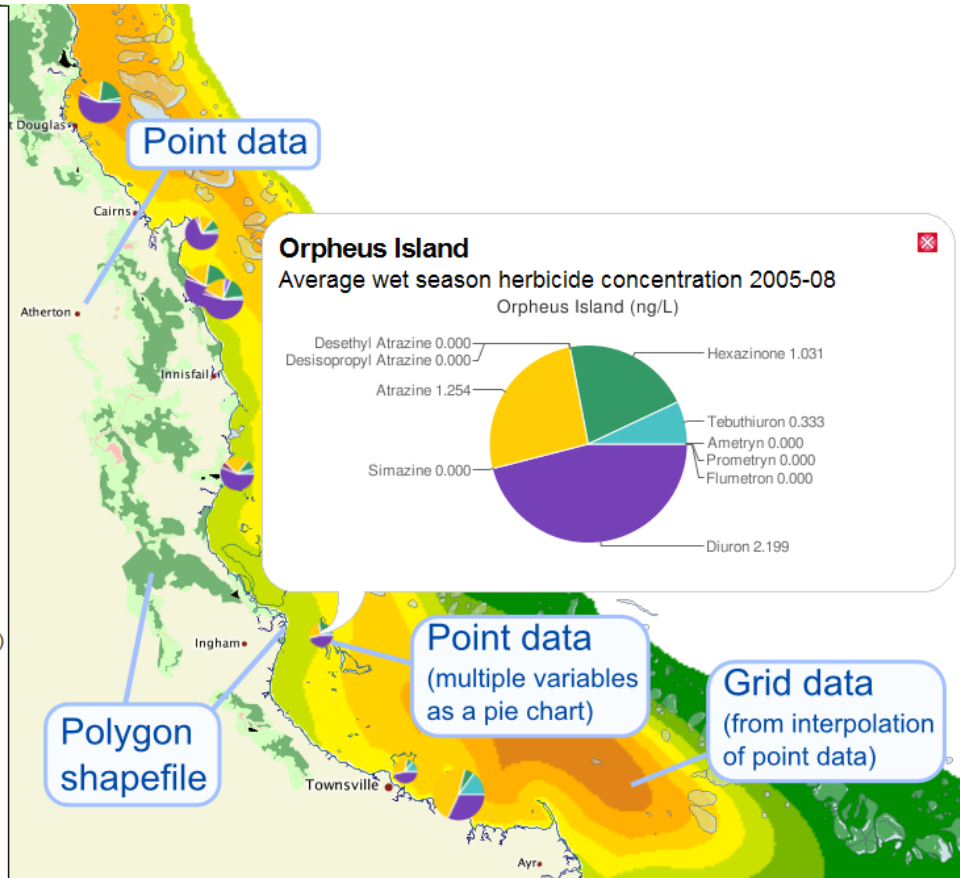
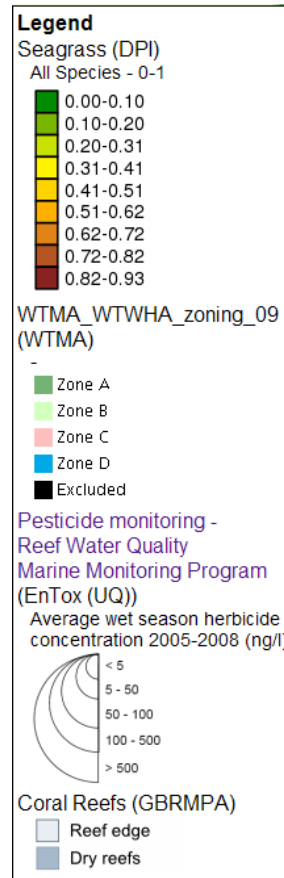
- For spatial data, maps:
 - Provide a preview without releasing the data
 - Allow visual comparison other data on e-Atlas
 - Capture key stories from the research
- For non spatial data:
 - Focus on creating an article that captures the work
 - Provide a preview of the data as graphics, tables, etc





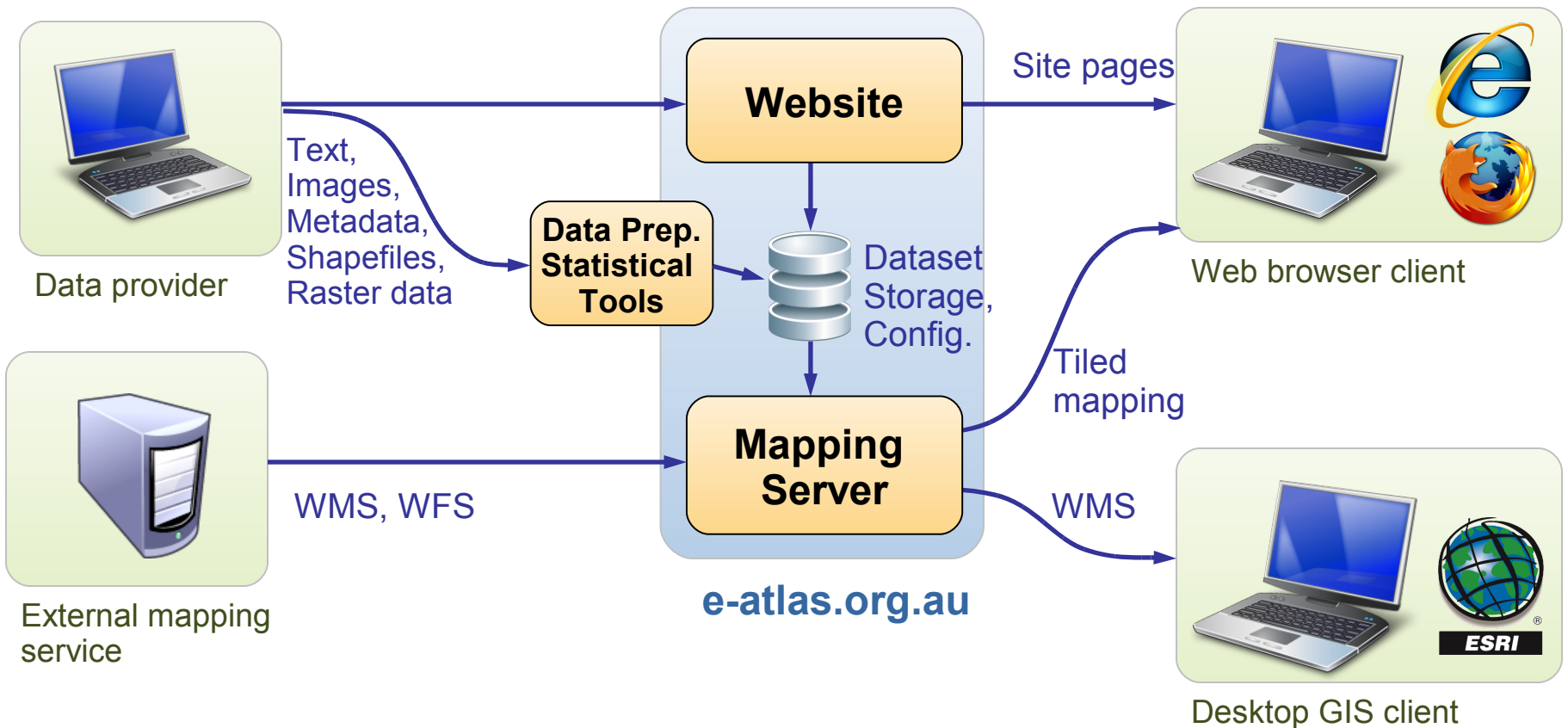
Types of map data

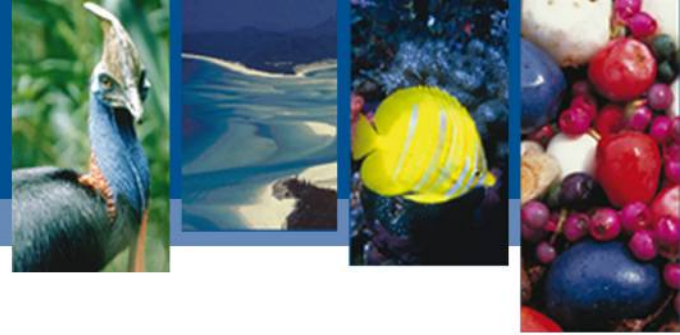
- Point (CSV, Spreadsheet, Shapefile)
 - Multi-variable pie chart
 - Interpolated to grid
 - Location points
- Grid (GeoTiff, ASCII grid)
 - Imagery
- Polygon (Shapefile)
 - Regions
- Polyline (Shapefile)
 - Borders





Basic Architecture





What do you need to submit?

MTSRF project

- Existing reports on the project
- Copies of publications
- Description of data (fields)
- Graphics / Photos for previews
- Data for map creation or data preview



e-Atlas team

- Metadata page
- Summary of results
- Maps in e-Atlas / KMLs



Where is the e-Atlas going (Content)?

- More content
 - Full coverage of MTSRF
 - Expand coverage of other institutions
 - Existing public data
 - Broader synthesis information
- Possibly a book form
 - Long life (permanent record)
 - Publication platform
- Easier contact with data custodians



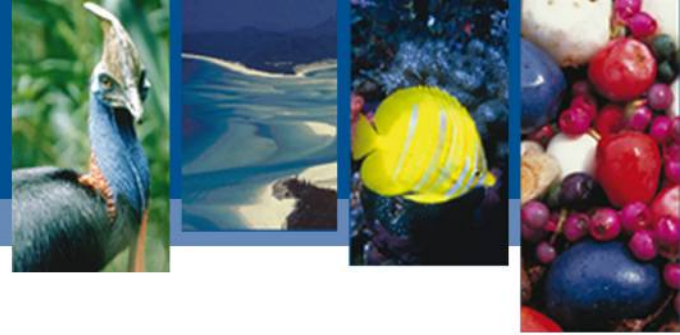
Where is the e-Atlas going (Maps/Tools)?

- Improved web mapping client
 - Flexible styling / filtering
 - Quick maps for publication
 - Better website integration
- Integration with desktop GIS
- Downloadable KMLs for all layers
- Publication quality maps
 - e-Atlas as a map creation service
- Improved interpolation tools (written in R)
 - Developed for a wider audience



What would you find useful?

- Easier map creation?
- More content?
- Better discovery of existing research?
- Better access to data?
- Offline e-Atlas for in-field mapping
- PDF book of the best e-Atlas content



Please send feedback/ideas

- Eric Lawrey
 - e.lawrey@aims.gov.au
- Katharina Fabricius
- David Souter
- Glenn De'ath
- Kim Pritchard
- Gael Lafond



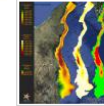
Extra slides

Large-scale manta tow surveys of densities of crown of thorns starfish and benthic cover by the AIMS LTMP

Katharina Fabricius

Australian Institute of Marine Science

Posted on 28 January 2009



The purpose of this study is to quantify spatial and temporal changes in the density of crown-of-thorns starfish and benthic cover in the Great Barrier Reef. Broad-scale manta tow surveys have been conducted by the Long-Term Monitoring Program (LTMP) of the Australian Institute of Marine Science since 1986, counting crown-of-thorns-starfish (COTS, *Acanthaster planci*). COTS densities fluctuates over years forming southward bound 'waves' (the incidence of reefs with new active outbreaks moving south over time, due to the southward transport of larvae by the East Australian Current). Outbreaks in the Swains sector appear to occur independently of the main southward moving wave of COTS outbreaks. The highest overall mean number of COTS per tow was 1.17 in 1988. Active or incipient outbreaks were recorded on 16% and 11% of the reefs surveyed reefs in 2004 and 2005, respectively. The highest percentage of reefs with active outbreaks was 17%, recorded in 1987, 1999 and 2000.

Benthic cover of hard corals, soft corals and dead corals was also estimated on each tow, providing comprehensive estimates of cover around the whole perimeter of reefs.

Custodian(s)	Hugh Sweatman (AIMS)
Owner Institution(s)	Australian Institute of Marine Science
Data Units	Crown-of-thorns starfish: number of starfish per transect; Benthic cover: percent.
Region & Spatial Extent	Great Barrier Reef (whole GBR).
Data Collection	1986 - 2005
Maintenance & Update Frequency	Ongoing
Resource Constraints	Copyright remains with the data owners.
References	Bass D.K. & Miller I.R. (1996) Crown-of-thorns starfish and coral surveys using the manta tow and SCUBA search techniques. Standard Operational Procedures Number 1, AIMS, Townsville. Sweatman H., Burgess S., Cheal A., Coleman G., Delean S., Emslie M., Miller I., Osborne K., McDonald A. & A T. (2005) Long-Term Monitoring of the Great Barrier Reef Status Report Number 7. In. Australian Institute of Marine Science, Townsville.
View Complete Metadata	

Google Earth Data	
<input type="checkbox"/> LTMP-Manta tow: Density of crown-of-thorns starfish (long-term average)	ltmpmanta-cots-3.kmz
<input type="checkbox"/> LTMP-Manta tow: Long-term average probability of COTS outbreaks	LTMP_Manta-Outbreaks-3.kmz
<input type="checkbox"/> LTMP-Manta tow: Long-term average coral cover	LTMP_Manta-Live_Coral-3.kmz
<input type="checkbox"/> LTMP-Manta tow: Long-term average dead coral cover	LTMP_Manta-Dead_Coral-3.kmz
<input type="checkbox"/> COTS outbreak animation 1985-2008	cots-outbreaks.kmz

Maps	
<input type="checkbox"/> Density of crown-of-thorns starfish	
<input type="checkbox"/> Hard coral cover (manta tow estimates)	

Metadata page

- Records the nature of the research, not the results. Does not include interpretation of results.
- Who, What, Where, When, Why, How
 - Title of the research
 - Description of the research
 - Custodians of the data
 - Description of the data
 - Study location
 - Collection period, update rate
 - Ancillary information (reports, data, KMLs, references, licensing, etc)



Summary of Results

- An overview of the research and results for the general public
- Summary of work based on supplied publications, reports, discussions

Sven Uthicke

Australian Institute of Marine Science

Posted on 29 March 2010

This research incorporated field and experimental work on benthic foraminifera as indicators for water quality in the Great Barrier Reef (GBR). Firstly, distribution of benthic foraminifera was examined on 20 reefs in four regions of the GBR (Princess Charlotte Bay, Wet Tropics, Whitsunday Area, and Mid/Outer-shelf reefs), and along a water quality (WQ) gradient in the Whitsunday region. Secondly, manipulative laboratory experiments were carried out to determine whether the distribution of symbiont-bearing foraminifera is controlled by light levels or other environmental factors.

To test if light is the main factor regulating communities of symbiont bearing benthic foraminifera, sediment samples from 3 different depths on 6 reefs (Reef 19-138 and Barb Reef; Edward, Lindeman and Repulse islands) along an environmental gradient in the Whitsunday Islands were investigated. In addition, an experiment was conducted quantifying growth and response to light levels using 3 abundant taxa with diatom symbionts.

Results

- Twenty seven easily recognisable benthic foraminifera taxa (> 63 µm) were distinguished.
- Several species were associated with either high nutrient/high turbidity or low nutrient/low turbidity conditions.
- In general, large (algal symbiont bearing) foraminifera were more characteristic for clear water/low nutrient environments, while more turbid high-nutrient environments harbour heterotrophic taxa (free of algal symbionts).
- Application of the Caribbean FORAM index showed significantly increasing values along the Whitsunday Islands WQ gradient (i.e. with increasing light and decreasing nutrient availability).
- Diversity of symbiotic taxa, and the abundances of most symbiont bearing species, increased along a WQ gradient away from the mainland in the Whitsunday region. Distance from the mainland alone explained nearly three times more of the variance than sampling depth and percent surface light in the distribution of species.
- In the laboratory experiment manipulating light levels, two (*Amphistegina* spp. and *Calcarina* spp.) of the three symbiotic genera tested exhibited similar growth rates at 100%, 30% and 7% of sea surface light. This indicates a wide tolerance for light levels. In contrast, growth of *Heterostegina depressa* decreased significantly with increasing light intensity, suggesting that too much light inhibits growth in this species. All three taxa had the most efficient light use at the lowest light level tested. Reduced photosynthetic yield at high irradiance suggested that high light may exert stress on the photosystem of the symbionts.
- Both field and laboratory studies suggest that light is unlikely to be the controlling factor for the distribution of foraminifera that were selected as potential bioindicators for water quality.
- All four geographic regions differed significantly in their community composition, and analysis showed that sediment parameters only explained a small proportion of the variance in the community composition.
- On 9 reefs along a previously studied water quality gradient, foraminifera showed a distinct shift in species dominance towards larger symbiont-bearing species from turbid inner shelf towards clearer outer shelf reefs. Analysis separated symbiotic and heterotrophic species.
- Total suspended solid and water column chlorophyll concentrations were negatively, and optical depth and distance to the mainland were positively, correlated with the abundance of symbiont bearing taxa.
- Heterotrophic rotaliids and a species retaining plastids (*Elphidium* sp.) were highly characteristic for low light, higher nutrient conditions.

View metadata records

- [Use as indicators for water quality](#)
- [Light as a limiting factor in distribution](#) (available shortly).

Further Reading

Foram atlas: Nobes K, Uthicke S (2008) Benthic Foraminifera of the Great Barrier Reef: A guide to species potentially useful as Water Quality Indicators. Report to the Marine and Tropical Sciences Research Facility, Reef and Rainforest Research Centre Limited, Cairns (44pp.).

MTSRF Project 3.7.1 webpage

Uthicke S, Thompson A, Schaffelke B (2010) Effectiveness of benthic foraminiferal and coral assemblages as water quality indicators on inshore reefs of the Great Barrier Reef, Australia. *Coral Reefs* 29: 209-225

Nobes KL, Uthicke S and Henderson R (2008) Is light the limiting factor for the distribution of benthic symbiont bearing foraminifera on the Great Barrier Reef? *Journal of Experimental Marine Biology and Ecology* 363: 48-57.





Workflow

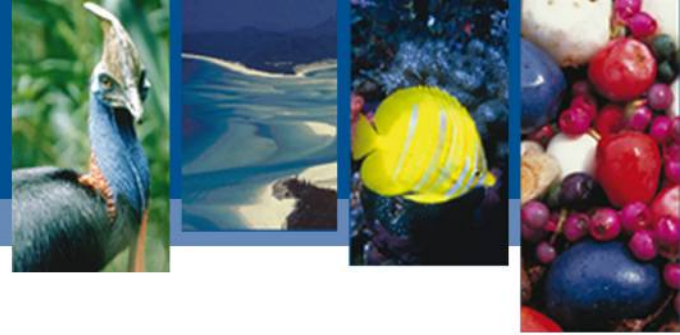
- Content on the e-Atlas has a managed workflow
- Ensures quality and consistency of content
 - Draft
 - Ready for review
 - Needs Work
 - Author Approval
 - Published

The screenshot shows the e-Atlas website interface. At the top, there is a navigation bar with the e-Atlas logo and the text "Test Author". Below the navigation bar, there are several tabs: "Browse by: Topic", "Institution", "Funding", "Interactive Maps", and "Recent". The main content area is divided into two columns. The left column contains a "Content Administration" section with links for "Add Article", "Add Dataset", "My Content", "Forum", and "View all Contents". Below this is a "Help" section with links for "Accessing the e-Atlas maps via a Desktop GIS", "Spatial Modelling of Data", and "Submitting Data for Map Creation". The right column shows the article title "Test article - Hermit Crabs - DO NOT PUBLISH" and the current state "Author Approval". There are three tabs: "View", "Revisions", and "Workflow". Below the tabs, there are three radio buttons for "Change Article Lifecycle state": "Needs Work", "Author Approval" (which is selected), and "Published". At the bottom, there is a "Comment:" field.



Flexible sharing

- In utopia publically funded data would be:
 - Freely available
 - Well documented
 - Designed for reuse
- In practice data sharing is complex:
 - Pending publications
 - Data collected for specific use
 - Data is poorly managed
 - Data is sensitive



Flexible sharing

- Cater for a range of access
 - Direct download of data
 - Maps as a preview for data
 - Meta-data and summary articles



Offline data submission

- Emailed to me (Eric Lawrey)
 - Discuss data sharing, timing of publication, presentation of data
 - Data is checked for completeness, errors, understandability
- Gather meta-data for mapping and website
 - From reports, papers, etc
- Consider most appropriate maps
 - Interpolated maps from point data
 - Point maps with charts
 - Styling
 - GIS files, Grid files, etc
- Reprocess the data for mapping
- Make previews available for checking