

Ningaloo Outlook Symposium - 2016

Ningaloo Outlook – A partnership between BHP Billiton and CSIRO

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Theme 1: Deepwater Reefs

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Deepwater (mesophotic) Reefs

What are they?

• Reef zonation: coral reef growth limited by light availability at depth, but deep areas can be extensive

Why are they important?

- Undiscovered biodiversity
- Refugia for shallow water populations in times of stress (resilience)
- Habitat for many species important to us (e.g. fisheries)

Generally these areas are poorly known, especially their dynamics.

Importance of understanding dynamics

Management decisions need to be based on sound information: knowledge of baselines, trends and variability: "where are we on this timeline"



For deepwater habitats we have no idea.

Deepwater Project – specific aims:

Discover and describe

- assess distribution and abundance of deeper-water habitats i.e. coral, filter feeding assemblages (baselines)
- assess structuring processes among deep-water habitats

"Undertake research to characterise the coral species and distribution within the reserves with a particular emphasis on the seaward deeper water community abundance and key functional groups of coral populations (CALM) (H)" Ningaloo Management Plan 2005

Process understanding

- identifying timescales for turnover rates for benthic assemblages.
- variability of deeper-water habitats i.e. coral, filter feeding assemblages.

"Performance measures: diversity and biomass constant or positive" Ningaloo Management Plan 2005

Timelines

 Yr 1 – Swath map Target Areas

• Yr 2 – Towed Video

 Yrs 3-5 Dynamics – novel AUV methodology



Discovering and describing Ningaloo Deepwater Habitats



Target areas: Helby Bank, Tantabiddi, Mangrove, Mandu, Osprey



Sonar swath Mapping: bathymetry

Helby Banks

before



after



Sonar swath Mapping: backscatter products

Bottom hardness and texture



Towed Video: assessing bottom type and biota



11 | Research Theme 1 - Deep Reefs | Russ Babcock

Combining video and backscatter



^{12 |} Research Theme 1 - Deep Reefs | Russ Babcock

Automated habitat classification (first pass)



Habitat summary

 Main reef extends to ~ 35m; reef building corals rare/absent below 25-30m,

 35-70m; reef structures few and low profile, and often sand covered, biota predominantly sponges & octocorals

 Extensive beds of shell gravel and crustose coralline algal nodules and solitary corals







Next steps:

- Selection of target areas, Fill towed video gaps,
- Build detailed habitat maps
- Commence AUV operations

Starbug-X

- Joe Turner PhD project
- transects
- full cover quadrats
- repeatability and sampling precision
- Photomosaics/mesh construction



Starbug-X – recent modifications and improvements

- forward looking altimeter
- forward looking stereo cameras,
- new CPU
- high bandwidth USBL surface communications



Thank you



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PhD: Deep reef ecological processes at Ningaloo

Joe Turner

Supervisors: Dr Gary Kendrick and Dr Renae Hovey (UWA), Dr Russ Babcock (CSIRO)

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About Me

Education

- 2008 2011: Newcastle University (UK)
 - BSc (hons) Marine Zoology

- 2011-2012: Newcastle University (UK)
 - MSc Tropical Coastal Management
 - Research project with DPaW, Montebello and Barrow Islands



Environ Monit Assess (2015) 187: 234 DOI 10.1007/s10661-015-4431-8

Measuring coral size-frequency distribution using stereo video technology, a comparison with in situ measurements

Joseph A. Turner • Nicholas V. C. Polunin • Stuart N. Field • Shaun K. Wilson



About Me

Working in UK government agencies

- February 2013 December 2014: Natural England (UK)
 - Marine Monitoring Specialist
- December 2014 February 2016: Joint Nature Conservation Committee (UK)
 - Marine Offshore Habitats Monitoring Officer



Epibiota Remote Monitoring from Digital Imagery: Operational Guidelines



Authors: Hitchin, R., Turner, J.A., and Verling, E.

About Me Working in UK government agencies



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PhD Topic – Deep reef ecological processes at Ningaloo

Habitat Mapping:

- Number of scales
- Broad-scale: Acoustics and drop video
- Fine-scale: Photo mosaics with the AUV

PhD Topic – Deep reef ecological processes at Ningaloo

Community Structure

- Identify the biological communities present
- What drives the communities?
 - Depth
 - Exposure
 - Other environmental variables
- Look at predictive modelling

PhD Topic – Deep reef ecological processes at Ningaloo

Detecting change

- Look to revisit areas
- Look to get an insight into finer scale processes
 - Recruitment
 - Growth rates
 - etc

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