

KIMBERLEY MARINE BIODIVERSITY: museum collections and new opportunities

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<http://www.museum.wa.gov.au/kimberley/marine-life-kimberley-region>

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OVERVIEW

- The Kimberley region of Western Australia is a vast and pristine marine wilderness area.
- The marine biodiversity of the Kimberley is not well known and most of what is known is held within the collections of the WA Museum and project partner agencies.
- The Woodside Collection Projects 4 & 5 (Kimberley 2008 - 2015) are two meshed, marine biodiversity projects incorporating historic and contemporary data, which spanned a Project Area of 475,000 km² from the coast to the shelf edge.
- Historic data** assessment resulted in a series of publications that in combination documented over 6000 species, and highlighted major gaps in our knowledge (Kimberley Marine Biota: *Records of the Western Australian Museum* 84).
- Contemporary data** 181 stations from inshore, mid-shelf, and offshore reef habitats were surveyed covering various faunal taxa, marine plants and water quality (Fig. 1 & 2).
- Future data** will expand the survey program from the shallow waters to the deep sea by utilising Remotely Operated Vehicles (ROV) to capture video and specimens of fauna from Woodside Energy exploration drilling campaigns, down to a depth in excess of 2000 m (Fig.3).

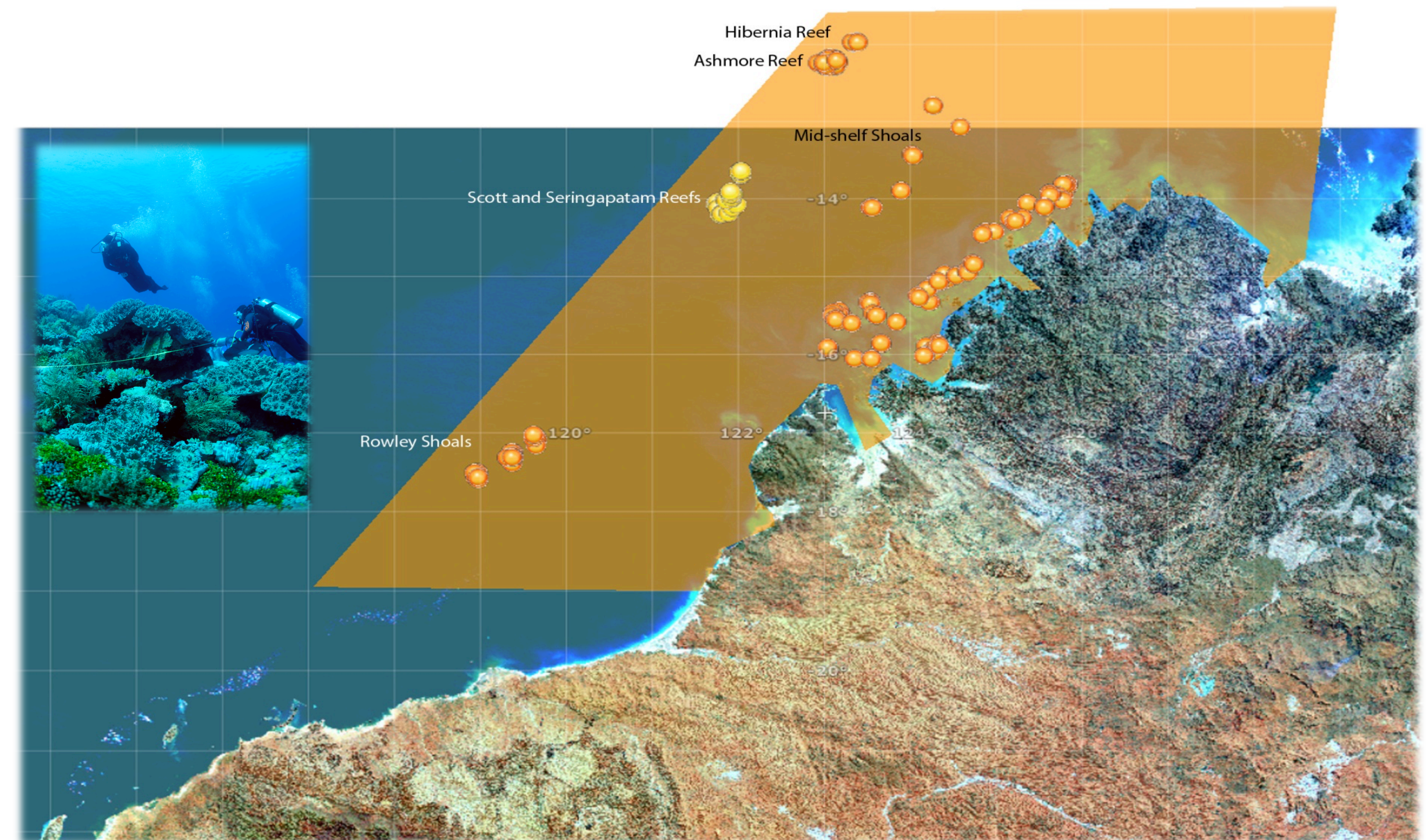


Figure 1. Sampling location in the Kimberley. The Project Area boundary is marked in orange. Map proj. GDA94, Scale: 1:6, 250 000.

INSHORE, MID-SHELF, OFFSHORE

- 1000nds of specimen and DNA vouchers were collected, incorporating many new species and revealing new range extensions. Some of the highlights are pictured in Fig. 2 and first scientific publications referenced in table 1. (Table 1 & Fig. 2).
- Interactive documentary, media contributions etc.

Taxa	# reg. voucher	# of species	# new species	# new records	# DNA vouchers	Scientific Publications
Marine flora						Richards ZT. & Huisman J. (2014) Coral-mimicking alga <i>Eucheuma arnoldii</i> found at Ashmore Reef. <i>Coral Reefs</i> 33:441. DOI: 10.1007/s00338-013-1121-2.
Porifera		200				
Octocorallia	1500	200	30+	2	1500	Bryce M., Polisenno A., Alderslade P. & Vargas S. (2015). Digitate and capitate soft corals (Coelenterata: Octocorallia: Alcyoniidae) from Western Australia with reports on new species and new Australian geographical records. <i>Zootaxa</i> , 3963 (2):160-200. Bryce M. & Polisenno A. (2014). Two new records of octocorals (Anthozoa, Octocorallia) from north-west Australia. <i>Records of the Western Australian Museum</i> 29: 159-168.
Octo- and Hexacorallia						Richards Z., Bryce M. & Bryce C. (2013). New records of atypical coral Reef habitat in the Kimberley, Australia. <i>Journal of Marine Biology</i> . Vol 2013.
Hexacorallia	1500	~300	1	~30	1400	Richards ZT., Wallace CC., Garcia R., Rosser N. & Muir P. (2015) Thriving on adversity: High reef coral diversity in an extreme intertidal environment. <i>Plos One</i> 10(2), 1-17. Richards ZT and O'Leary, M. (2015) The coralline algal cascades of Tallon Island fringing reef, NW Australia. <i>Coral Reefs</i> , 34(2), 595-595.
Molluscs						
Worms						
Echinoderms						
Crustaceans	~4000	~400	~40	~100		Bruce AJ. (2011). A new species of <i>Ancylomenes</i> Okuno & Bruce, 2009 (Crustacea: Decapoda: Pontoninae) from the Kimberley region, Western Australia. <i>Zootaxa</i> 3018, 66-68. Bruce AJ. (2012). <i>Periclimenaeus parkeri</i> sp. nov. (Crustacea: Decapoda: Pontoninae) from the Kimberley, Western Australia. <i>Cah. Biol. Mar</i> 53, 289-298. Bruce AJ. (2012). <i>Onyccaris longirostris</i> Bruce, 1980 (Crustacea: Decapoda: Pontoninae), new to the Australian fauna. <i>Zootaxa</i> 3299, 61-65. Bruce AJ. (2011). Notes on Some Indo-pacific Pontoninae, <i>L. Typtonichus</i> spp. nov., from Northwest Australia. <i>Crustaceana</i> 84(11): 1337-1351. Hughes LE. & Peart R. A. (2013). New species and new records of Amphitoidae (Peracarida: Amphipoda) from Australian Waters. <i>Zootaxa</i> , 3719(1): 1-102.
Fish	~2000	~400	~5	~10	546	Johnson J. (2012). <i>Pseudopataecus carnatobarbatus</i> , a new species of velvetfish (Teleostei: Scorpaeniformes: Aploactinidae) from the Kimberley coast of Western Australia. <i>Zootaxa</i> , 3245:54-62. Moore GI. & Richards ZT. (2014). New records of sea snakes at mid-shelf shoals of Australia's North-west Shelf. <i>Marine Biodiversity</i> . Online First. DOI: 10.1007/s12526-014-0267-7.
Reptiles					1	

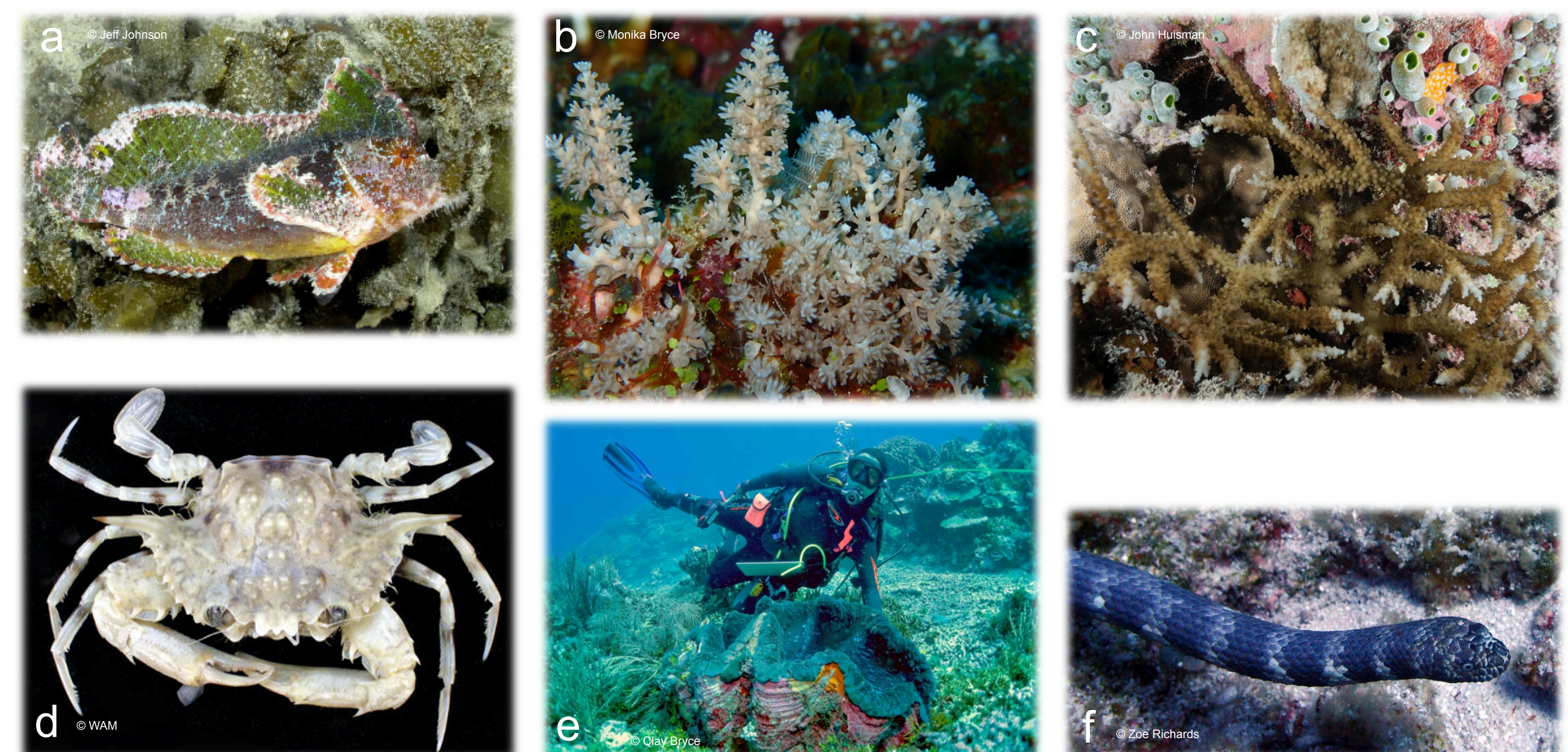


Figure 2. a) new species of Bearded Velvetfish, b) a new Australian record of the octocoral *Coelogorgia palmosa*, c) a rarely encountered algae mimicking a hard coral, d) a new record of the swimming crab *Portunus spiniferus*, e) a giant clam f) a new Australian record of the sea snake *A.duboisii*.

OVER THE EDGE

- The WA museum holds over 4000 deep-water records of voucher specimens from depths over 400 m.
- Visual assessment from three hours of video footage obtained using a ROV from four Woodside Energy Ltd. (WEL) well sites from depth between 821–2038 m revealed a diverse range of animals including several taxa of cnidarian, molluscs, worms, crustaceans, echinoderms and a variety of fish (Fig. 3 & 4).
- The animals observed could all be considered significant, and included rare species, potentially new species and distributional range extensions.
- Significant sightings included a helmet jelly (*Periphyllopsis* sp.), Venus fly-trap anemones (*Actinoscyphia* spp.), a Dumbo octopus (*Grimpoteuthis* sp.), a mobile squid worm (*Teuthidodrillus* cf. *samae*) and a large crab belonging to the genus *Lithodes* sp. (Fig. 4).



Figure 3. Drilling platform. Inserts showing shelf contours, control room and ROV.

NEW MUSEUM OPPORTUNITIES

- Research opportunities and field experience for many career level students.
- The museum as an information hub for future investigation and can provide a raft of research and educational outreach programs covering many formats.
- To provision of museum collections for molecular work in regards to barcoding, molecular taxonomy, phylogenetics, metagenomics and population genetics and generic boundaries.
- Future expansion of the deep water work - ROV image capture and specimen and sediment collections.
- Media opportunities – Populating of dedicated websites (data, images and general information, “field guides” developed into online information sheets), interactive documentaries, and new media expedition contributions.

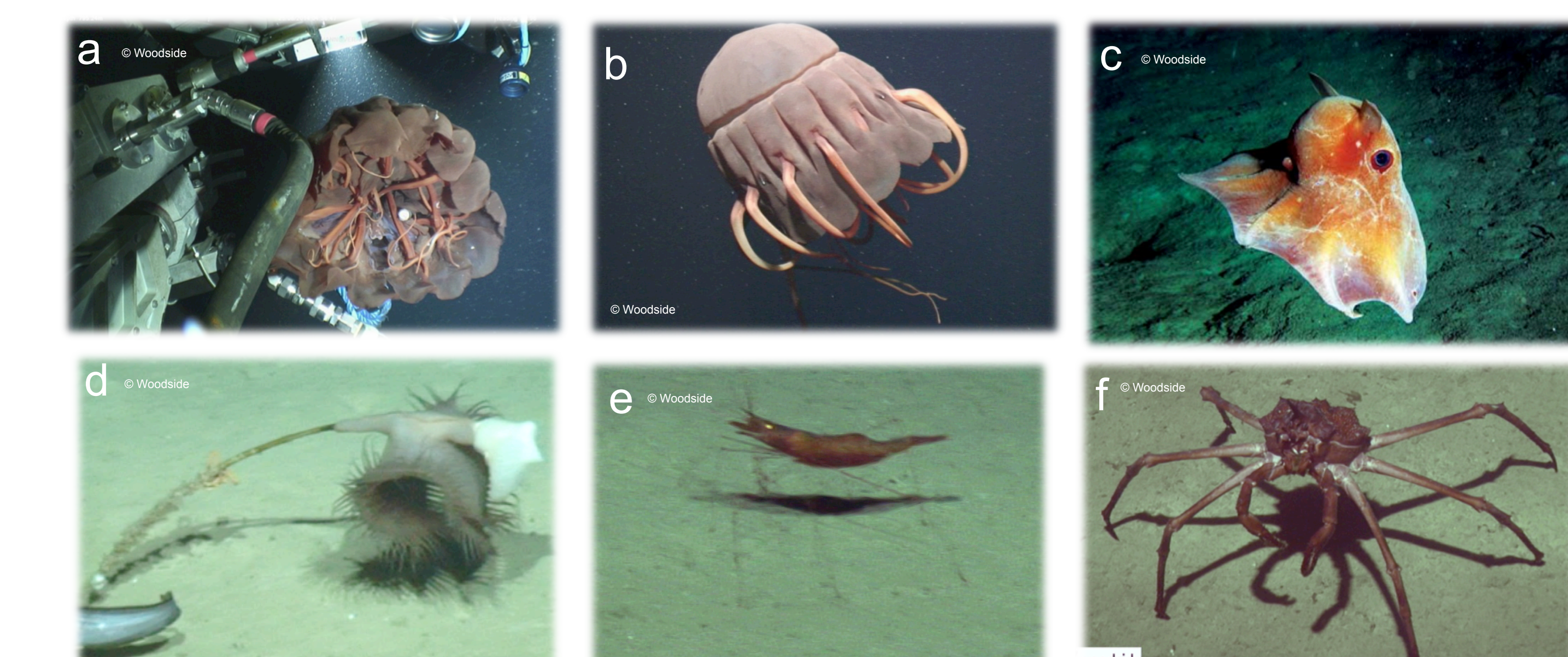


Figure 4. a, b) helmet jelly (*Periphyllopsis* sp.), c) Dumbo octopus (*Grimpoteuthis* sp.), d) Venus fly-trap anemones (*Actinoscyphia* spp.), e) undescribed shrimp, f) crab belonging to the genus *Lithodes* sp..