

Faculty of Computing Health and Science

Research Unit Annual Report

RESEARCH UNIT NAME: Centre for Marine Ecosystems Research

RESEARCH UNIT LEVEL (tick):

Level I Research Group

Level II Research Centre

Level III Research Institute

Centre of Excellence

YEAR: 2010

BRIEF OVERVIEW (1-2 paragraphs outlining major activities conducted in past year)

Members of the CMER have a strong track record of obtaining external research income from a wide range of industry and national competitive sources. In 2010, CMER members were involved in grants totalling \$345,800. An additional grant of \$1,417,395 was successful in 2010, with funding beginning in 2011. CMER members published 18 research papers, of which 44% were published in A* and A category journals, while the remainder were published in B category journals under the ERA system. A notable feature of the publication record is the large number of collaborative papers, reflecting the close and complementary research occurring within the group as well as with external research collaborators. There were 3 HDR completions in 2010.

Through its research activities CMER has maintained strong engagement with the WAMSI. CMER members have been involved in the negotiation of the re-funding bid (WAMSI 2), and with the development of the new WAMSI research node on Dredging. CMER staff have also assisted the Dept. of Environment and Conservation with data collection for the Walpole-Nornalup Inlets Marine Park, involving 3rd year students to achieve research-informed teaching outcomes.

MEMBERSHIP (Full Title of Researchers, including staff, research students, adjuncts in the past year)

| Research Staff | Adjunct Staff | Students |
|-------------------------|--------------------|----------------------------------|
| Mr Pierre Bouvais | Dr Russ Babcock | Mr Gary Choney |
| Mr Rob Czarnik | Mr Dave Holley | Mr Thibaut de Bettignies |
| Dr Richard Campbell | Dr Ray Misini | Ms Ainslie Denham |
| Ass. Prof. Glenn Hyndes | Dr Mads Thomsen | Mr Adam Gartner |
| Ms Karina Inostroza | Dr Fernando Tuya | Mr Jason How |
| Prof. Paul Lavery | Dr Mat Vanderklift | Ms Karina Inostroza |
| Ms Ciara McIlldiff | Dr Thomas Campbell | Mr Rozaimi Jamaludin |
| Dr Kathryn McMahon | | Mr Justin King |
| Dr Pippa Moore | | Mr Peter Kiss |
| Dr Britta Munkes | | Mr Nushan Nawarathna Mudiyansele |
| Ass. Prof. Ute Mueller | | Mr Michael Mulligan |

Mr Aldo Turco
Dr Adriana Verges
Mr Phil van Dyke
Ms Candace Willison

Ms Chara Lata Singh
Ms Carli Telfer
Ms Candace Willison

NEW GRANTS (Identify Funding Body, Value of grant, Years funded, Chief Investigator, collaborators, title)

| Project | Funding Body | Investigators | 2010 Actual External & Internal Income | Years Funded |
|--|--|---|--|---|
| Improving the experiential design and statistical rigour for estimating state-wide recreational catch by boat based anglers. | Fisheries WA | Paul Lavery, Glenn Hyndes, Ute Mueller, Vicki Graham | - | 2011-2014 (\$1,417,395 granted late 2010) |
| Survey of New Zealand fur seal in south-west Western Australia | DEC and ECU | Glenn Hyndes & Richard Campbell | \$103,000 | 2010-2011 |
| The role of herbivory and hydrodynamics in ameliorating the impacts of nutrient enrichment in marine ecosystems | CSIRO (Flagships Collab.) | Paul Lavery, Britta munkes, Mat Vasderklift | \$100,000 | 2009-2011 |
| Quantification of the Biodiversity of the Lake MacLeod Northern Ponds | Dampier Salt Limited | Pierre Horwitz, Glenn Hyndes, Ray Froend, Kathryn McMahon | \$76,475 | 2010-2013 |
| Trophic Interaction and Ecosystem Modelling | WAMSI Node 4.3 | Glenn Hyndes | \$65,018 | 2008-2011 |
| Developing indicators of nutrient enrichment impacts on near shore coastal reefs | Commonwealth Department of Defence and ECU | Britta Munkes, Paul Lavery, Kathryn McMahon | \$58,937 | 2010 |
| Predicting climate change impacts on seagrasses - the effect of temperature and ocean acidification | ECU | Kathryn McMahon | \$24,995 | 2010 |
| Source and supply of seaweed wrack from reefs to adjacent habitats | | Thibaut de Bettignies | \$12,272 | 2010 |
| Ecological interactions in coastal marine ecosystems: Trophodynamics | WAMSI | Glenn Hyndes | \$5,000 | 2008-2010 |
| Rates and processes of Posidonia sinuosa degradation in south Western Australia. | ECU | Candace Willison, Paul Lavery & Kathryn McMahon | \$3,000 | 2010 |

PUBLICATIONS, REFERRED BOOKS, CHAPTERS, JOURNAL ARTICLES, CONFERENCE PAPERS, REPORTS

Journals

Bennett, S., **Verges, A.**, and Bellwood, D (2010). Branching coral as a macroalgal refuge in a marginal coral reef system. *Coral Reefs*. 29: 471-480.

Collier C., Prado P., and **Lavery P** (2010). Carbon and nitrogen translocation in response to shading of the seagrass *Posidonia sinuosa*. *Aquatic Botany*. 93: 47 – 54.

Eklof, J., **McMahon, K.**, and **Lavery, P** (2010). Effects of multiple disturbances in seagrass meadows: shading decreases resilience to grazing. *Marine and Freshwater Research*. 60: 1317-1327.

Gartner A., Lavery P., McMahon K., Brearley A., and Barwick H (2010). Light reductions drive macroinvertebrate changes in *Amphibolis griffithii* seagrass habitat. *Marine Ecology Progress Series*. 401: 87-100.

Hanson, C., **Hyndes, G.**, and Wang, S (2010). Differentiation of benthic marine primary producers using stable isotopes and fatty acids: Implications to food web studies. *Aquatic Botany*. 93: 114-122.

Hawkins, S., Sugden, H., Mieszkowska, N., **Moore, P.**, Poloczanska, E., Leaper, R., Herbert, R., Genner, M., Moschella, P., Thompson, R., Jenkins, S., Southward, A., and Burrows, M (2010). Consequences of climate-driven biodiversity changes for ecosystem functioning of North European rocky shores. *Marine Ecology Progress Series*. 396: 245-259.

Lavery, P., McMahon, K., Mulligan, M., and **Tennyson, A** (2010). Interactive effects of timing, intensity and duration of experimental shading on *Amphibolis griffithii*. *Marine Ecology Progress Series*. 394: 21-33.

Smale, D., Kendrick G., and **Wernberg T** (2010). Assemblage turnover and taxonomic sufficiency of subtidal macroalgae at multiple spatial scales. *Journal of Experimental Marine Biology and Ecology*. 384: 76–86.

Svensson C., **Hyndes G.**, and **Lavery P** (2010). An efficient method of collecting large samples of live copepods free from detritus. *Marine and Freshwater Research*. 61: 621 – 624.

Thomsen, M., Wernberg, T., Altieri, A., Tuya, F., Gulbransen, D., McGlathery, K., Holmer, M., and Silliman, B (2010). Habitat cascades: the conceptual context and global relevance of facilitation cascades via habitat formation and modification. *Integrative And Comparative Biology*. 50: 158-175.

Thomsen, M., Wernberg, T., Tuya, F., and Silliman, B (2010). Ecological performance and possible origin of a ubiquitous but under-studied gastropod. *Estuarine Coastal and Shelf Science*. 87: 501-509.

Tuya F., Vanderklift M., and **Hyndes G** (2010). Proximity to rocky reefs alters the balance between positive and negative effects on seagrass fauna. *Marine Ecology Progress Series*. 405: 175-186.

Vanderklift, M., and **Wernberg, T** (2010). Stable isotopes reveal a consistent consumer–diet relationship across hundreds of kilometers. *Marine Ecology Progress Series*. 403: 53–61.

Vergés A., Alcoverro T., Romero J (2010). Plant defences and the role of epibiosis in mediating within-plant feeding choices of seagrass consumers. *Oecologia*. DOI 10.1007/s00442-010-1830-y

Waters, J., **Wernberg, T.**, Connell, S., **Thomsen, M.**, Zuccarello, T., Kraft, G., Sanderson, J. West, J. and Gurgel, C. (2010). Australia's marine biogeography revisited: Back to the future? *Austral Ecology* 35: 988-992.

Wernberg, T; Tuya, F; Thomsen, MS, et al. (2010). Turban snails as habitat for foliose algae: contrasting geographic patterns in species richness. *Marine and Freshwater Research*. 61: 1237-1242.

Wernberg T., Thomsen M., and Tuya F (2010). Decreasing resilience of kelp beds along a latitudinal temperature gradient: potential implications for a warmer future. *Ecology Letters*. 13: 685 – 694.

Wernberg, T., and **Vanderklift, M** (2010). Contribution of temporal and spatial components to morphological variation in the kelp *Ecklonia* (laminariales). *Journal of Phycology*. 46: 153–161.

Non refereed papers/proceedings

McMahon, K. (2010). Seagrass wrack dynamics – Australian Marine Science Association.

Reports

Lavery P. and **Munkes B** (2010). *Monitoring on seagrass meadows on the eastern shore of Garden Island, Western Australia*. CMER 2010-04.

Oldham, C. E., **Lavery, P. S., McMahon, K.**, Pattiaratchi, C., & Chiffings, T. W. (2010). Seagrass Wrack Dynamics in Geographe Bay, Western Australia. Report to Dept. of Transport and Shire of Busselton.

Conference Attendance and Presentations

WAMSI show and tell, Fremantle. February 9th, 2010.

Gary Choney, Glenn Hyndes, Paul Lavery, Pippa Moore, Britta Munkes and Candace Willison.

International Seaweed Symposium, Mexico. February 18-28, 2010.

Thomas Wernberg.

Special meeting on Marine-Costal Sciences - Coastal Zone Rehabilitation and Investigation of land-Sea Interactions of Pilot Areas for Economic Recovery along the Eastern-Southern Mediterranean (CORER), Lebanon. March 24-29 2010.

Britta Munkes.

NCEAS meeting, Santa Barbara, U.S.A. April 16-24 20120.

Pippa Moore.

AMSA National Conference, Wollongong. July 4-8, 2010.

Kathryn McMahon, Britta Munkes, Candace Willison and Adriana Vergés.

ARC Australian Coral Reefs Symposium, Canberra. October 7-8, 2010.

Adriana Vergés.

ASPAB Conference, Rottnest Island. November 15-18, 2010.

Thibaut de Bettignies and Kathryn McMahon.

World Seagrass Conference and 9th International Seagrass Biology Workshop, Phuket. November 21-29, 2010.

Gary Choney, Glenn Hyndes, Paul Lavery, Kathryn McMahon, Britta Munkes, Rozaimi Jamaludin and Candace Willison.

University of Otago, New Zealand, October 2010.

Glenn Hyndes (2 seminars)

HIGHER DEGREE BY RESEARCH LOAD

| Student | Candidature |
|----------------------------------|-------------|
| Mr Thibaut de Bettignies | PhD |
| Ms Ainslie Denham | PhD |
| Mr Adam Gartner | PhD |
| Mr Jason How | PhD |
| Mr Rozaimi Jamaludin | PhD |
| Mr Nushan Nawarathna Mudiyansele | PhD |
| Ms Chara Lata Singh | PhD |
| Mr Gary Choney | MSc |
| Mr Justin King | MSc |
| Mr Peter Kiss | MSc |
| Mr Michael Mulligan | MSc |
| Ms Carli Telfer | MSc |
| Ms Candace Willison | MSc |
| Ms Karina Inostroza | Honours |

HIGHER DEGREE BY RESEARCH COMPLETIONS

| Student | Degree | Thesis Title |
|---------------------------|---------|---|
| Adam Gartner | PhD | <i>Trophic implications of light reductions for Amphibolis griffithii seagrass fauna</i> |
| Chongdee Srinoparatwatana | PhD | <i>Population biology of two key fish species and the dynamics and management of the trap fishery in beung borapet, Thailand.</i> |
| Carli Telfer | MSc | <i>The Western Australian charter boat industry: working towards long-term sustainability</i> |
| Karina Inostroza | Honours | <i>The effects of spatial management on communities and ecological interactions in seagrass meadows in southwest WA.</i> |

VISITORS AND COLLABORATIONS

Local

Paul Lavery and Kathryn McMahon collaborated with Profs C. Oldham and Pattiaratchi, from the University of Western Australia and T Chiffings from the DHI International on the project “Seagrass Wrack Dynamics in Geographe Bay, Western Australia”

Glenn Hyndes and Paul Lavery continued their collaborations with Drs M. Vanderklift, M. and R. Babcock at CSIRO on a range of research projects.

Glenn Hyndes, Paul Lavery and Kathryn McMahon collaborated with staff at Dept. of Environment and Conservation to gain data for the management of the Walpole-Nornalup Inlets Marine Park. This collaboration involved 3rd year students in the Marine and Freshwater Biology degree to achieve research-informed teaching outcomes.

International

Pippa Moore has been involved with an international working group working towards understanding the impact of climate change on marine systems. The working group, funded by the National Center for Ecological Analysis and Synthesis, includes participants from 12 institutions and 8 countries.

Glenn Hyndes visited the University of Otago for his study leave in late 2010 to extend collaborations with Drs R. McLeod, R. Frew & C. Hurd. Glenn is a “mentor” for Dr McLeod on her NZ Science and Technology Postdoctoral Fellowship.

Paul Lavery visited Dr Miguel Angel Mateo at the CEAB in Blanes, Spain to continue collaboration of seagrass carbon dynamics. The visit has led to a planned post-doctoral exchange in late 2011 and a sabbatical for Paul Lavery at CEAB in 2012 to expand this research area.

COMMUNITY ENGAGEMENT ACTIVITIES AND LINKAGES

Centre members maintained their commitment to engaging with the scientific and broader community, through presentations at conferences, involvement in scientific committees and media (see below table). Members have also been active in reviewing manuscripts for journals including highly ranked journals.

| Body/Event | Role | Name |
|--|--------------|-------------------------------|
| Seminars – <ul style="list-style-type: none"> ○ Biomarkers in food-web ecology: good food or a pain in the gut? Chemistry Dept, Uni Otago ○ Pathways of connectivity in marine landscapes. Botany Dept, Uni Otago ○ Marine (Coastal) Systems. Rio Tinto | Speaker | Glenn Hyndes |
| Marine Reference Group, Perth Region NRM. | Chair | |
| Perth Region NRM. | Board member | |
| Reference Group for River Symposium 2010. | Member | Paul Lavery |
| Participation in a series of community information sessions on proposed management options for wrack accumulations in Geographe Bay | Participants | Paul Lavery & Kathryn McMahon |

| | | |
|--|-------------------|-----------------|
| Presentation to Busselton Naturalist Club on seagrass wrack dynamics and wrack management. | Speaker | Kathryn McMahon |
| Busselton Dunsborough Mail newspaper article: Port Geographe groyne reconfiguration. A two year study has recommended structural changes to the groynes to remedy long term seagrass accumulation problems by UWA, ECU and independent research company DHI who undertook the study. | Author | |
| Radio Interview ABC Bunbury. | Interviewee | |
| AMSA Annual Postgraduate Symposium. | Invited Speaker | Pippa Moore |
| Talk to National Institute of Accountants (WA) on "Accounting for Biodiversity" at AQWA. | Speaker | |
| Profile interview of an early career researcher for COSMOS magazine. | Interviewee | |
| 20 th International Seaweed Symposium, Mexico. | Invited presenter | Thomas Wernberg |
| CSIRO research meeting. | Invited presenter | |
| Reviewed report of the Swan River Trust. | Reviewer | |

FUTURE PLANS AND DIRECTION

CMER's major goals for 2011 and beyond will be to:

1. Build on existing strengths in benthic marine ecosystem research using existing and new external collaborations;
2. Maintain and develop research capabilities in its four key research areas: Habitat connectivity and trophic interactions, Management of human impacts, Conservation and fisheries biology, and Stress and disturbance ecology through major funded research projects and appointment of postdoctoral fellows;
3. Build research partnerships with key private industry, government agencies and universities (national and international);
4. Support postdoctoral researchers through externally-funded research income;
5. Build postgraduate enrolments;
6. Build international linkages through visiting researchers and student exchanges.

DATE OF NEXT FORMAL REVIEW

2013