

Mark E. Baird

Personal details

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Summary

Mark Baird is an aquatic scientist who uses observations and numerical models to study estuarine and marine ecosystems. Dr. Baird leads the CSIRO Coastal Biogeochemical Modelling (CBM) Team and is a key developer of the CSIRO Environmental Modelling Suite (EMS). Baird led the team that developed the coupled hydrodynamic – biogeochemical model of the Great Barrier Reef (eReefs) that is being used by state and federal governments to assess the present state of the reef, and to quantify the impact of proposed catchment management investments. He has published 86 papers in the peer-review literature on topics including coral biogeochemistry, estuarine ecology, plankton population dynamics, salp blooms, ocean acidification, physical oceanography, bio-optics and ecosystem modelling. Dr. Baird has developed parameterisations for ecological processes that have been coupled to community hydrodynamic models such as EMS, ROMS, POM and MOM. He has supervised 9 PhD students, 4 Honours students and lectured undergraduate courses in oceanography and ecological modelling.

Education

Ph.D. (Biological Sciences), University of Warwick, U.K (2000)

Thesis: Towards a verified mechanistic model of plankton population dynamics.

M.Sc. (Oceanography), University of Hawaii, U.S.A. (1996)

Thesis: Mass transfer on coral-rough surfaces.

B.E. (Hons), Mechanical, University of Sydney, Australia (1992)

Thesis: Mass transfer on rough surfaces at high Schmidt numbers in a circular Couette flow.

Employment

2017- Principal Research Scientist, CSIRO, Oceans and Atmosphere, Australia

Leader of a team of 6 sediment, optical and biogeochemical modellers studying estuarine, coastal and continental shelf waters.

2012-2017 Senior Coastal Modeller, CSIRO Marine and Atmospheric Research, Australia

Leader of a team of 10 hydrodynamic, sediment and biogeochemical modellers studying estuarine, coastal and continental shelf waters. In particular I have led the development of the biogeochemical and optical models in the CSIRO Environmental Modelling Suite.

2010 – 2012 Senior Research Fellow, Functional Biology and Climate Change Cluster, University of Technology Sydney, Australia.

Partly funded by a CSIRO Wealth from Oceans collaboration fund project I have concentrated on the observation and modelling of bio-optical phenomena in marine and estuarine environments. I have also supervised graduate students and led the navigation and analysis of output from autonomous glider deployments off NSW.

2007-2009 Senior Research Fellow, School of Mathematics, UNSW, Australia, and

2005-2007 Research Fellow, School of Mathematics, UNSW, Australia

Funded by an ARC Australian Research Fellowship, my primary task was the development of a size-resolved pelagic ecosystem model. A total of 14 research publications were produced from this project. I was also involved in undergraduate teaching (~10 hours per semester + 2 field trips), postgraduate teaching (in total 4 PhD students and 3 honours students).

2002-2004 Post-doctoral Research Fellow, University of NSW, Australia

Funded by an ARC Postdoctoral Fellowship, I led the development of a 3D coupled physical-biological model of the waters off southeast Australia.

1999-2001 Research Scientist, CSIRO Land and Water, Australia.

I was employed as an aquatic ecosystem modeller to develop and implement biological models for coupling to hydrodynamic models. The largest project involved the development of the CSIRO Simple Estuarine Response Model for a national-wide audit of estuarine condition. This project involved consultation with other science agency during the development of the software, and communication of the outcomes directly to stakeholders in each state capital.

1996-1999 Ph.D. studentship, Natural Environment Research Council, U.K.

This studentship funded my Ph.D. studies in the development of a mechanistic model of plankton population dynamics.

1994-1996 Research Assistant, Hawaii Institute of Marine Biology, U.S.A.

This studentship funded my Masters' studies at the University of Hawaii where I researched nutrient uptake rates on experimental coral communities using mass transfer theories.

1993- 1994 Technical support engineer, Alfa Laval, Australia

Through the organisation of a workshop, warehouse and site work, I managed the repair and upgrade of industrial heat transfer equipment at a range of sites around Australia including remote mine sites, breweries and chemical plants.

Peer-reviewed publications (citations = 3436, h-index = 34, Google scholar 1st May 2022)

88. Bozec, Y.-M., K. Hock, R. Mason, **M. Baird**, C. Castro-Sanguino, S. Condie, M. Puotinen A. Thompson, P. Mumby (2022) Cumulative impacts across Australia's Great Barrier Reef: A mechanistic evaluation. *Ecol. Monogr.* 92:e01494.
87. Schilling, H. T., J. D. Everett, A. Schaeffer, P. Yates, **M. E. Baird**, I. M. Suthers (submitted 14th May 2021) Vertically resolved particulate (zooplankton) biomass and size-structure across a continental shelf under the influence of a western boundary current *Progress in Oceanography*.
86. Kalmus, P. A., Ekanayaka, E. Kang, E. C. Massoud, **M. Baird**, M. Gierach (in press, 1st May 2022) Past the precipice? Coral loss and projected refugia under global warming. *Future Earth*.
85. Soja-Woźniak, M., L. Clementson, B. Wojtasiewicz, **M. Baird** (under revision 1st Apr 2022) Estimation of the global distribution of phytoplankton light absorption from pigment concentrations. *J. Geophys. Res (Oceans)*.
84. Condie, S. A., Anthony, K. R. N., Babcock, R. C., **Baird, M. E.**, Beeden, R., Fletcher, C. S., Gorton R., Harrison, D., Hobday, A. J., Plagányi É. E., Westcott, D. A. (2021) Large-scale interventions may delay decline of the Great Barrier Reef. *R. Soc. open sci.*8:201296.201296.
83. **Baird, M. E.**, M. Mongin, J. Skerratt, N. Margvelashvili, S. Tickell, A. D. L. Steven, C. Robillot, R. Ellis, D. Waters, P. Kaniewska, J. Brodie (2021) Impact of catchment loads of nutrients and sediments on marine water quality on the Great Barrier Reef: An application of the eReefs marine modelling system. *Mar. Poll. Bull.* 167: 112297.
82. Mongin. M., **M. E. Baird**, A. Lenton, C. Neill, J. Akl (2021) Reversing ocean acidification along the Great Barrier Reef using alkalinity injection. *Environmental Research Letters*, 16, 064068.
81. **Baird, M.E.**, M. Mongin, F. Rizwi, L. Bay, N. Cantin, L. Morris (2021) The effect of natural and anthropogenic nutrient and sediment loads on coral oxidative stress on runoff-exposed reefs. *Marine Pollution Bulletin.* 168, 112409.
80. Scofield, J. M.P., E. L. Prime, F. Flores, A. Severati, M. Mongin, E. Bougeot, **M. E. Baird**, A. P. Negri, G. G. Qiao. (preparing for re-submission) The development of a floating mono-particle "Sun Shield" to protect corals from high irradiance during bleaching conditions.
79. Laiolo, L. R. J. Matear, M. Soja-Woźniak, D. Suggett, D. Hughes, **M. Baird**, M. Doblin (2021) Modelling the impact of phytoplankton cell size and abundance on inherent optical properties (IOPs) and a remotely sensed chlorophyll-a product. *J. Mar. Sys.* 213: 103460.

78. Soja-Wozniak, L. Laiolo, **M. E. Baird**, R. Matear, L. Clementson, T. Schroeder, M. A. Doblin, I. M. Suthers (2020). Effect of phytoplankton community size structure on remote-sensing reflectance and chlorophyll a products J. Mar. Sys. 211: 103400.
77. Messer, L, M. Ostrowski, M. Doblin, K. Petrou, **M. Baird**, T. Ingleton, A. Bissett, J. Van de Kamp, T. Nelson, I. Paulsen, L. Bodrossy, J. Fuhrman, J. Seymour, M. Brown (2020) Microbial Tropicalisation driven by a Strengthening Western Ocean Boundary Current. Glob Change Biol. 26:5613–5629.
76. Robson, B., J. Skerratt, **M. Baird**, C. Davies, M. Herzfeld, E. Jones, M. Mongin, A. Richardson, F. Rizwi, K. Wild-Allen, A. D.L. Steven (2020) Enhanced assessment of the eReefs biogeochemical model for the Great Barrier Reef using the Concept/State/Process/System model evaluation framework. Environ. Mod. Soft. 129:104707.
75. **Baird, M. E.**, R. Green, R. Lowe, M. Mongin and E. Bougeot (2020) Optimising cool-water injections to reduce thermal stress on coral reefs of the Great Barrier Reef. PLoS ONE 15(10): e0239978. [https:// doi.org/10.1371/journal.pone.0239978](https://doi.org/10.1371/journal.pone.0239978).
74. **Baird, M. E.**, K. Wild-Allen, J. Parslow, M. Mongin, B. Robson, J. Skerratt, F. Rizwi, M. Soja-Woźniak, E. Jones, M. Herzfeld, N. Margvelashvili, J. Andrewartha, C. Langlais, M. Adams, N. Cherukuru, S. Hadley, P. Ralph, T. Schroeder, A. Steven, U. Rosebrock, L. Laiolo, M. Gustafsson, and D. Harrison (2020). CSIRO Environmental Modelling Suite (EMS): Scientific description of the optical and biogeochemical models (vB3p0). Geoscientific Model Development.13:4503-4553.
73. Steven., A. D. L., **M. E. Baird**, R. Brinkman, N. J. Car, S. J. Cox, M. Herzfeld, J. Hodge, E. Jones, E. King, N. Margvelashvili, C. Robillot, B. Robson, T. Schroeder, J. Skerratt, N. Tuteja, K. Wild-Allen, J. Yu. eReefs: An operational information system for managing the Great Barrier Reef J. Operational Oceanogr. DOI: 10.1080/1755876X.2019.1650589.
72. Soja-Wozniak, M., **M. Baird**, T. Schroeder, Y. Qin, L. Clementson, B. Baker, D. Boadle, V. Brando, A. Steven (2019). Particulate backscattering ratio as an indicator of changing particle composition in coastal waters: Observations from Great Barrier Reef waters. Journal of Geophysical Research: Oceans, 124. <https://doi.org/10.1029/2019JC014998>.
71. Skerratt J.H., M. Mongin, K. A. Wild-Allen, **M. E. Baird**, B. J. Robson, B. Schaffelke, M. Soja-Wozniak, N Margvelashvili, C. H. Davies, A. J. Richardson, A. D. L. Steven (2019) Simulated nutrient and plankton dynamics in the Great Barrier Reef (2011-2016). J. Mar. Sys. 192, 51-74.
70. Davies, C.H., Ajani, P., Armbrecht, L., Atkins, N., **Baird, M.E.**, Beard, J., Bonham, P., Burford, M., Clementson, L., Coad, P., Crawford, C., Dela-Cruz, J., Doblin, M.A., Edgar, S., Eriksen, R., Everett, J.D., Furnas, M., Harrison, D.P., Hassler, C., Henschke, N., Hoenner, X., Ingleton, T., Jameson, I., Keesing, J., Leterme, S.C., James McLaughlin, M., Miller, M., Moffatt, D., Moss, A., Nayar, S., Patten, N.L., Patten, R., Pausina, S.A., Proctor, R., Raes, E., Robb, M., Rothlisberg, P., Saeck, E.A., Scanes, P., Suthers, I.M., Swadling, K.M., Talbot, S., Thompson, P., Thomson, P.G., Uribe-Palomino, J., Van Ruth, P., Waite, A.M., Wright, S., Richardson, A.J. (2018) A database of chlorophyll a in Australian waters. Scientific Data, **5**, 180018,
69. **Baird, M. E.**, M. Mongin, F. Rizwi, L. K. Bay, N. E. Cantin, M. Soja-Wozniak and J. Skerratt (2018) A mechanistic model of coral bleaching due to temperature-mediated light-driven reactive oxygen build-up in zooxanthellae. Ecol. Model **386**: 20-37.
68. Margvelashvili, N. M., J. Andrewartha, **M. Baird**, M. Herzfeld, E Jones, M. Mongin, F. Rizwi, B. Robson, J. Skerratt, K. Wild-Allen and A. Steven (2018) Simulated fate of catchment-derived sediment on the Great Barrier Reef shelf. Mar. Poll. Bull. **135**: 954-962.

67. Adams, M. A., M. Ghisalberti, R. Lowe, D. P. Callaghan, **M. Baird**, E. Infantes, K. O'Brien (2018) Water residence time controls the feedback between seagrass, sediment and light: implications for restoration. *Wat. Res.* 117 14–26.
66. Laiolo, L. R. Matear, **M. E. Baird**, M. Soja-Woźniak, M. A. Doblin (2018) Information content of in situ and remotely sensed chlorophyll-a: Learning from size-structured phytoplankton model. *J. Mar. Sys.* 183, 1-12.
65. Robson, B. J., G. Arhonditsis, **M. Baird**, J. Brebion, K. Edwards, L. Geoffroy, M.-P. Hébert, V. van Dongen-Vogels, E. Jones, C. Kruk, M. Mongin, Y. Shimoda, J. Skerratt, S. Trevathan-Tackett, K. Wild-Allen, X. Kong, A. Steven (2018) Towards evidence-based parameter values and priors for aquatic ecosystem modelling. *Env. Mod. Soft.* 100: 74-81.
64. Brodie, J., **M. Baird**, M. Mongin, J. Skerratt, C. Robillot and J. Waterhouse (2017) Pollutant target setting for the Great Barrier Reef: Using the eReefs framework. In Syme, G., Hatton MacDonald, D., Fulton, B. and Piantadosi, J. (eds) MODSIM2017, 22nd International Congress on Modelling and Simulation. Modelling and Simulation Society of Australia and New Zealand, December 2017, pp. 1913-1919. ISBN: 978-0-9872143-7-9. <https://www.mssanz.org.au/modsim2017/L22/brodie.pdf>
63. Robson, B. J., J. Andrewartha, M.E. Baird, M. Herzfeld, E.M. Jones, N. Margvelashvili, M. Mongin, F. Rizwi, J. Skerratt, K. Wild-Allen (2017) Evaluating the eReefs Great Barrier Reef marine model against observed emergent properties. In Syme, G., Hatton MacDonald, D., Fulton, B. and Piantadosi, J. (eds) MODSIM2017, 22nd International Congress on Modelling and Simulation. Modelling and Simulation Society of Australia and New Zealand, December 2017, pp. 1976 – 1982. ISBN: 978-0-9872143-7-9. <https://www.mssanz.org.au/modsim2017/L22/robson.pdf>.
62. **Baird, M. E.**, J. Andrewartha, M. Herzfeld, E. Jones, N. Margvelashvili, M. Mongin, F. Rizwi, J. Skerratt, M. Soja-Wozniak, K. Wild-Allen, T. Schroeder, B. Robson, E. da Silva, M. Devlin (2017) River plumes of the Great Barrier Reef: freshwater, sediment and optical footprints quantified by the eReefs modelling system. In Syme, G., Hatton MacDonald, D., Fulton, B. and Piantadosi, J. (eds) MODSIM2017, 22nd International Congress on Modelling and Simulation. Modelling and Simulation Society of Australia and New Zealand, December 2017, pp.1892-1898. ISBN: 978-0-9872143-7-9. <https://www.mssanz.org.au/modsim2017/L22/baird.pdf>.
61. Everett J., **M. Baird**, P. Buchanan, C. Bulman, C. Davies, R. Downie, C. Griffiths, R. Heneghan, R. Kloser, L. Laiolo, A. Lara Lopez, H. Lozano-Montes, R. Matear, F. Mcennulty, B. Robson, W. Rochester, J. Skerratt, J. Smith, J. Strzelecki, I. Suthers, K. Swadling, P. van Ruth, A. Richardson (2017) Modelling what we sample and sampling what we model: challenges for zooplankton model assessment. *Frontiers in Marine Science* 4: 77.
60. Margvelashvili, N. M. Herzfeld, F. Rizwi, M. Mongin, **M. Baird**, E. Jones, B. Schaffelke, E. King and T. Schroeder (2016). Emulator-assisted data assimilation in complex models *Ocean Dynamics*. **66**, 1109–112.
59. Jones, E., **M. Baird**, M. Mongin, J. Parslow, J. Skerratt, Lovell, J. N. Margvelashvili, R. Matear, K. Wild-Allen, B. Robson, F. Rizwi, P. Oke, E. King, T. Schroeder, A. Steven, and J. Taylor (2016) Use of remote-sensing reflectance to constrain a data assimilating marine biogeochemical model of the Great Barrier Reef. *Biogeosciences* **13**, 6441–6469.
58. Albright, R., D. M. Alongi, K. Anthony, **M. Baird**, R. Beeden, M. Byrne, C. Collier, S. Dove, K. Fabricius, O. Hoegh-Guldberg, R. Kelly, J. Lough, M. Mongin, P. Munday, R. Pears, B. Russell, Bayden, B. Tilbrook, E. Abal (2016) Ocean Acidification: Linking Science to

- Management Solutions Using the Great Barrier Reef as a Case Study. *J. Env. Manage.* **182**, 641-650.
57. Mongin M., **M. E. Baird**, A. Lenton, S. Hadley (2016) Optimising reef-scale CO₂ removal by seaweed to buffer ocean acidification. *Environ. Res. Lett.* **11** 034023.
 56. Mongin M., **M. E. Baird**, B. Tilbrook, R. J. Matear, A. Lenton, M. Herzfeld, K. A. Wild-Allen, J. Skerratt, N. Margvelashvili, B. J. Robson, C. M. Duarte, M. S. M. Gustafsson, P. J. Ralph, A. D. L. Steven (2016). The exposure of the Great Barrier Reef to ocean acidification. *Nature Communications* **7**, 10732.
 55. Macdonald, H. S., M. Roughan, **M. E. Baird** and J. Wilkin (2016). The formation of a cold-core eddy in the East Australian Current. *Cont. Shelf Res.* **114**: 72-84.
 54. Cherukuru, N., P. L Davies, V. E. Brando, J. M. Anstee, **M. E Baird**, L. A Clementson, M. A. Doblin (2016) Physical oceanographic processes influence bio-optical properties in the Tasman Sea. *J. Sea Res.***110**: 1-7.
 53. **Baird, M. E.**, M. P. Adams, R. C. Babcock, K. Oubelkheir, M. Mongin, K. A. Wild-Allen, J. Skerratt, B. J. Robson, K. Petrou, P. J. Ralph, K. R. O'Brien, A. B. Carter, J. C. Jarvis, M. A. Rasheed (2016) A biophysical representation of seagrass growth for application in a complex shallow-water biogeochemical model *Ecol. Mod.* **325**: 13-27.
 52. **Baird, M. E.**, N. Cherukuru, E. Jones, N. Margvelashvili, M. Mongin, K. Oubelkheir, P. J. Ralph, F. Rizwi, B. J. Robson, T. Schroeder, J. Skerratt, A. D. L. Steven and K. A. Wild-Allen (2016) Remote-sensing reflectance and true colour produced by a coupled hydrodynamic, optical, sediment, biogeochemical model of the Great Barrier Reef, Australia: comparison with satellite data. *Env. Model. Software* **78**: 79-96.
 51. Woodcock, S., B. Manojlovic, **M. E. Baird** and P. J. Ralph (2015) A Poisson-Pareto model of Chlorophyll-a fluorescence signals in the marine environment. *The ANZIAM Journal.* **56**: 373-380.
 50. Adams, M. P., A. J. P. Ferguson, C. J. Collier, **M. E. Baird**, R. K. Gruber and K. R. O'Brien (2015) Assessment of light history indicators for predicting seagrass biomass. 21st International Congress on Modelling and Simulation, Gold Coast, Australia, 1303- 1309. 29 Nov to 4 Dec 2015 www.mssanz.org.au/modsim2015.
 49. Everett, J. D., H. Macdonald, **M. E. Baird**, J. Humphries, M. Roughan, and I. M. Suthers (2015) Cyclonic entrainment of pre-conditioned shelf waters into a frontal eddy. *J. Geophys. Res. (Oceans).* **120**, 677-691.
 48. Robson, B.J., J. Skerratt, M. Mongin, K. Wild-Allen and **M. E. Baird** (2014) Varying the temporal resolution of river nutrient boundary conditions to a coupled hydrodynamic-biogeochemical model of a coastal system has surprisingly little impact on model results. Proceedings - 7th International Congress on Environmental Modelling and Software: Bold Visions for Environmental Modeling, iEMSs, **1**, pp. 533-539. http://www.iemss.org/sites/iemss2014/papers/Volume_1_iEMSs2014_pp_1-602.pdf
 47. Davies, C. H., A. J. Armstrong, **M. E. Baird**, F. Coman, S. Edgar, D. Gaughan, J. Greenwood, F. Gusmão, N. Henschke, J. A. Koslow, S. C. Leterme, A. D. McKinnon, M. Miller, S. Pausina, J. U. Palomino, R.-L. Roennfeldt, P. Rothlisberg, A. Slotwinski, J. Strzelecki, I. M. Suthers, K. M. Swadling, S. Talbot, M. Tonks, D. H. Tranter, J. W. Young, and A. J. Richardson (2014) Over 75 years of zooplankton data from Australia. *Ecology* **95**, 3229-3229.

46. Mongin, M. and **M. E. Baird** (2014) The interacting effects of photosynthesis, calcification and water circulation on carbon chemistry variability on a coral reef flat: a modelling study. *Ecol. Mod.* **284**, 19-34.
45. Gustafsson, M. S., **M. E. Baird** and P. J. Ralph (2014) Modeling photoinhibition driven bleaching in Scleractinian coral as a function of light, temperature, and heterotrophy. *Limnol Oceanogr.* **59**, 603-622.
44. Everett, J. D., **M. E. Baird**, M. Roughan, I. M. Suthers and M. A. Doblin (2014) Relative impact of seasonal and oceanographic drivers on surface chlorophyll a along a Western Boundary Current. *Prog. Oceanogr.* **120**, 340-351.
43. Macreadie, P. I., **M.E. Baird**, S.M. Trevathan-Tackett, A.W.D. Larkum, P.J. Ralph (2014) Quantifying and modelling the carbon sequestration capacity of seagrass meadows - a critical assessment. *Mar. Poll. Bull.* **83**, 430-439.
42. Robson, B. J., **M. E. Baird** and K. A. Wild-Allen. (2013). A physiological model for the marine cyanobacteria, *Trichodesmium*. In Piantadosi, J., Anderssen, R.S. and Boland J. (eds) MODSIM2013, 20th International Congress on Modelling and Simulation. Modelling and Simulation Society of Australia and New Zealand, December 2013, pp. 1652-1658. ISBN: 978-0-9872143-3-1. www.mssanz.org.au/modsim2013/L5/robson.pdf
41. Kidston, M., R. Matear and **M. E. Baird** (2013). Phytoplankton growth in the Australian sector of the Southern Ocean, examined by optimising ecosystem model parameters. *J. Mar. Sys.* **128**, 123-137.
40. **Baird, M. E.**, P. J. Ralph, K. Wild-Allen, F. Rizwi and A. D. L. Steven (2013). A dynamic model of the cellular carbon to chlorophyll ratio applied to a batch culture and a continental shelf ecosystem. *Limnol. Oceanogr.* **58**, 1215-1226.
39. Macdonald, H. S., **M. E. Baird**, M. Roughan and J. Wilkin (2013) A numerical model of the East Australian Current encircling and overwashing a warm-core eddy. *J. Geophys. Res. (Oceans)* **118**, 1-15.
38. Gustafsson, M. S., **M. E. Baird** and P. J. Ralph (2013) The interchangeability of autotrophic and heterotrophic nitrogen sources in Scleractinian coral symbiotic relationships: a numerical study. *Ecol. Model.* **250**, 183-194.
37. Everett, J. D., **Baird, M. E.**, Oke, P. R. and Suthers, I. M. (2012). An avenue of eddies: Quantifying the remotely-sensed physical and biological properties of mesoscale eddies in the Tasman Sea. *Geophys. Res. Letts.* **39**, L16608.
36. Seymour, J. R., M. A. Doblin, T. C. Jeffries, M. V. Brown, K. Newton, P. J. Ralph, **M. Baird**, J. G. Mitchell (2012) Contrasting microbial assemblages in adjacent water masses associated with the East Australian Current. *Environmental Microbiology Reports.* **4**, 548-555. DOI: 10.1111/j.1758-2229.2012.00362.x
35. Flynn, K. J., J. C. Blackford, **M. E. Baird**, J. A. Raven, D. R. Clark, J. Beardall, C. Brownlee, H. Fabian, and G. L. Wheeler (2012). Changes in pH at the exterior surface of plankton with ocean acidification. *Nature Climate Change* **2**, 510-513.

34. **Baird, M. E.** and K. R. Ridgway (2012). The southward transport of sub-mesoscale lenses of Bass Strait Water in the centre of anti-cyclonic mesoscale eddies. *Geophys. Res. Letts.* **39**, L02603.
33. Everett, J. D, **M. E Baird** and I. M. Suthers (2011) Three-dimensional structure of a swarm of the salp *Thalia democratica* within a cold-core eddy off southeast Australia. *J. Geophys. Res. (Oceans)* **116**, C12046.
32. Earp, A., C. E. Hanson, P. J. Ralph, V. E. Brando, S. Allen, **M. E. Baird**, L. Clementson, P. Daniel, A. G. Dekker, P. R.C.S. Fearn, J. S. Parslow, P. G. Strutton, P. A. Thompson, M. Underwood, S. Weeks and M. A. Doblin (2011) Review of fluorescent standards for calibration of in situ fluorometers: Recommendations applied in coastal and ocean observing programs. *Optics Express* (2011) **19**, 26768-26782.
31. Suthers, I. M., J.W. Young, **M.E. Baird**, M. Roughan, J.D. Everett, G.B. Brassington, M. Byrne, S.A. Condie, J.R. Hartog, C.S. Hassler, A.J. Hobday, N.J. Holbrook, H.A. Malcolm, P.R. Oke, P.A. Thompson and K. Ridgway (2011) The strengthening East Australian Current, its eddies and biological effects — an introduction and overview. *Deep Sea Res. II* **58**, 538-546.
30. **Baird, M. E.**, I. M. Suthers, D. A. Griffin, B. Hollings, C. Pattiaratchi, J. D. Everett, M. Roughan, K. Oubelkheir and M. Doblin (2011) Physical-biogeochemical dynamics of a surface flooded warm-core eddy off southeast Australia *Deep Sea Res. II* **58**, 592-605.
29. **Baird, M. E.**, J. D. Everett and I. M. Suthers (2011) Analysis of southeast Australian zooplankton observations of 1938-42 using synoptic oceanographic conditions. *Deep Sea Res. II* **58**, 699-711.
28. Roughan, M., H. S. Macdonald, **M. E. Baird** and T. Glasby (2011) Modelling seasonal and interannual variability in a western boundary current and its implications on coastal connectivity. *Deep Sea Res. II* **58**, 628-644.
27. Kidston, M., R. Matear and **M. E. Baird** (2011) Parameter optimisation of a marine ecosystem model at two contrasting stations in the sub-Antarctic zone. *Deep Sea Res. II* **58**, 2301-2315.
26. Henschke, N., J. D. Everett, **M. E. Baird**, M. D. Taylor, I. M. Suthers (2011) Distribution of life-history stages of the salp *Thalia democratica* in shelf waters during a spring bloom. *Mar. Ecol. Prog. Ser.* **430**, 49-62.
25. Mullaney, T. J., A. G. Miskiewicz, **M. E. Baird**, P. T. P. Burns and I. M. Suthers (2011). Entrainment of larval fish assemblages from the inner shelf into the East Australian Current and into the western Tasman Front. *Fish. Oceanogr.* **20**, 434-447.
24. **Baird, M. E.** and I. M. Suthers (2010) Increasing model structural complexity inhibits the growth of initial condition errors. *Ecol. Comp.* **7**, 478-486.
23. **Baird, M. E.** (2010) Limits to prediction in a size-resolved pelagic ecosystem model. *J. Plankton Res.* **32**, 1131-1146.
22. Thompson, P. A., **M. E. Baird**, T. Ingleton, and M. A. Doblin (2009) Long-term changes in temperate Australian coastal waters and implications for phytoplankton. *Mar. Ecol. Prog. Ser.* **394**, 1-19.

21. Rissik, D., H. S. Edward, B. Newell, **M. E. Baird** and I. M. Suthers (2009) Plankton dynamics due to rainfall, eutrophication, dilution, grazing and assimilation in an urbanized coastal lagoon. *Est. Coast. Shelf Sci.* **84**, 99-107.
20. Macdonald, H. S., **M. E. Baird** and J. H. Middleton (2009) The effect of wind on continental shelf carbon fluxes off southeast Australia: a numerical model. *J. Geophys. Res.* **114**, C05016.
19. **Baird, M. E.**, P. G. Timko, I. M. Suthers, J. H. Middleton, T. J. Mullaney and D. R. Cox (2008) Biological properties across the Tasman Front off southeast Australia. *Deep Sea Res I.* **55**, 1438-1455.
18. **Baird, M. E.**, P. G. Timko, L. Wu (2007) The effect of packaging of chlorophyll within phytoplankton and light scattering in a coupled physical-biological ocean model. *Marine and Freshwater Res.* **58**, 966-981.
17. **Baird, M. E.**, O. Leth and J. F. Middleton (2007) Biological response to circulation driven by mean summertime winds off central Chile: A numerical model study. *J. Geophys. Res. (Oceans)*, **112**, C07031.
16. Everett, J. D., **M. E. Baird** and I. M. Suthers (2007) Nutrient and plankton dynamics in an intermittently closed/open lagoon, Smiths Lake, south-eastern Australia: an ecological model. *Est. Coast. Shelf Sci.* **72**, 690-702.
15. **Baird, M. E.** and I. M. Suthers (2007) A size-resolved pelagic ecosystem model. *Ecol. Model.* **203**, 185-203.
14. Suthers, I.M, C.T. Taggart, D. Rissik and **M. E. Baird** (2006) Day and night ichthyoplankton assemblages and the zooplankton biomass size spectrum in a deep ocean island wake. *Mar. Ecol. Prog. Ser.* **322**, 225-238.
13. Moore, S. K., **M. E. Baird** and I. M. Suthers (2006) Relative effects of physical and biological processes on nutrient and phytoplankton dynamics in a shallow estuary after a storm event. *Estuaries and Coasts* **29**, 81-95.
12. **Baird, M. E.**, P. G. Timko, I. M. Suthers and J. H. Middleton (2006) Coupled physical-biological modelling study of the East Australian Current with idealised wind forcing. Part I: Biological model intercomparison. *J. Mar. Sys.* **59**, 249-270.
11. **Baird, M. E.**, P. G. Timko, I.M. Suthers and J. H. Middleton (2006) Coupled physical-biological modelling study of the East Australian Current with idealised wind forcing: Part II: Biological dynamical analysis. *J. Mar. Sys.* **59**, 271-291.
10. **Baird, M. E.**, P. R. Oke, I. M. Suthers and J. H. Middleton (2004) A plankton population model with bio-mechanical descriptions of biological processes in an idealized 2-D ocean basin. *J. Mar. Sys.* **50**, 199-222.
9. **Baird, M. E.**, M. Roughan, R. W. Brander, J. H. Middleton and G. J. Nippard (2004) Mass transfer limited nitrate uptake on a coral reef flat, Warraber Island, Torres Strait, Australia. *Coral Reefs* **23**, 386-396.
8. **Baird, M. E.** and J. H. Middleton (2004) On relating physical limits to the carbon:nitrogen ratio of unicellular algae and benthic plants. *J. Mar. Sys.* **49**, 169-175.

7. **Baird, M. E.** (2003) Numerical approximations of the mean absorption cross-section of a variety of randomly oriented microalgal shapes. *J Math. Biol.* **47**, 325-336.
6. **Baird, M. E.**, S. J. Walker, B. B. Wallace, I. T. Webster and J. S. Parslow (2003) The use of mechanistic descriptions of algal growth and zooplankton grazing in an estuarine eutrophication model. *Estuarine, Coastal and Shelf Science* **56**, 685-695.
5. **Baird, M. E.** (2003) Reply to 'In defence of the cell quota model of micro-algal growth' by M. R. Droop. *J. Plankton Res.* **25**, 109-110.
4. **Baird, M. E.**, S. M. Emsley and J. M. McGlade (2001) Modelling the interacting effects of nutrient uptake, light capture and temperature on phytoplankton growth. *J Plankton Res.* **23**, 829-840.
3. **Baird, M. E.**, S. M. Emsley and J. M. McGlade (2001) Using a phytoplankton growth model to predict the fractionation of stable carbon isotopes. *J Plankton Res.* **23**, 841-848.
2. **Baird, M. E.** and S. M. Emsley (1999) Towards a mechanistic model of plankton population dynamics. *J. Plankton Res.* **21**, 85-126.
1. **Baird, M. E.** and M. J. Atkinson (1997) Measurement and prediction of mass transfer to experimental coral reef communities. *Limnol. Oceanogr.* **42**, 1685-1693.

Book Chapters

- Baird, M. E., S. Dutkiewicz, A. Hickman, M. Mongin, M. Soja-Wozniak, J. Skerratt, K. Wild-Allen (2021). Modelling phytoplankton processes in multiple functional types. In: Clementson, L. R. Eriksen, A. Willis. *Advances in Phytoplankton Ecology: Applications of Emerging Technologies* ISBN: 9780128228616.
- IOCCG (2020). Synergy between Ocean Colour and Biogeochemical/Ecosystem Models. Dutkiewicz, S. (ed.), IOCCG Report Series, No. 19, International Ocean Colour Coordinating Group, Dartmouth, Canada. <http://dx.doi.org/10.25607/OBP-711>
- O'Brien K. R., M. P. Adams, A. J. P. Ferguson, J. Samper-Villarreal, P. S. Maxwell, **M. E. Baird** and C. Collier (2018). Chapter 10 Seagrass Resistance to Light Deprivation: Implications for Resilience. In *Seagrasses of Australia: Structure, Ecology and Conservation*. Eds. Larkum, A. W. D., Kendrick, G. A., Ralph, P. J.
- Rissik, D., **M. E. Baird**, T. Kobayashi, B. Sanderson, S. Wallace, M. Root, D. Large, L. T. H. Newham, A. J. Jakeman, R. A. Letcher, J. Ticehurst and W. Merritt (2009) Chapter 9: Models and Management. In *Plankton: A Guide to their Ecology and Monitoring for Water Quality*. Eds, Suthers, I. M. and D. Rissik. CSIRO Publishing.
- Aquarone, M. C., S. Adams, I. M. Suthers and **M. E. Baird** (2008) Chapter IX-18 East-Central Australian Shelf: LME #41. In: Sherman, K. and Hempel, G. (Editors) 2008. *The UNEP Large Marine Ecosystem Report: A perspective on changing conditions in LMEs of the world's Regional Seas*. UNEP Regional Seas Report and Studies No. 182. United Nations Environment Programme. Nairobi, Kenya.

Science and general media coverage of research findings

The discovery of discs of Bass Strait water at depth in East Australia Current eddies (published in Baird and Ridgway, 2012) was reported in the Sydney Morning Herald, the Age, the Mercury, Canberra Times and other regional Australian Newspapers, and environmental news websites such as the Australian Geographic. I conducted radio interviews on ABC Hobart, ABC Southeast, ABC National and the BBC World Service.

The quantification of the largest salp bloom ever was reported in the Sydney Morning Herald, the Age, and newspapers in the UK, Pakistan and India. I conducted interviews for ABC Newcastle and ABC NSW Rural. The finding was covered by *Frontiers*, a publication of The Ecological Society of America, and *EOS*, a weekly publication of the American Geophysical Union. *Frontiers* and *EOS* report significant new research to the ecological and geoscience research communities respectively.

A report in the Torres Strait News and a Torres Strait Radio 4MW interview in the lead up to a field trip on Warraber Island, Torres Strait made the local indigenous community aware of our research activities on their land.

Internet based projects

CSIRO simple estuarine response model - <http://www.per.marine.csiro.au/serm>

Technical reports

Cantin, N. E., Baird, M. E., Morris, L. A., Ceccarelli, D. M., Mocellin, V. J. L., Ferrari, R., Mongin, M. and Bay, L. K. (2021) Assessing the linkages between water quality and coral bleaching on the Great Barrier Reef. Report to the National Environmental Science Program. Reef and Rainforest Research Centre Limited, Cairns (158pp.)

IOCCG (2020). Synergy between Ocean Colour and Biogeochemical/Ecosystem Models. Dutkiewicz, S.(ed.), IOCCG Report Series, No. 19, International Ocean Colour Coordinating Group, Dartmouth, Canada. <http://dx.doi.org/10.25607/OBP-711>.

Anthony KRN, Condie S, Bozec Y-M, Harrison D, Gibbs M, **Baird M**, Mumby PJ, Mead D (2019) Reef Restoration and Adaptation Program: Modelling Methods and Findings. A report provided to the Australian Government by the Reef Restoration and Adaptation Program (112 pp).

Harrison DP, **Baird M**, Harrison L, Utembe S, Schofield R, Escobar Correa R, Mongin M, Rizwi F (2019) Reef Restoration and Adaptation Program: Environmental Modelling of Large Scale Solar Radiation Management. A report provided to the Australian Government by the Reef Restoration and Adaptation Program (83pp).

Baird M, Mongin M, Bouget E (2019) Reef Restoration and Adaptation Program: Ultra-Thin Surface Films. A report provided to the Australian Government by the Reef Restoration and Adaptation Program (23 pp).

Baird ME, Green R, Lowe R (2019) Reef Restoration and Adaptation Program: Cool Water Injection. A report provided to the Australian Government by the Reef Restoration and Adaptation Program (15 pp).

Brinkman, R., **Baird, M.**, Boswood, P., Fearn, P., Gruber, R., Holmes, M., Honchin, C., Johnson, R., Lewis, S., Lonborg, C., Mueller, J., Robillot, C., Schroeder, T., Steinberg, C., and Treleaven, J. 2019, Monitoring the marine physical and chemical environment within the Reef 2050 Integrated Monitoring and Reporting Program: Final Report of the Marine Physical and Chemical Environment Expert Group, Great Barrier Reef Marine Park Authority, Townsville.

Baird, M. E., Margvelashvili, N and Cantin, N (2019) Historical context and causes of water quality decline in the Whitsunday region. CSIRO Report to Department of Environment and Energy.

Robillot, C., Logan, M., **Baird, M.**, Waterhouse J., Martin, K. and Schaffelke, B. (2018) Testing and implementation of an improved water quality index for the 2016 and 2017 Great Barrier Reef Report Cards – Detailed technical report. Report to the National Environmental Science Program. Reef and Rainforest Research Centre Limited, Cairns (150pp.).

Brodie, J., **Baird, M.**, Waterhouse, J., Mongin, M., Skerratt, J., Robillot, C., Smith, R., Mann, R., Warne, M., 2017. Development of basin-specific ecologically relevant water quality targets for the Great Barrier Reef. TropWATER Report No. 17/38, James Cook University, Published by the State of Queensland, Brisbane, Australia. 68 pp.

Waterhouse, J., Brodie, J., Tracey, D., Smith, R., VanderGragt, M., Collier, C., Petus, C., **Baird, M.**, Kroon, F., Mann, R., Sutcliffe, T., Waters, D., Adame, F., 2017. 2017 Scientific Consensus Statement: A synthesis of the science of land-based water quality impacts on the Great Barrier Reef, Chapter 3: The risk from anthropogenic pollutants to Great Barrier Reef coastal and marine ecosystems. Published by the State of Queensland, 2017.

Babcock, R. C., **Baird, M. E.**, Pillans, R., Patterson, T., Clementson, L. A., Haywood, M. E., Rochester, W., Morello, E., Kelly, N., Oubelkheir, K., Fry, G., Dunbabin, M., Perkins, S., Forcey, K., Cooper, S., Donovan, A., Kenyon, R., Carlin, G., Limpus, C., 2015. Towards an integrated study of the Gladstone marine system 278 pp ISBN: 978-1-4863-0539-1. Tech. rep., CSIRO Oceans and Atmosphere Flagship, Brisbane.

Coastal Environmental Modelling Team (2015). CSIRO Environmental Modelling Suite: Scientific description of the optical, carbon chemistry and biogeochemical models. Online documentation. 103 pages.

Baird, M. E. (2005) Dynamical analysis of a size-resolved plankton model. Proceedings of the 2004 Mathematical Biology Project Workshop, School of Mathematics, University of NSW.

Baird, M. E. (2004) A numerical model of pigment diffusion in a degrading matrix. School of Mathematics, University of NSW

Baird, M. E. and I. M. Suthers (2003) The effect of cross-shelf topography on a pelagic ecosystem response to upwelling favourable winds. School of Mathematics, University of NSW.

Baird, M. E. and I. M. Suthers (2003) Progress report on a 3D coupled physical-biological pelagic ecosystem model of the East Australian Current. School of Mathematics, University of NSW.

Baird, M. E. (2001) Simple estuarine response model: Technical description of the ecological model. CSIRO Land and Water.

Undergraduate Teaching

GENS0501 - The Marine Environment - 4 hours of lectures (Estuarine Ecology) and 1 field trip, and course co-ordination. This subject often had 200 students (2002-2007)

MSCI 3001 - Physical Oceanography. 4 hours of lectures in dynamical oceanography

MSCI 2001 - Introductory Marine Science - 5 hours of lectures (Marine Chemistry) and 1 field trip (2002-2007)

MSCI 2051 - Coral Reefs: Ecology and Environment - 1 hour lecture (Coral biogeochemistry) on a field trip (2003)

BIOS 4511 - Professional Skills - 1.5 hours of lectures (Mathematical modelling of biological phenomena), 2002-2007.

BIOS 3081 - Ocean Biology and Fisheries - 2 hours of lectures (Aquatic ecological modelling), (2002-2007)

MSCI 3501 - Fundamentals of Climate Change - 2 hour lecture on ecosystem impacts of climate change (2007)

MSCI5005 - Topics in Marine Science – 4 hour lecture / practical, and course preparation on the IMOS observational program (2012).

Graduate Supervision

Ph.D. students:

Mehera Kidston (awarded 2010) Data assimilation in a marine ecosystem model of the Southern Ocean. (co-supervisor: Richard Matear, CSIRO)

Raffaele Bernardello (awarded 2010, visiting Ph.D. candidate from Universitat Politècnica de Catalunya). A 3D high resolution coupled hydrodynamic-biogeochemical model for the Western Mediterranean Sea. Interannual variability of primary and export production.

Jason Everett (awarded 2007) Biogeochemical dynamics of an intermittently open estuary: a field and modelling study (co-supervisor: Iain Suthers)

Elizabeth Heagney (awarded 2009) Pelagic fish in coastal waters: hydrographic habitats, fine scale population structure and implications for spatial management (primary supervisor: Iain Suthers)

Helen Macdonald (awarded 2013) Modelling study of the formation of mesoscale eddies in the western Tasman Sea (co-supervisor Moninya Roughan)

Malin Gustafsson (awarded 2013) Ecological model of coral host-symbiont interactions (co-supervisor Peter Ralph)

Ponlachart Chotikarn (2012 -) Carbon fluxes in seagrass meadows determined using eddy covariance methods (primary supervisor Peter Ralph).

Tom Mullaney (awarded 2012), Larval fish ecology off southeast Australia (primary supervisor: Iain Suthers)

Honours students:

Bojana Manojlovic (2012) Interpreting fluorescence and scattering observations in the Integrated Marine Observing System.

Helen Macdonald (2007) Carbon fluxes on the continental shelf off southeast Australia.

Lujia Wu (2006) Modelling spectrally-resolved light attenuation in a coupled physical-biological ocean model

Jason Everett (2002) A numerical model of autotrophic growth in seagrass communities.

Other University Service

Assessor of PhD thesis for Flinders University, Queensland University and Universitat Politècnica de Catalunya. BarcelonaTech (UPC).

Chairman of PhD committees (UTS: Hayden Beck and Cian Foster-Thorpe).

Promotions Committee, Faculty of Arts UNSW, 2007, 2009

Honours examiner UNSW 2002-2008 (2-3 students per year).

Gifted Education Research Resource and Information Centre (GERRIC, UNSW) - Scientia Challenge Program for Years 7-10. Workshop on Global Climate Change.

Gifted Education Research Resource and Information Centre (GERRIC) Careers Day UNSW - Careers in Marine Science presentation.

Seminar Organiser Climate and Environmental Dynamics Laboratory, UNSW 2006-07.

Grants

Antoine, D., **Baird, M. E.** and Behrenfeld (2021-2024) Why ocean deserts matter. Phytoplankton production in the oligotrophic ocean (ARC Discovery Project. DP210101959 \$387,000).

Kalmus, P. et al. (2018-2020) Identifying coral refugia from observationally weighted climate model ensembles. NASA Proposal Number 18-SLSCVC18-0049.

Robillot, C., **Baird M. E.** et al. (2017-2020). Embedding eReefs in Reef WQ Planning and Reporting. Department of Energy and Environment. (\$2,400,000).

Baird, M. E. and S. Condie (2017-18) Great Barrier Reef resilience mapping. Great Barrier Reef Foundation (\$386,773).

Collier, C. **Baird, M.E** (CSIRO lead) et al. (2017-2019) NESP Tropical Water Quality Hub Project 3.2.1 – Deriving ecologically relevant load targets to meet desired ecosystem condition for the Great Barrier Reef: a case study for seagrass meadows in the Burdekin region (\$1,311,000).

Baird, M. Schaffelke, B. (2017-2019). Scoping study to address poor water quality in the Whitsunday Region. Department of Energy and Environment. (\$498,000).

Schaffelke, B., **M. Baird** (CSIRO lead), C. Robillot (2017) NESP Tropical Water Quality Hub, Project 3.2.5 – Testing and implementation of the water quality metric for the 2017 and 2018 reef report cards. (\$633,000).

Line, B., N. Cantin, **M. Baird** (CSIRO lead) and M. Mongin (2017-2019). NESP Tropical Water Quality Hub, Project 3.3.1 – Quantifying the linkages between water quality and the thermal tolerance of GBR coral reefs (\$1,181,000).

Baird, M. E. and M. Mongin (2015-16). Ocean Acidification Buffering Workshop. Great Barrier Reef Foundation (\$60,000).

Suthers, I. M., A. J. Richardson, E. Pakhomov and **M.E. Baird (2015-2017)**. The missing link in our oceans: how zooplankton size spectra couple phytoplankton with fisheries (DP150102656) (\$349,000)

Baird, M. E., S. A. Condie and J. Andrewartha (2013-2014) An operational model of particle trajectories on the Victorian coast. Victoria EPA. (\$300,000).

Baird, M. E., M. Mongin and P. Gillibrand (2013-2014) Modelling the feasibility of small-scale biological and chemical buffering of ocean acidification on coral reefs. Great Barrier Reef Foundation. (\$300,000).

Ralph, P. J., **M. E. Baird,** A. D. L. Steven and J. S. Parslow and K. Wild-Allen (2010-2012) Enhanced bio-optical capability to improve the estimation of primary production within the CSIRO Environmental Modelling Suite. CSIRO Wealth from Oceans Flagship Collaborative Research Fund (\$250,000)

Suthers, I. M., **M. E. Baird** and J. D. Everett (2009) Salps, eddies and entrainment in the Stockton Bight. Returning to the eddy dynamics at the East Australian Current separation zone, to assess the effects of salps, eddy size and its source waters. National Facility Steering Committee for RV Southern Surveyor (13 days at sea).

Baird, M. E. and I. M. Suthers (2008-2009). Exploring hydrography and fluorescence in the EAC, its eddy field and in the Tasman Front. IMOS Infrastructure deployment.

Suthers, I. M. and **M. E. Baird** (2008) Biological oceanography of coastal cold-core eddies and of salps in the continental shelf waters off the Stockton Bight of eastern Australia. National Facility Steering Committee for RV Southern Surveyor (11 days at sea).

Suthers, I. M. and **M. E. Baird** (2008-2010). Quantifying the role of salps in marine food webs and organic carbon export. ARC Discovery Project (\$249, 784).

Baird, M. E., R. Matear and P. Oke (2007). Comparison of high resolution global and regional coupled physical-biological models. CSIRO Wealth from Oceans Flagship Collaboration Research Fund (\$158,000)

Baird, M. E. and M. Roughan (2007). Assessment of a size-resolved pelagic ecosystem model using observations from the Tasman Front and Lord Howe Rise. UNSW FRGP (\$10,014)

Baird, M. E. (2005-2009). Development of a coupled physical-biological model of size-structured biota in marine waters. ARC Discovery Project (\$465,000).

Suthers, I. M, **M. E. Baird**, R. L. Stephenson and C. T. Taggart (2005-2007). Prediction of fishery year-class-strengths from larval growth and zooplankton size structure. ARC Discovery Project (\$240,000).

Middleton, J. H., Suthers, I. M. and **M. E. Baird** (2006) A comparison of nutrient supply processes and biological productivity in upwelling and frontal regions of the Lord Howe Ridge. National Facility Steering Committee for RV Southern Surveyor (14 days at sea)

Suthers I. M. and **M.E. Baird** (2002-2004) Development of a mechanistic model of marine biological activity. ARC Discovery Project - (\$202,000)

Suthers I. M., **M.E. Baird** and G. I. Tuckerman (2003-2006). A biogeochemical study of a coastal lagoon - assessment of a mechanistic model. ARC Linkage Grant - (\$69,000).

Baird, M. E. and I. M. Suthers (2003-2004) Trophodynamics of the Great Australian Bight: a coupled physical-biological model. South Australian Research and Development Institute (SARDI) via Fisheries Research and Development Corporation (FRDC) (\$13,200)

Middleton, J. H. and **M. E. Baird** (2004) East Australia Current frontal processes at 30 S. UNSW FRGP (\$10,000)

Baird, M. E. (2004) Scientific Visit to USA. Australian Academy of Science (\$3,900)

Suthers, I. M., J. H Middleton and **M. E. Baird** (2004) High resolution dynamics of frontal systems and the zooplankton size spectrum. National Facility Steering Committee for RV Southern Surveyor (10 days at sea)

Suthers, I. M. and **M. E. Baird** (2003) Using estuarine circulation models and larval fish condition to identify key larval settlement habitats ("recruitment hotspots") UNSW FRGP (\$14,000)

Middleton, J.H. and **M. E. Baird** (2002) Circulation and nutrient uptake on a coral cay reef flat. URSP (\$12,500)

Conference Keynotes

National Academy Sciences (Webinar, August 2, 2018). Shading and Cooling Interventions. Webinar: Environmental Interventions to Promote Coral Reef Resilience.

Great Barrier Reef Restoration Symposium (Cairns, 2018). Is it feasible and worth altering temperature and light stress on the GBR?

Australia Marine Sciences Annual Conference (Melbourne, 2015) Integrating observational and modelling systems for the management of the Great Barrier Reef.

Conference Publications

Karen Wild-Allen, Mark Baird, Mathieu Mongin, Emlyn Jones, Jenny Skerratt, Monika Wozniak
Simulation of observed properties improves model accuracy and leads to wider uptake of model products for research and management. *Advances in Marine Ecosystem Modelling Research Symposium*. Plymouth 2017.

Emlyn M. Jones, **Mark E. Baird**, Mathieu Mongin, Jenny Skerratt, Nugzar Margvelashvili, Karen Wild-Allen, Barbara Robson, Farhan Rizwi, Thomas Schroeder, Andy Steven. Use of remote-sensing reflectance to constrain a data assimilating marine biogeochemical model of the Great Barrier Reef. *American Society of Limnology and Oceanography Annual Meeting*. Honolulu. 2017.

CSIRO Coastal Environmental Modelling Team* (John Andrewartha, **Mark Baird**, Mike Herzfeld, Emlyn Jones, Mathieu Mongin, Nugzar Margvelashvili, Farhan Rizwi, Barbara Robson, Thomas Schroeder, Jenny Skerratt, Karen Wild-Allen) Integrating observational and modelling systems for the management of the Great Barrier Reef. *Ocean Sciences*. New Orleans 2016.

Baird, M. E., B. J. Robson, J. Skerratt, F. Rizwi, A. D. L. Steven, P. A. Thompson. The transferability of the CSIRO estuarine model around Australia's diverse estuarine and coastal systems. *Coastal Estuarine Research Foundation Annual Conference*. San Diego. 2013.

Jones, E. and **M. E. Baird**. Estimating blue carbon stocks and fluxes: combining observations and models. *Estuarine Continental Shelf Association Annual Conference*. Shanghai 2013.

Baird, M. E., P. J. Ralph, K. Wild-Allen, F. Rizwi and A. D. L. Steven. Numerical model predictions of carbon-to-chlorophyll ratios in Storm Bay, southeast Tasmania. *Marine Sciences Association Annual Conference 2012*, Hobart. Oral presentation.

Baird, M. E., P. R. Oke, I. M. Suthers, D. A. Griffin, J. D. Everett, M. Roughan and M. Doblin. Dynamics of a surface gravity current in a cold-core eddy in the western Tasman Sea. *Australian Marine Sciences Association Annual Conference 2011*, Freemantle. Oral presentation.

Baird, M. E. I. M. Suthers, D. A. Griffin, B. Hollings, C. Pattiaratchi, J. D. Everett, M. Roughan, K. Oubelkheir and M. Doblin. Vertical distribution of phytoplankton in warm core eddies of the western Tasman Sea. *Australian Marine Sciences Association Annual Conference 2010*, Wollongong. Oral presentation.

Baird, M. E. A Slocum Glider deployment in a Warm Core Eddy off NSW. *Australian Marine Sciences Association Annual Conference*, Adelaide 2009. Oral presentation.

Baird, M. E. Decadal simulations of a size-resolved pelagic ecosystem model. *American Society for Limnology and Oceanography*, Nice 2009. Oral presentation.

Baird, M. E. The effect of model complexity on predictability in a size-resolved pelagic ecosystem model. *Dynamic Green Ocean Workshop* Nice 2008 (Invited presentation).

- Baird, M. E.** A size-resolved pelagic ecosystem model. *Advances in Marine Ecosystem Modelling Research*. Plymouth UK 2008. Oral presentation.
- Baird, M. E.** et al. Physical and biological properties of the Tasman Front off southeast Australia. *Australian Marine Sciences Association Annual Conference*, Melbourne 2007. Oral presentation.
- Baird, M. E.**, P. G. Timko, I. M. Suthers and J. H. Middleton. Time Evolution of a Pelagic Ecosystem along the Tasman Front off Southeast Australia in a Coupled Physical-biological Model. *American Geophysical Union Annual Conference (Ocean Sciences)*, Honolulu, 2006. Poster presentation.
- Baird, M. E.**, P. G. Timko, I. M. Suthers and J. H. Middleton. Biological response to wind forcing in the East Australian Current *Baird Australian Marine Science Association Annual Conference*, Hobart, 2004. Oral presentation.
- Everett, J. D. and **Baird, M. E.** A Numerical Model of Autotrophic Growth in a Seagrass Dominated ICOLL. *Estuarine Research Foundation Annual Conference*, Ballina, 2004. Oral presentation.
- Baird, M. E.** and I. M. Suthers. Effects of small-scale turbulence at the community and ecosystem level: 1.formation of a deep chlorophyll maximum 2.nutrient uptake on coral reefs. *American Geophysical Union Annual Conference (Ocean Sciences)*, Honolulu, 2004. Oral presentation.
- Baird, M. E.** and J. H. Middleton. The effect of autotroph geometry on C:N ratios. *American Geophysical Union Annual Conference (Ocean Sciences)*, Honolulu, 2002. Oral presentation.
- Baird, M. E.** A generic model of aquatic autotroph growth. *American Society for Limnology and Oceanography*, Albuquerque, 2001. Oral presentation.
- Baird, M. E.**, Why waves build coral reefs. *Australian Marine Science Association Annual Conference*, Sydney, 2000. Oral presentation.
- Baird, M. E.**, Modelling the growth and stable isotope fractionation of phytoplankton cells. *Australian Marine Science Association Annual Conference*, Sydney, 2000. Oral presentation.
- Baird, M. E.**, and S. M. Emsley. A mechanistic model of plankton population dynamics *British Ecological Society Annual Conference*, Coventry, 1999. Poster Presentation.

Professional activities

- Member of the Queensland Water Modelling Network (QWMN) Advisory Board (2021-).
- Panel member of the IOCCG (International Ocean Color Co-ordinating Group) working group on Ocean Colour Applications for Biogeochemical, Ecosystem and Climate Modelling.
- Node Leader, South East Australia Integrated Marine Observing System (2014-2017).
- President of the Tasmanian branch of the Australian Marine Science Association (2012-2017)

Member of the Scientific and Organising Committees for the Australian Marine Science Association national conference in Hobart, July 2012.

Co-ordinator of the Australian National Facility for Ocean Gliders (ANFOG) data users group.

Member of the IMOS Bio-optical working group and Zooplankton Task Team.

Co-author of the 2010 NSW-IMOS Node Plan and 2015 SEA-IMOS Node Plan.

Member of the Sydney Metropolitan Catchment Management Authority (2007-2009) - Science Advisory Panel.

Expert Reviewer of the Working Group II IPCC 4th Assessment Report.

Reviewed proposals for: National Environmental Research Council (UK), National Science Foundation (USA), Australian Research Council, National Facility Steering Committee for RV Southern Surveyor, Univ. of Washington (SeaGrant), Pinellas County Environmental Fund (USA).

Guest editor for special issue “The East Australian Current – Its Eddies and Impacts” Deep Sea Res. II. 58, Issue 5.

Panel member of the IOCCG (International Ocean Color Co-ordinating Group) working group on Ocean Colour Applications for Biogeochemical, Ecosystem and Climate Modelling.

Reviewed manuscripts for numerous international journals including: Limnol. Oceanogr., J. Geophys. Res. (Oceans), J. Climate, Deep Sea Res., Ecol. Model., Ecol. Complexity, Est., Coast. and Shelf Sci., Coral Reefs, Lakes and Reservoirs, Hydrobiologica, Prog. Oceanogr., J. Plank. Res., Mar. Ecol. Prog. Ser., Global Biogeochem. Cyc., Prog. Oceanogr. J. Mar. Sys., J. Remote sensing. Geophys. Model. Dev.

Recognised by Limnol. Oceanogr. for being one of the top 15 reviewers of 2013 (out of 800).

Contracted to provide independent assessment of coupled physical-biological modeling studies for the Queensland, South Australian and Waikato (NZ) governments.

Memberships

Australian Coral Reef Society (ACRS)

Australian Marine Sciences Association (AMSA)

American Geophysical Union (AGU)

American Society of Limnology and Oceanography (ASLO)

Australian Meteorological and Oceanographic Society (AMOS)