

# *Jon Edward Brodie*

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**Partner & Senior Scientist**  
C<sub>2</sub>O Consulting



**Chief Research Scientist and Program Leader**  
**Catchment to Reef Research Group**  
**Centre for Tropical Water and Aquatic Ecosystem Research (TropWATER), James Cook University**

## **EMPLOYMENT HISTORY**

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2014 – Partner and Senior Scientist, C<sub>2</sub>O Consulting

2001 – present Chief Research Scientist  
Centre for Tropical Water & Aquatic Ecosystem Research (TropWATER), James Cook University, Townsville

1998 – 2001  
Director, Water Quality & Coastal Development Group, Great Barrier Reef Marine Park Authority, Townsville

1995 – 1999  
Senior Environmental Impact Assessment and Monitoring expert for Hassall & Associates/Australian Marine Science & Technology Ltd consortium for the Protection of Marine Ecosystems of the Red Sea Coast of Yemen Project of the United Nations Development Programme, Hodeida, Yemen

1993 & 1995 – 1998  
Director, Research & Monitoring, Great Barrier Reef Marine Park Authority, Townsville, Australia

1990 – 1994  
Assistant Director, Research & Monitoring, Great Barrier Reef Marine Park Authority, Townsville

1988 – 1990  
Research Fellow (Senior Chemist), Australian Centre for Tropical Freshwater Research, James Cook University

1988  
Manager, Rockhampton Laboratory of Analytical Reference Laboratories Pty Ltd, Rockhampton

1987  
Director, Institute of Natural Resources, University of the South Pacific, Fiji

1981 – 1986  
Senior Research Fellow at the Institute of Natural Resources, University of the South Pacific, Fiji

1981: Analytical Chemist, Ovens Research Station, Myrtleford, Victorian Department of Agriculture, Australia  
1978 – 1980: Lecturer at the University of the South Pacific, Suva, Fiji  
1977: Lecturer at Queensland University of Technology, Brisbane, Australia  
1976 – 1977: Research position at James Cook University of North Queensland, Townsville, Australia  
1971 – 1974: Technical Teacher at Newcastle Technical College, N.S.W., Australia  
1969 – 1970: Analytical Chemist, Conzinc Riotinto of Australia, Metallurgical research section, NSW

## QUALIFICATIONS

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**1976-1977      Master of Science (Research) – Environmental Chemistry**

James Cook University of North Queensland, Townsville, Australia

**1971              Technical Teacher Training Certificate**

Sydney Teachers College, NSW, Australia

**1964-1968      Bachelor of Science (Hons) – Inorganic Chemistry with third-year major in mathematics**

University of Sydney, NSW, Australia

## GRANTS AND CONSULTANCIES (selection)

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Jon Brodie has secured > AU\$7 million in research and consultancy project funding over the last 12 years.

**2011 – 2014      Pesticide dynamics in the Great Barrier Reef catchment and lagoon: management practices in the sugarcane, bananas, grazing and horticultural industries**

Principal researcher on Australian Government Reef Rescue R&D program

**2010 – 2012      Comparative effectiveness of community drainage schemes and EVTAs in trapping PSII herbicides, nutrients and sediments from sugarcane farms**

Principal researcher on Queensland Department of Environment and Resource Management project

**2010 – 2011      Pesticide review in Australian waters: concentrations, toxicity, effects and management**

Project leader on WWF (Australia) project

**2009 – 2010      Assessment of relative risk of impacts of broad-scale agriculture on the Great Barrier Reef and priorities for investment under the Reef Protection Package**

Principal consultant (with Jane Waterhouse) on Queensland Government project

**2006 – 2010      Connectivity and risk: tracing materials from the upper catchment to the GBR**

Project leader and Principal researcher on Marine and Tropical Science Research Facility project

**2004 – 2008      Capacity building for implementation of the ASEAN Marine Water Quality Criteria**

Principal consultant on ASEAN Australia Development Cooperation Program

## 2003 – 2004 Assessing best management practices in palm oil plantation development to protect off farm aquatic and marine ecosystems in PNG

Principal consultant on TNC (The Nature Conservancy), New Britain Palm Oil Ltd project

### PROFESSIONAL COMMITTEES (recent selection)

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- Reef Plan Coordinating Action Group to Implement the Paddock to Reef Integrated Monitoring Plan
- Scientific Advisory Panel for the Reef Partnership
- Scientific Advisory Panel for the Burnett Baffle WQIP
- Science Task Team for the Mackay Whitsunday WQIP
- Reference Group for the Burdekin WQIP
- Steering Group for the Black Ross WQIP
- Led scientists writing the Consensus Statement on Water Quality in the Great Barrier Reef in 2008 and 2013
- Led the team preparing the MTSRF Water Quality Synthesis Report

### RECENT PUBLICATIONS (selection since 2012)

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#### Books, book chapters and technical reports

Davis, A.M., Lewis S.E., O'Brien, D.S., Bainbridge Z.T., Bentley C., Mueller, J.F. and **Brodie, J.E.** 2014. Water resource development and high value coastal wetlands on the lower Burdekin floodplain, Australia. In: 'Estuaries of Australia in 2050 and beyond', Estuaries of the World. Wolanski, Eric (Ed.), 223-245. Springer, Dordrecht.

Waterhouse, J., **Brodie, J.**, Wolanski, E., Petus, C., Higham, W., Armstrong, T. 2013. Hazard assessment of water quality threats to Torres Strait marine waters and ecosystems. Report to the National Environmental Research Program. Reef and rainforest Research Centre Limited, Cairns (75 pp).

Berry, K.L.E., O'Brien, D., Burns, K.A., **Brodie, J.** 2013. Unrecognised Pollutant Risks to the Great Barrier Reef. Centre for Tropical Water & Aquatic Ecosystem Research (TropWATER) Report No. 13/23, James Cook University, Townsville (36 pp).  
[http://research.jcu.edu.au/research/tropwater/publication/copy\\_of\\_1323UnrecognisedPollutantRiskstotheGreatBarrierReef.pdf](http://research.jcu.edu.au/research/tropwater/publication/copy_of_1323UnrecognisedPollutantRiskstotheGreatBarrierReef.pdf)

**Brodie, J.**, Waterhouse, J., Schaffelke, B., Johnson, J., Kroon, F., Thorburn, P., Rolfe, J., Lewis, S., Warne, M., Fabricius, K., McKenzie, L., Devlin, M. 2013. *Reef Water Quality Scientific Consensus Statement 2013*, Department of the Premier and Cabinet, Queensland Government, Brisbane.  
<http://www.reefplan.qld.gov.au/about/assets/scientific-consensus-statement-2013.pdf>

Schaffelke, B., Anthony, K., Blake, J., **Brodie, J.**, Collier, C., Devlin, M., Fabricius, K., Martin, K., McKenzie, L., Negri, A., Ronan, M., Thompson, A. and Warne, M. 2013. "Marine and coastal ecosystem impacts" in *Synthesis of evidence to support the Reef Water Quality Scientific Consensus Statement 2013*, Department of the Premier and Cabinet, Queensland Government, Brisbane. <http://www.reefplan.qld.gov.au/about/scientific-consensus-statement/assets/scsu-chapter-1-marine-impacts.pdf>

**Brodie, J.**, Waterhouse, J., Schaffelke, B., Furnas, M., Maynard, J., Collier, C., Lewis, S., Warne, M., Fabricius, K., Devlin, M., McKenzie, L., Yorkston, H., Randall, L., Bennett, J. 2013. "Relative risks to the Great Barrier Reef from degraded water quality" in *Synthesis of evidence to support the Reef Water Quality Scientific Consensus*

Statement 2013, Department of the Premier and Cabinet, Queensland Government, Brisbane.  
<http://www.reefplan.qld.gov.au/about/scientific-consensus-statement/assets/scsu-chapter-3-relative-risks.pdf>

Wilkinson, C. and **Brodie, J.** 2011. Effective catchment management and coral reef conservation: best practice case studies. Global Coral Reef Monitoring Network and Reef and Rainforest Research Centre.  
<http://www.crisponline.net/Portals/0/New%20reports/ENG%202011%20Catchment%20management%20Guide%20for%20coastal%20resource%20mngmt.pdf>

Devlin, M.J., Schroeder, T., McKinna, L., **Brodie, J.E.**, Brando, V. & Dekker, A. 2012. Monitoring and mapping of flood plumes in the Great Barrier Reef based on in situ and remote sensing observations. In: Environmental Remote Sensing and Systems Analysis (ed: Chang, N.), 147-165. CRC Press. ISBN: 1439877432.

## Journal Articles

Fabricius, K., Logan, M., Weeks, S., **Brodie, J.** 2014. The effects of river run-off on water clarity across the central Great Barrier Reef. *Marine Pollution Bulletin* 84, 191 – 200  
<http://dx.doi.org/10.1016/j.marpolbul.2014.05.012>

Davis, A.M., Lewis, S.E., **Brodie, J.E.**, Benson, A. 2014. The potential benefits of herbicide regulation: A cautionary note for the Great Barrier Reef catchment area. *Science of the Total Environment* 490, 81 - 92.

**Brodie, J.** 2014. Dredging the Great Barrier Reef: Use and misuse of science. *Estuarine, Coastal and Shelf Science* 142, 1 - 3. doi.org/10.1016/j.ecss.2014.01.010

Bartley, R., Bainbridge, Z.T., Lewis, S.E., Kroon, F.J., Wilkinson, S.N., **Brodie J.E.**, Silburn, D.M. 2014. Relating sediment impacts on coral reefs to watershed sources, processes and management: A review. *Science of the Total Environment* 468-469, 1138-1153.

O'Brien, D., Davis, A., Nash, M., DiBella, L., Turner, R., Reghenzani, J., **Brodie, J.** 2013. Water quality within the Herbert River catchment associated with specific land use. *Proceedings of the Australian Society of Sugar Cane Technologists* 35.

Karim, F. Palmer, A., **Brodie, J.** 2013. Hydrodynamic modelling of floodplain flow residence time in a wet tropical catchment, north eastern Australia. *Proceedings of MODSIM 2013*, Adelaide, Australia, December, 2013.

Devlin, M., da Silva, E., Petus, C., Zeh, D., Wenger, A., Tracey, D., Alvarez-Romero, J., **Brodie, J.** 2013. Combining in-situ water quality and remotely sensed data across spatial and temporal scales to measure variability in wet season chlorophyll a: Great Barrier Reef lagoon (Qld, Australia). *Ecological Processes* 2: 31.

Oliver, D.P., Anderson, J.S., Davis, A., Lewis, S., **Brodie, J.** Kookana, R. 2014. Banded applications are highly effective in minimizing herbicide migration from furrow-irrigated sugar cane. *Science of the Total Environment* 466–467, 841–848.

Waterhouse, J., **Brodie, J.**, Maynard, J. 2013. Assessing the relative risk of land based pollutants to the Great Barrier Reef. *Proceedings of MODSIM 2013*, Adelaide, Australia, December, 2013.

Grech, A., Bos, M., **Brodie, J.**, Coles, R., Dale, A., Gilbert, R., Hamann, M., Marsh, H., Neil, K., Pressey, B., Rasheed, M., Sheaves, M., Smith, A. 2013. Guiding principles for the improved governance of port and shipping impacts in the Great Barrier Reef. *Marine Pollution Bulletin* 75, 8 - 20. doi.org/10.1016/j.marpolbul.2013.07.013

- Dale, A., Vella, K., Pressey, R.L., **Brodie, J.**, Yorkston, H., Potts, R. 2013. A method for risk analysis across governance systems: a Great Barrier Reef case study. *Environmental Research Letters* 8. doi:10.1088/1748-9326/1/015037
- Alvarez-Romero, J.G., Devlin, M., Teixeira da Silva, E., Petus, C., Ban, N.C., Pressey, R.L., Kool, J., Roberts, J.J., Cerdeira-Estrada, S., Wenger, A.S., **Brodie, J.** 2013. A novel approach to model exposure of coastal-marine ecosystems to riverine flood plumes based on remote sensing techniques. *Journal of Environmental Management* 119, 194 - 207.
- Lewis, S.E., Bainbridge, Z.T., Sherman, B.S., Kuhnert, P., Henderson, B., Cooper, M., **Brodie, J.E.** 2013. Calculating sediment trapping efficiencies for reservoirs in tropical settings: A case study from the Burdekin Falls Dam, NE Australia. *Water Resources Research* 49, 1 – 13. Doi: 10.1002/wrcr.20117, 2013.
- Tsatsaros, J.H., **Brodie, J.E.**, Bohnet, I.C., Valentine, P. 2013. Water quality degradation of coastal waterways in the Wet Tropics, Australia. *Water, Air and Soil Pollution* 224, 1443.
- King, J., Alexander, F., **Brodie, J.E.** 2013. Regulation and management of pesticides in Australia: The Great Barrier Reef as a case study. *Agriculture Ecosystems and Environment* 180, 54 - 67.
- Butler, J.R., Wong, G.Y., Metcalfe, D.J., Honzák, M., Pert, P.L., Rao, N., van Grieken, M.E., Lawson, T., Bruce, C., Kroon, F.J. & **Brodie, J.E.** 2013. Applying an ecosystem services framework to identify catchment to reef trade-offs in water quality regulation in the Great Barrier Reef, Australia. *Agriculture Ecosystems and Environment* 180, 176 - 191. doi:10.1016/j.agee.2011.08.017.
- Davis, A.M., Thorburn, P.J., Lewis, S.E., Bainbridge, Z.T., Attard, S.J., Milla, R. & **Brodie, J.E.** 2013. Herbicide run-off dynamics of furrow irrigated sugarcane farms and associated drainage systems on the Burdekin River Floodplain, north-eastern Australia. *Agriculture, Ecosystems and the Environment* 180, 123 - 135. doi:10.1016/j.agee.2011.06.019.
- Brodie, J.E.**, Zoe Bainbridge, Stephen Lewis, Michelle Devlin, Jane Waterhouse, Aaron Davis, Frederieke Kroon, Britta Schaffelke and Eric Wolanski. 2012. Terrestrial pollutant runoff to the Great Barrier Reef: Issues, priorities and management response. *Marine Pollution Bulletin* 65, 81 – 100. doi:10.1016/j.marpolbul.2011.12.012.
- Brodie, J.** Wolanski, E. Lewis S. Bainbridge Z. 2012. Residence times of major land-sourced contaminants in the Great Barrier Reef lagoon *Marine Pollution Bulletin* 65, 267 – 279. doi:10.1016/j.marpolbul.2011.12.011.
- Brodie, J.**, Waterhouse, J. 2012. A critical assessment of environmental management of the 'not so Great' Barrier Reef. *Estuarine, Coastal and Shelf Science* 104-105, 1-22. doi:10.1016/j.ecss.2012.03.012.
- Kennedy, K., Michelle Devlin; Christie Bentley; Kristie Lee-Chue; Chris Paxman; Steve Carter; Stephen E Lewis; **Jon Brodie**; Ellia Guy; Suzanne Vardy; Katherine Martin; Alison Jones; Robert Packett; Jochen F Mueller. 2012. The influence of a season of extreme wet weather events on exposure of the Great Barrier Reef World Heritage Area to pesticides. *Marine Pollution Bulletin* 64, 1495–1507.
- Lewis, Stephen E., Schaffelke, Britta, Shaw, Melanie, Bainbridge, Zoë T., Rohde, Ken W., Kennedy, Karen, Davis, Aaron M., Masters, Bronwyn L., Devlin, Michelle J., Mueller, Jochen F., and **Brodie, Jon E.** 2012. Assessing the additive risks of PSII herbicide exposure to the Great Barrier Reef. *Marine Pollution Bulletin*, 65, 280-291.

- Davis, Aaron M., Lewis, Stephen E., Bainbridge, Zoë T., Glendenning, Lionel, Turner, Ryan D.R., and **Brodie, Jon E.** 2012. Dynamics of herbicide transport and partitioning under event flow conditions in the lower Burdekin region, Australia. *Marine Pollution Bulletin*, 65, 182-193.
- Waterhouse, J., **Brodie, J.**, Lewis, S., and Mitchell, A. 2012. Quantifying the sources of pollutants in the Great Barrier Reef catchments and the relative risk to reef ecosystems. *Marine Pollution Bulletin*, 65, 394-406.
- Kroon, Frederieke J., Kuhnert, Petra M., Henderson, Brent L., Wilkinson, Scott N., Kinsey-Henderson, Anne, Abbot, Brett, **Brodie, Jon E.**, and Turner, Ryan D.R. 2012. River loads of suspended solids, nitrogen, phosphorus and herbicides delivered to the Great Barrier Reef lagoon. *Marine Pollution Bulletin*, 65, 167-181.
- Lewis, S.E., **Brodie, J.E.**, McCulloch, M.T., Mallella, J., Jupiter, S.D., Williams, H. Stuart, Lough, J.M., and Matson, E.G. 2012. An assessment of an environmental gradient using coral geochemical records, Whitsunday Islands, Great Barrier Reef, Australia. *Marine Pollution Bulletin*, 65, 306-319.
- Bainbridge, Z.T., Wolanski, E., Alvarez-Romero, J.G., Lewis, S.E., Brodie, J.E. 2012. Fine sediment and nutrient dynamics related to particle size and floc formation in a Burdekin River flood plume, Australia. *Marine Pollution Bulletin*.65, 236 – 248. doi: 10.1016/j.marpolbul.2012.01.043.
- Webster, A.J., Bartley, R., **Brodie, J.E.** and Thorburn, P.J. 2012. Reducing nitrogen fertiliser application rate reduces the nitrogen surplus and nitrogen losses in surface water from sugarcane production systems. *Marine Pollution Bulletin* 128 – 135. doi:10.1016/j.marpolbul.2012.02.023.
- Shaw, C. M., Mueller, J. F., **Brodie, J.** 2012. Phytotoxicity induced in isolated zooxanthellae by chemicals extracted from Great Barrier Reef flood waters. *Marine Pollution Bulletin* 65, 355 – 362. doi:10.1016/j.marpolbul.2012.01.037.
- Schroeder, T., Devlin, M., Brando, V.E., Dekker, A.G., **Brodie, J.**, Clementson, L.A., McKinna, L. 2012. Inter-annual variability of wet season freshwater plume extent in the Great Barrier Reef lagoon based on satellite coastal ocean colour observations. *Marine Pollution Bulletin* 65, 210 – 223.
- Devlin, M J., McKinna, L.C., Alvarez-Romero, J.G., Petus, C., Abott, B., Harkness, P., **Brodie, J.** 2012. Exposure to riverine plumes in the Great Barrier Reef. Risk assessment by mapping plume extent and composition using remote sensing. *Marine Pollution Bulletin* 224 – 235. doi.org/10.1016/j.marpolbul.2012.03.001.
- Kuhnert P.M., Henderson, B.L., Lewis, S.E., Bainbridge, Z.T., Wilkinson, S.N., **Brodie, J.E.** 2012. Quantifying total suspended sediment export from the Burdekin River catchment using the loads regression estimator tool. *Water Resources Research* 48, W04533, doi:10.1029/2011WR011080.
- Devlin, M., **Brodie, J.**, Wenger, A., da Silva, E., Alvarez- Romero, J.G., Waterhouse, J. McKenzie, L. 2012. Extreme weather conditions in the Great Barrier Reef: Drivers of change? Proceedings of the 12th International Coral Reef Symposium, Cairns, Australia, 9-13 July 2012.
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