IAN McLEOD

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School of Marine and Tropical Biology
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AIMS@JUC, APA and GBRMPA Science for Management Award
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Effects of ocean warming on the larval development of coral reef fishes

Originally from New Zealand, Ian completed his BSc and MSc (1st Class) through the University of Auckland. Ian has worked in every continent (18 countries and counting). His previous roles include: ranger on a small conservation island in NZ, filmmaker in Africa, personal trainer in London, head chef on a super yacht based in the med, environmental consultant, contract diver, website manager, pollution response officer, research officer in Antarctica, and English teacher in a small village on the foothills of the Himalayas. Ian has a passion for communicating science and has published 6 papers in international scientific journals and a number of technical reports. He has produced videos promoting science research and built and maintains a website for a major aquatic research institution (www.jcu.edu.au/TropWATER).

Ian's research has led to important progress in our understanding of the impacts of ocean warming on larval coral reef fishes. Tropics-wide sampling showed that equatorial populations might be especially vulnerable to warming. Ian's leading-edge experiments quantified the energetic cost of digestion of larval reef fishes for the first time and showed that larval fish have some of the highest routine metabolic rates ever measured. Since routine metabolic rate increases with increasing temperature, individuals must consume more food to maintain the same level of growth at higher temperatures. However, the planktonic communities that are food for many coral reef fish are predicted to become more variable or decline with climate change, even if food is plentiful larvae may not be able to process food at the necessary speed to maintain current-day growth rates. Elevated temperatures and reduced food supplies are therefore likely to lead to slower larval growth and protracted development in the pelagic environment with effects on larval survival and dispersal and population connectivity and persistence.

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Publications

Wenger AS, McCormick MI, Endo GGK, McLeod IM, Kroon F, Jones GP (2013) Suspended sediment prolongs larval development in a coral reef fish. *Journal of Experimental Biology*. In press.

McLeod IM, Rummer JL, Clark TD, Jones GP, McCormick MI, Wenger AS, Munday PL. (2013) Climate change and the performance of larval coral reef fishes: the interaction between temperature and food availability. Conservation Physiology 1. In press.

McLeod IM, Parsons DM, Morrison MA, Van Dijken, SG, Taylor RB. (2013) Mussel reefs on soft sediments: a severely reduced but important habitat for macroinvertebrates and fishes in New Zealand. *New Zealand Journal of Marine and Freshwater Research*. In Press.

Brooker RM, Munday PL, McLeod IM, Jones GP. (2013). Habitat preferenes of a corallivorous reef fish: predation risk versus prey availability. *Coral Reefs*. 32 613-622.

Wenger AS, McCormick MI., McLeod IM, Jones GP. (2013). Suspended sediment alters predator-prey interactions between two coral reef fishes. *Coral Reefs*. 32 369-374.

McLeod IM, Parsons DM, Morrison MA, Le Port A, Taylor RB. (2012). Factors affecting the recovery of soft-sediment mussel reefs in the Firth of Thames, New Zealand. *Marine and Freshwater Research*. 63 78-83.

Articles in Review

McLeod IM and Clark TD. Climate change and the digestive physiology of the smallest vertebrates. *Oecologia*.

Rummer JL. McLeod IM, Killen SS, Clark TD. Fish larvae: A critical and energetically demanding life history stage. *Functional Ecology*.

McLeod IM, McCormick MI, Munday PL, Clark, T.D., Takahashi M, Brooker RM, Wenger AS, Jones GP (In review). Latitudinal variation in larval development of coral reef fishes: implications for a warming ocean. *Animal Ecology*.

Articles in Preparation

McLeod IM, Jones GP, McCormick MI (In Prep). Inter-annual variation in the larval development of a coral reef damselfish at Lizard Island, Australia. *Coral Reefs*.

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Conferences and invited presentations

McLeod IM (2013) Effects of ocean warming on larval coral reef fishes. *Invited presentation at AIMS*, Townsville, Australia.

McLeod IM (2013) Effects of ocean warming on larval coral reef fishes. *PhD Completion Seminar*, JCU, Townsville, Australia.

McLeod IM, Clark TD, Jones GP (2013) Variable food supply and elevated temperatures influence performance of a larval coral reef fish. *AIMS@JCU Student Presentation Day*, Townsville, Australia.

McLeod IM, Rummer JL, Clark TD, Jones GP, McCormick MI, Wenger AS, Munday PL. (2013) Variable food supply and elevated temperatures influence performance of a larval coral reef fish. *Indo-Pacific Fish Conference*, Okinawa, Japan.

McLeod IM, Rummer JL, Clark TD, Jones GP, McCormick MI, Wenger AS, Munday PL. (2012) Variable food supply and elevated temperatures influence performance of a larval coral reef fish. *Australian and New Zealand Society for Comparative Physiology & Biochemistry*, Auckland, New Zealand, December 2012.

McLeod IM, Jones GP, McCormick MI, Munday PL, Takahashi M. (2012). Latitudinal variation in early life history traits of coral reef fishes. *International Coral Reef Symposium*, Cairns, Australia, July 2012.

McLeod IM, Taylor RB, Parsons DP, Morrison MA. (2009). Green-lipped mussels, *Perna canaliculus*, in soft-sediment systems in northeastern New Zealand. *Marine Science Society of New Zealand conference*, Auckland, New Zealand, September 2009.

McLeod, IM, Taylor, RB, Parsons DP, Morrison MA. (2008). The environmental and ecological services of *Perna canaliculus* in soft-sediment systems in northeastern New Zealand. *Marine Science Society of New Zealand conference*, Christchurch, New Zealand, July 2008.

Reports and other publications

McLeod IM (2009). Green-lipped mussels, *Perna canaliculus*, in soft-sediment systems in northeastern New Zealand. A technical report for Auckland Regional Council.

Morrison MA, Lowe ML, Parsons DM, Usmar NR, & McLeod IM (2009). A review of land-based effects on coastal fisheries and supporting biodiversity in New Zealand. *New Zealand Aquatic Environment Report 47*, Ministry of Fisheries.

McLeod IM (2009). Green-lipped mussels, Perna canaliculus, in soft-sediment systems in northeastern New Zealand. MSc thesis.

McLeod IM (2002). A marine reserve for Tiritiri Matangi Island? A survey of public opinion. *Graduate Diploma Dissertation*.