



Jarrod Walker, PhD

Coastal and Marine Specialist

Jarrod is a marine ecologist with 14 years' experience working in marine ecosystems. He has a broad range of expertise and research interests and has produced and contributed to the understanding of subtidal rocky reef ecosystems, impacts of anthropogenic stressors on nearshore marine environments, effects of marine reserves, temporal and spatial variability in nearshore marine water quality, and the design of innovative methods for mapping and monitoring complex marine seascapes and water bodies.

Jarrod is experienced in coastal management and coastal engineering. He obtained a BSc and MSc (1st Class) from the School of Biology, University of Auckland, and a PhD at the School of Marine Sciences.

Jarrod was employed as a marine ecologist at NIWA (National Institute of Water and Atmospheric Research) and led research on rocky reef ecology in projects around New Zealand.

Most recently, Jarrod was employed by Auckland Council as a Senior Marine Scientist and then as a Principal Coastal Specialist.

As a Principal Coastal Specialist, Jarrod provided technical expertise in engineering and planning to address coastal erosion, inundation and sea-level rise issues. Jarrod provided research direction and advice to Auckland Council's multiple local boards, community groups and mana whenua groups to help develop community engagement in the management of Auckland's coastal and marine environment.

As a Senior Marine Scientist, Jarrod spearheaded the development of "Safeswim", which is Auckland Council's flagship programme for beach water quality, led State of the Environment long-term monitoring programmes, and developed innovative techniques using multi-spectral satellite imagery for mapping intertidal and subtidal rocky reefs and associated algae-dominated communities in the Hauraki Gulf.

Jarrod is of Ngā Puhī descent, and works widely with mana whenua and iwi in the Auckland region, providing marine science advice and guidance, and developing coastal water quality indicators that integrate science and mātauranga. As an honorary lecturer and supervisor of MSc and PhD students at the University of Auckland, he actively promotes science as a career for young Māori and Pasifika students.

Jarrod has influenced coastal and water policy directions at a local government level and continues to maintain collaborative programmes

Education

PhD Marine Science, University of Auckland, 2005

Masters (1st Honors), University of Auckland, 1999

BSc. University of Auckland. 1996

Experience Highlights

10 years' experience working with Auckland Council and collaborating with other councils to provide robust information in advance of mandatory policy and planning requirements

Providing expert advice and research into marine ecological systems and assessing anthropogenic stressors

Providing science guidance and advice to mana whenua in Auckland

Spearheading the development of Auckland Council's flagship Safeswim programme, and the development of source-to-sink models for the Manukau and Upper Waitemata harbours

Large-scale mapping of rocky reef habitats in the Hauraki Gulf using satellite imagery

with NIWA, Cawthron Institute, University of Auckland, University of Otago and CSIRO (Australia).

Specialty areas

Marine water quality
Remote sensing
Marine ecology
Ecological effects of sediments
Tracking bacteria sources
Mana whenua engagement
Science communication
Strategic science direction
Coastal hazards and coastal process assessments
Coastal infrastructure and assets assessments

Awards

Best talk at the New Zealand Coastal Society Conference: Walker, J., Neale, M., Tuckey, B., Schollum, A. "Forecasting the risk – Beach water quality modelling of Auckland's Beaches"

Selected Recent examples of Experience

Coastal Management Framework for the Auckland Region. Contributing author to a systems-based approach to coastal management of the Auckland region. The framework outlines principles and a tiered approach to managing the coastline and associated coastal assets from natural events such as coastal erosion and inundation, climate change and sea-level rise. The framework has allowed Auckland Council to understand the magnitude of coastal hazards, the level of investment required to maintain and plan for climate change and sea-level rise whilst maintaining desired levels of service of various coastal assets (e.g. coastal parks and walkways).

Coastal asset inspection manual. To assist with the programming of maintenance/renewals or decommissioning of coastal assets, robust and consistent data are required to underpin funding and coastal management decisions. Jarrod was the lead author on the production of an instruction manual on how to undertake visual inspections and condition grading of Auckland Council's coastal assets. The manual included guidance on how to use customised templates for various structures (e.g. timber wharves to concrete boat ramps) along with guidance on how to assess coastal processes which influence the condition and continued viability of a structure.

Coastal erosion operational responses. The Auckland region was subjected to a series of coastal storms in early (January–February) 2018, which coincided with elevated (king) tide levels. These events resulted in erosion, inundation and damage to the beaches and a range of coastal structures. The response to this damage ranged from reinstatement of eroded beach scarps, sand transfers and reconstruction of erosion control structures (timber and rock seawalls). Jarrod led these types of responses for several high-profile and politically charged sites in the Howick area (east Auckland). Jarrod led communications across various stakeholders (from the Mayor of Auckland, local boards and residents), project management (engineering detailed design, physical works), input into resource consent preparation (Jarrod wrote the ecological assessments for each site affected by the January storms), and site supervision of physical works and construction of rock revetments.

Safeswim programme/ beach water quality model. Jarrod was the originator of Auckland Council's Safeswim modelling programme. This model was generated as the monitoring programme based on a single (weekly) water sample severely underestimated the real risk of bacterial contamination at Auckland beaches. Initial phases of this project involved creating a low-budget, proof-of-concept hydrodynamic model (working with DHI) with validation of a bacteria load model for the various discharge points and coupled hydrodynamic model for the study area (St Marys Bay). This proof of concept was used – at the time – to provide water quality information for the international Ironman event. Following the proof of concept, a larger model was developed to extend across the southern shores of the Waitemata Harbour to augment the current routine monitoring programme. The Safeswim model is now expanding around the Auckland region and has won multiple awards.

Marine water quality monitoring. Jarrod led Auckland Council's regional marine water quality programme. This involved managing the programme to ensure sampling was undertaken consistently and to a high standard, data QA, and reporting state and trends in regular technical reports and presentations to various stakeholders and forums. This role also involved evolving the monitoring programme to identify efficiencies in methodologies (e.g. sampling and trends analysis) and operational expenditure. Jarrod is currently considered to be one of the leading marine water quality experts in New Zealand and has contributed to processes such as the NEMS (National Environmental Monitoring Standards) for coastal water quality and understanding how a limits-based approach for freshwater (NPSFM) will influence estuarine and coastal water quality.

Mana whenua/kaitiaki relationships and guidance. Jarrod has developed and maintained a trusted and close relationship with many iwi groups and kaitiaki forums in Auckland via his science communication, advice on issues impacting the health of the marine environment, and potential mitigation options that link to iwi processes. Jarrod has also led programmes to bridge the divide between pure science and Te Ao Māori and mātauranga in developing coastal water quality indicators. This water quality indicator programme attempted to place mātauranga alongside science-based water quality indicators to empower kaitiaki to monitor their coastal waters in a manner that is accepted by both Councils and iwi.

Selected Recent Peer-Reviewed Publications

Walker J., van Duivenboden, R. and Neale, M. (2015). A tiered approach for the identification and management of faecal pollution sources on an urban beach in Auckland. *New Zealand Journal of Marine and Freshwater Research*, 49: 333–345.

Taylor, D.I., Wood, S.A., McNabb, P., Ogilvie, S., Cornelisen, C., Walker, J., Khor, S. and Cary, C. (in prep). Facilitation effects of invasive and farmed bivalves on native populations of *Pleurobranchaea maculata*: population explosions, diet analysis and dog deaths.

Walker J. and Oldman, J. (in prep). Fate and distribution of fine sediments in the Upper Waitemata Harbour.

Wood, S.A., Taylor, D.I., McNabb, P., Walker, J., Adamson, J. and Stephen, C. (2012). Tetrodotoxin concentrations in *Pleurobranchaea maculata*: temporal, spatial and individual variability from New Zealand populations. *Marine Drugs*, 10(1): 163–176.

Ross, P.M., Montgomery, J., Thrush, S., Walker, J.W. and Parsons, D. (2007). Habitat complexity and predation risk determine juvenile snapper (*Pagrus auratus*) and goatfish (*Upeneichthys lineatus*) behaviour and distribution. *Marine and Freshwater Research*, 58: 1144–1151

Walker, J.W. (2007). Effects of fine sediments on settlement and survival of the sea urchin *Evechinus chloroticus* in northeastern New Zealand. *Marine Ecology Progress Series*, 331: 109–118.

Shears, N.T., Babcock, R.C., Duffy, C.A.J. and Walker, J.W. (2004). Validation of qualitative habitat descriptors commonly used to classify subtidal reef assemblages in north-eastern New Zealand. *New Zealand Journal of Marine and Freshwater Research*, 38: 743–752.

Babcock, R. C. Kelley, S. Shears, N. T. Walker, J. W. and Willis, T. J. (1999). Changes in community structure in temperate marine reserves. *Marine Ecology Progress Series*, 189: 125–134.

Selected Recent Reports

- Foley, M. M., Walker, J., Vaughan, M., Stanley, C. L. and Hussain, E. (2018). *Marine Water Quality State and Trends in the Auckland Region from 2007 to 2016*. Auckland Council Technical Report TR2018/015.
- Carpenter N., Walker J., Klinac P. and Sinclair S. (2017) *Coastal Management Framework for the Auckland Region*. Auckland Council Technical report.
- Walker, J. and Kalbus, E (2017). *St Mary's Bay Auckland: Assessment of Recent Water Quality Monitoring Initiatives*. Auckland Council Working Report WR2017/004.
- Williams, P., Vaughan, M and Walker, J (2017). *Marine Water Quality Annual Report: 2015*. Auckland Council Technical Report 2017/015.
- Walker, J. and Vaughan, M. (2014). *Marine Water Quality Annual Report: 2013*. Auckland Council Technical Report 2014/030.
- Walker, J. and Vaughan, M. (2013). *Marine Water Quality Annual Report: 2010*. Auckland Council Technical Report TR2013/030.
- Walker, J. and Vaughan, M. (2013). *Marine Water Quality Annual Report: 2011*. Auckland Council Technical Report TR2013/031.
- Walker, J. and Vaughan, M. (2013). *Marine Water Quality Annual Report: 2012*. Auckland Council Technical Report TR2013/051.
- Carbines M., Walker J., Cameron M. and Vaughan, M. (2013). *Identification of Degraded Marine Receiving Environments*. Auckland Council Working Report WR2013/009.
- Walker, J.W. and Khin, J. (2012). *Waterfront Auckland: Microbial Water Quality Investigation*. Auckland Council Internal Report IR2012/002.
- Walker, J.W., (2012). *Marine Water Quality Annual Report: 2009*. Auckland Council Technical Report TR 2012/008.
- Walker, J.W. (2009) *Marine Water Quality Annual Report: 2007*. Auckland Regional Council Technical Report 2009/099.
- Walker, J.W. (2009) *Marine Water Quality Annual Report: 2008*. Auckland Regional Council Technical Report 2009/100.
- Walker, J.W. and Babcock, R.C. (2001) *The Long Bay Monitoring Program Sampling Report July 2000 / June 2001*. Auckland Uniservices Ltd, Report for Auckland Regional Council, 75 pp.

Recent Conference Presentations

- 2018 New Zealand Coastal Society Conference, oral presentation: Quilter, P., Walker, J. "Coastal monitoring and advancements in the use of drones".
- 2017 New Zealand Coastal Society Conference, oral presentation: Walker, J., Neale, M., Tuckey, B., Schollum, A. "Forecasting the risk – Beach water quality modelling of Auckland's Beaches".
- 2015 New Zealand Marine Science Society Conference, oral presentation: Walker, J., Taylor, B. "Mapping subtidal reefs from outer space".
- 2013 New Zealand Marine Science Society Conference, oral presentation: Walker, J., "Swimming in Auckland's harbour waters: can we predict the risk?".