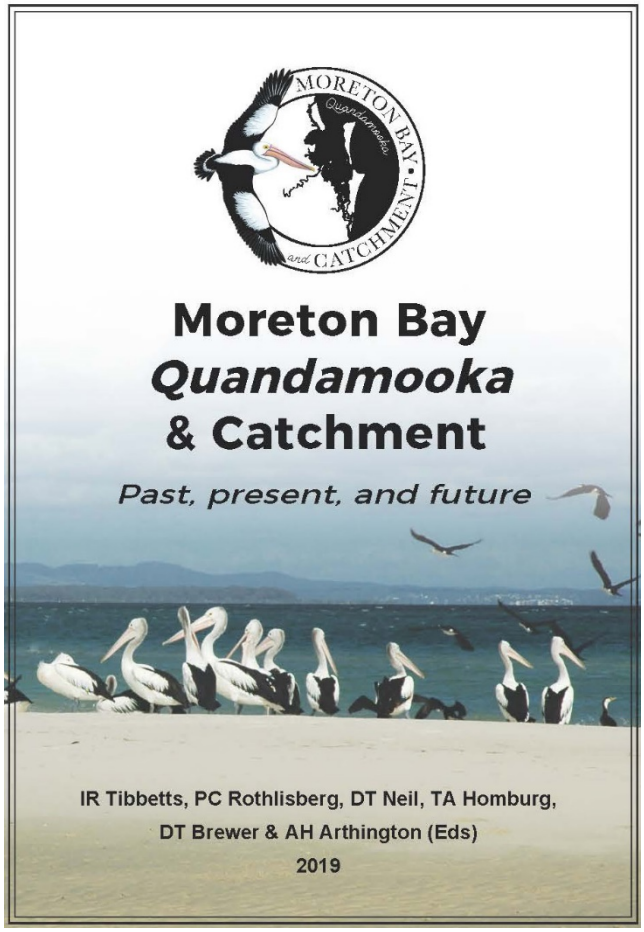

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Education in *Quandamooka* – A long and evolving tradition

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Abstract

The Traditional Custodians of this land, have a long history of education, and have been passing on their deep knowledge and love of this significant site for hundreds of generations. Quandamooka (Moreton Bay) is a rich and diverse resource for education. The complex interrelated system provides challenges that ignite the spark within students to conduct scientific and historical enquiry. It provides unique opportunities for critical thinking, which should be the goal of all modern education. Seven of the main education modes in Quandamooka are: (i) environmental education centres, (ii) schools (Marine Teachers Association of Queensland), (iii) universities and further education facilities (e.g. University of Queensland and Griffith University), (iv) local governments, (v) state government departments, (vi) not-for-profit organisations/industry, and (vii) ecotourism operators.

Three of the main ways to access Moreton Bay are the mainland foreshore, islands and by vessels travelling into the open Bay. Each of these access points has strengths and weaknesses for environmental education. The Department of Education and Training has invested in vessels that enable classes of students to become immersed in deeper learning in Moreton Bay. Research and infrastructure around Moreton Bay has been developed to capitalise on the unique learnings possible within the region. Future developments in environmental education may include improved access to the Bay and an emphasis on the health of catchments, waterways and wetlands supported by increasingly sophisticated technologies.

Keywords: environmental education, Moreton Bay, experiential learning, marine studies

The value of Moreton Bay to education

Here we describe the valuable contribution Moreton Bay makes to environmental education and also provides a brief educational history and an overview of the various education modes. These modes include both formal (e.g. schools and universities) and informal methods (e.g. recreation and ecotourism) designed for captive and non-captive audiences. While much of the discussion within this paper concerns educational opportunities for schools and children, we have also captured some of the opportunities and informal lessons available to the entire community. This information was gathered

from multiple sources, including specific research into Moreton Bay, conversations with various educational stakeholders and information publicly available from relevant organisations. The paper goes on to discuss education access points within Moreton Bay, and then summarises and describes opportunities for future directions.

Goals of environmental education

Environmental education offers a holistic way of learning that is typically designed to enhance knowledge, attitudes, skills, values and motivation towards improving the environment and ultimately achieving an ecologically sustainable future (1). The goals for environmental education, as agreed in the 1977 Tbilisi Declaration and later modified to capture sustainability at UNESCO meetings in the Asia–Pacific region, are to:

- foster awareness and concern about social, political and economic interdependence;
- provide all people with opportunities to acquire the knowledge, values, attitudes, commitment and skills needed to protect and improve the environment; and
- develop and reinforce patterns of environmentally sensitive behaviour among individuals, groups and societies (1).

These goals link to the modern education goals outlined in the Melbourne Declaration on Education Goals for Young Australians 2008 (2). Environmental education encourages an active role in learning, the creative and productive use of technology, multidisciplinary real-world problem solving, collaboration and communication, and develops the abilities of learners to evaluate evidence and make sense of the world around them.

The exploration and study of Moreton Bay can assist in creating successful students who are aware of, and connected with, their environment. Using Moreton Bay as a context exposes students to complex scientific, historical and geographical problems that require multifaceted solutions. In learning about these aspects of Moreton Bay, students are required to both analyse problems and develop and evaluate possible solutions. In the various Moreton Bay education programs, students use a variety of traditional tools such as sediment grabs, plankton nets, beach seines and Secchi discs, as well as modern technology such as underwater video cameras, digital microscopes, iPad-based identification applications and satellite and drone-derived images. Students are required to use ICT skills to both analyse data and share their results with the wider community. Fieldwork framed with explicit objectives allows students to develop team and social skills, which have been shown to be an indicator of academic achievement (3), as well as the ability to plan and conduct investigations.

Moreton Bay's complexity and the impact of humans require students to be creative and resourceful in their deductions as students interpret the changing world. Information is drawn heavily from the disciplines of biology and physical geography, but also climate science, physics, chemistry and history. The extent of human impacts in the western Bay provides opportunities for students to address questions of sustainability, which is a cross-discipline priority within the Australian Curriculum. The Australian Curriculum recognises

sustainability education as future-oriented, focusing on protecting environments and creating a more ecologically and socially just world through informed action (4).

Places such as Moreton Bay provide rich opportunities for environmental, place-based education. Ballantyne and Packer (5) conducted research examining the productive pedagogies used for learning in natural environments. Because of the rich opportunities available through place-based education, they proposed that experienced-based learning should be included as a fifth pedagogy to encompass those specific learning strategies (5). These strategies include hands-on exploration, using all five senses to experience and appreciate the natural environment, undertaking authentic tasks and investigating local real-life issues (5).

Educators working in Moreton Bay use these strategies to ensure students get the most from their experiences. It is a connection to place, authentic hands-on learning and the active participation of young people in decision-making that encourages students to care for the Bay. These approaches link back to the outcomes of the Melbourne Declaration and highlight the value of the learning that occurs when students operate outside the classroom in Moreton Bay.

Brief history and current state of education in Moreton Bay

Education in Moreton Bay began at least 20,000 years ago with the Quandamooka Peoples who still call the area home. They had an informal system of education that was both experiential and rigorous. Knowledge of their natural environment was passed to the next generation from their Elders partly to help sustain their livelihoods by taking advantage of cycles of food abundance, including fern roots, fruits, fish and shellfish. Environmental education in the Quandamooka culture also included the many sources and uses of various natural materials such as stone, wood, bone and shell and how to process them into effective tools.

Early Europeans visitors saw Moreton Bay as a gateway to the hinterland and a place to gather resources such as oysters for limestone and dugong oil for medicine. It was not until the 1880s that Reginald Heber Roe recognised it as an important education resource. He and his wife regularly took groups of students from the Brisbane Grammar School to a ‘Kamp’ on South Stradbroke Island near Southport to experience both communal life and explore southern Bay environments (6).

The Moreton Bay Research Station had its origin in 1949 as the Dunwich Marine Station (DMS), a joint venture between the Department of Harbours and Marine, CSIRO Fisheries division and The University of Queensland (UQ) (7). UQ’s formal education programs began in 1961 at the DMS. Following a complete rebuild using funds from UQ and gifts from Consolidated Rutile, the Port of Brisbane Corporation and the Royal Queensland Yacht Squadron, it was reopened in 2000 as the Moreton Bay Research Station and Study Centre. The station now serves as an important education facility for high schools, regional and international universities and community groups. Given its location, it offers a wide range of educational opportunities in fields from anthropology to zoology (7). An estimated

50,000 students passed through the station between 2000 and 2017 (pers. comm. Kevin Townsend).

State government departments have a long history of involvement in education activities within Moreton Bay. Their initial focus was community compliance with various regulations, but this has extended to more broadly educate the public about critical habitats and endangered species. Departments have undergone numerous name changes with changing governments and ministerial portfolios, but the departments that are currently most heavily engaged in education activities in Moreton Bay are the:

- Department of National Parks, Sport and Racing who manage the heritage parks of St Helena Island and Fort Lytton as well as Moreton Bay Marine Park and island parks such as Moreton Island, Peel Island and Bribie Island national parks (8);
- Department of Agriculture and Fisheries which includes the Fisheries and Forestry service area (9); and
- Department of Education and Training, responsible for the environmental education centres around Queensland (10).

In the 1980s, Education Queensland set up a state-wide network of environmental education centres (10). Three of those centres — Moreton Bay Environmental Education Centre, Nudgee Beach Environmental Education Centre and Jacobs Well Environmental Education Centre — have Moreton Bay as a primary focus (10).

The Queensland Museum, which opened in 1862, has had a long history of creating exhibitions that communicate information to visitors about the amazing animals and plants that reside in Moreton Bay. They have published very successful guides, such as *The Wild Guide to Moreton Bay*, that have enabled thousands of enthusiasts to identify creatures they find as they explore the Bay (11).

Local governments have also taken on the role of educators in Moreton Bay. Moreton Bay Regional Council runs Osprey House, first opened in 1996, as well as the Kumbartcho Centre and the Caboolture Region Environmental Education Centre, with a focus on educating the public on the value of the wetlands around Hays Inlet and the Pine River estuary (12). Redland City Council established the IndigiScapes Centre in 2000, with the aim of improving the environmental knowledge of its residents and increasing care for the local environment (13).

Ecotourism is a relatively new phenomenon in Moreton Bay, but has grown quickly in the past two decades. Operators such as Tangalooma Resort, SeaWorld, SEA LIFE Sunshine Coast (formerly UnderwaterWorld Mooloolaba) and whale-watching groups as well as numerous smaller operators offering boutique experiences are engaging with tens of thousands of individuals annually.

Modes of education within Moreton Bay

Modes of education delivered in Moreton Bay are varied and diverse. Below we describe many of the organisations, facilities and departments involved in education specific to Moreton Bay.

Environmental education centres

One of the most valuable modes of education within Moreton Bay is the continued use and development of environmental education centres (EECs), funded by the Queensland Department of Education and Training. With diverse settings in environments such as forests, estuarine and freshwater systems, EECs are able to provide specialised environmental learning for the education of students from Prep to Year 12 (10). The centres work within the Australian Curriculum for students up to Year 10 and senior student programs follow the Queensland Curriculum and Assessment Authority senior syllabi in subjects such as Senior Biology, Geography and Marine Science (10). Moreton Bay EEC, Nudgee Beach EEC and Jacobs Well EEC are the centres specifically located in the Moreton Bay area (10).

The main ideology powering the approach for teaching used by these EEC's is that of connecting people to place, inspiring them to care for animals and habitats, and developing an appreciation for ecosystem function and sustainability (10). The centres aim to foster this connection through student immersion in the environments of Moreton Bay and development of students' critical thinking skills in order to create a deeper understanding of the processes operating within the Bay (10). To achieve this, the centres have increasingly embraced data collection by students and the general public through citizen science as an educational model. This has the benefit of actively engaging students as well as providing useful data for environmental managers (14). According to their annual report, the three centres work with around 18,000 students each year which, with the present staffing, is operating at capacity (14–16).

These centres have land-based classrooms and other facilities but what makes them unique is their ability to directly access the Bay. Facilities that allow this access include Moreton Bay EEC's two aquatic vessels — *Inspiration*, a 12-m catamaran able to support 60 passengers or have 40 students actively working onboard, and *Janjari*, a 5.8-m rigid inflatable that can transport up to 11 passengers through the inshore areas of Moreton (14). Nudgee Beach EEC has canoes and an aluminium powerboat that is able to support 15 students (15). Jacobs Well EEC has *Educat*, a 12-m aluminium catamaran capable of supporting 40 students as well as canoes and two smaller outboard vessels (16).

Schools

Many schools, both primary and secondary, access education in Moreton Bay either independently or in partnership with commercial or not-for-profit providers. The vast majority access the western foreshore of Moreton Bay for studies of rocky shores, mud flats, seagrass and mangroves as these are the easiest places to access, typically just requiring a bus to transport students. Subjects in the Australian Curriculum that can

leverage learning from interaction with Moreton Bay are Science, Geography, History, Biology and Marine Science in the senior Queensland syllabus.

Craig Reid, from the Marine Teachers Association of Queensland (MTAQ), estimated that around 20 schools regularly do fieldwork in Moreton Bay (17). From his perspective, MTAQ values students being able to do authentic scientific field work in the large number of accessible ecosystems within Moreton Bay, but it was often difficult to access the large datasets that students need to complete useful analysis (17). MTAQ is a not-for-profit organisation that supports marine education, coordinates activities and lobbies governments, industry and interested individuals (18). With over 400 members, MTAQ aims to foster curiosity, imagination, knowledge and enthusiasm for 'real world' science and vocational maritime studies for primary, middle and secondary school students (18).

Universities and further education

The University of Queensland, owner of the Moreton Bay Research Station, and Griffith University (Griffith) are the two major institutions that regularly conduct marine science education within Moreton Bay. By speaking to the relevant parties and contributors we found that all valued time spent in the field with students and agreed that the wide variety of accessible habitats and biodiversity in close proximity to a major population made Moreton Bay an exceptional educational resource (19-21). All of those we consulted would like to increase the time students spend out in the field but noted that the costs involved were quite high (19-21).

Griffith University

Griffith offers a Bachelor of Marine Science and a marine biology major in their Bachelor of Science course (22). Through their marine sciences course, students have access to the diverse wetlands and coastal biodiversity of Moreton Bay and other natural and artificial waterways (22). The course focuses on practical experience and ensuring marine industries prosper sustainably (22). Annually they take around 60 to 80 students out into Moreton Bay for fieldwork, which is generally land-based and includes studies of the mangroves, seagrass beds (South and North Stradbroke islands) and dune ecology studies out on the Southport Spit (19).

The University of Queensland

At UQ, a number of schools facilitate education that is directly involved in Moreton Bay. These include the School of Earth and Environmental Science, School of Biological Sciences, School of Agriculture and Forestry, and School of Veterinary Science, with an estimated 300 students and 30 academic staff involved each year (20). The Centre for Marine Science is based at the St Lucia campus of UQ (23). The Faculty of Science offers a major in marine science and an extended major in marine biology. Courses cover a range of disciplines from physical and molecular science through to nature conservation and global change science (23). It is a world-class environment for postgraduate and postdoctoral research in marine science currently including over 200 PhD candidates, 50 postdoctoral research scientists from around the world and 6 ARC Professorial Fellows (24).

Moreton Bay Research Station

UQ owns and operates the Moreton Bay Research Station (MBRS) which is used to advance science and to provide engaging learning opportunities for young scientists (24). MBRS is on North Stradbroke Island and has direct access to the waters of Moreton Bay and surrounding environments (24). MBRS hosts approximately 3000 high-school students and a similar number of undergraduate students each year (21). Year 11 and 12 student school groups and leaders of undergraduate student groups may either choose to administer their own curriculum or take advantage of the programs provided by MBRS (24). Higher level undergraduate and postgraduate groups also use MBRS facilities as an integral part of their degree programs (24). The station attracts local as well as international scientists and student groups, with excellent facilities including a range of accommodation from VIP to dorm, modern research laboratories, boating and diving facilities, a sub-branch of the UQ Library and AV-equipped teaching and lecture spaces (24).

Local government

Moreton Bay Regional Council and Redland City Council each have EECs that serve to educate citizens to care for the environment, including Moreton Bay and its catchments.

Redlands (IndigiScapes)

Redland City Council runs the IndigiScapes Centre with a particular focus on involving children and developing a sense of wonder and interest in the natural environment (13). The centre has a variety of environmental education programs, such as organic recycling and bush-tucker walks, which cater to a range of ages and learning abilities from early childhood and school groups to adult education (13). These programs target curriculum outcomes for primary and secondary schools and can be done by an excursion to the Centre or an activity at the school (13). IndigiScapes also provides free environmental education talks to local Redland's community groups either at the centre or at local meeting points (13).

Moreton Bay Regional Council

The Moreton Bay Regional Council ensures that school groups have access to pertinent education about the Moreton Bay Region. Environmental education is facilitated by lessons through the Council's EECs, with resources such as lesson plans, maps and photographs to aid in teaching about local history (12). The EECs are Osprey House on the Pine River, the Kumbartcho Centre, and the Caboolture Region EEC. The education goal of these centres is to motivate the community to value the natural environment, particularly through 'connecting to nature' and nature play (25). A mix of staff and volunteers deliver education programs that link to the Australian Curriculum (Prep to Year 7) while also highlighting the important ecosystems close to each centre (25).

State government departments

Many Queensland government departments have responsibilities that impact Moreton Bay, its ecological integrity and educational value. These include the Departments of Environment and Science; Education; and Agriculture and Fisheries. These departments,

to varying degrees, serve to protect and preserve natural environments, make them accessible to the public and provide education about the importance of these places in our community (8, 9, 26, 27). Many of these departments provide resources and programs for schools and the wider community detailing facts about Moreton Bay environment, wildlife and the measures required to secure its ongoing importance as a natural resource for South East Queensland (SEQ) (8, 9, 26, 27).

Moreton Bay Marine Park

The Moreton Bay Marine Park, managed by the Department of National Parks, Sport and Racing, covers 3400 km^2 and is the only place in the world where significant populations of dugong (*Dugong dugon*) and sea turtles can still be found close to a major metropolitan centre (28). The goals of the Moreton Bay Marine Park are to increase environmental awareness, preserve the flora and fauna in the park for the enjoyment of the public, and to promote public access and use of the park (28). Most of the educational activities carried out by the marine park primarily involve disseminating information to users of the Bay so that they may readily comply with the regulations governing access to the park (29).

Not-for-profit organisations/industry

Provided here is a sample of the many industry and not-for-profit groups involved in education in the Moreton Bay area. Citizen science plays an ever-increasing role within these groups but will be discussed in the Citizen Science chapter in this volume.

Healthy Land and Water

Healthy Land and Water is an independent organisation that came about when experienced natural resource management groups Healthy Waterways and SEQ Catchments merged in June 2016 (30). Healthy Land and Water is dedicated to improving and protecting SEQ's environment and aims to inspire people with tools and action that will protect the natural environment and support the economy for future generations (30). The organisation provides assessments, advice, training, workshops and support services and responds to urgent community needs and natural disasters (30). Healthy Land and Water works with community, industry and governments at all levels to align policy and education planning (30). While striving to improve natural resources management, Healthy Land and Water recognises the difficulties in competing for people's attention. South East Queensland communities are highly fragmented and, apart from the Traditional Custodians, not as closely connected to the land as are more rural communities (31).

Australian Marine Environment Protection Association

The Australian Marine Environment Protection Association (AUSMEPA) is a not-for-profit organisation run mainly by volunteers with the main goal of promoting marine environmental education and awareness through school education programs and seafarer education (32). The school Marine Education Programs available through AUSMEPA are designed around core curriculum units for foundation years to Year 6 (32). Students learn about the marine environment and those who use it, both commercial and recreational, with the aim of becoming responsible users of marine resources and protectors of the marine environment for future generations (33). There is also a Junior Ranger program that gives

children learning opportunities about respecting country and how Indigenous peoples care for country (33). Further, AUSMEPA aspires to instil in those it reaches an increased marine environmental consciousness and awareness. Indeed, AUSMEPA places a copy of an internationally recognised DVD 'Welcome to Australia: Protecting the Marine Environment' on every ship when it first arrives in Australia (33).

Port of Brisbane

The Port of Brisbane is located at the mouth of the Brisbane River, adjacent to the Moreton Bay Marine Park, and is Queensland's largest multi-cargo port and one of Australia's fastest growing container ports (34). It has many policies concerning respect for the environment that aim to minimise negative and enhance positive impacts on the surrounds by ensuring environmental management is considered in all decision-making processes (34). To reduce their ecological footprint, the Port is involved in energy efficient and waste-reduction projects and employee education programs (34). The Port of Brisbane provides a website for teachers and students offering educational resources for primary and secondary school groups and also operates port tours for school excursions (34).

Ecotourism operators

Ecotourism Australia defines ecotourism as 'ecologically sustainable tourism with a primary focus on experiencing natural areas that fosters environmental and cultural understanding, appreciation and conservation' (35). Operators identified within the sphere of Moreton Bay education are Tangalooma Marine Education and Conservation Centre, SeaWorld, SEA LIFE Sunshine Coast and whale-watching operators. These groups have access to the diverse flora and fauna of Moreton Bay and facilitate a range of educational programs for school groups that align to curriculum units (Prep to Year 12) as well as for tertiary students and community groups (36–39). They also provide specialised programs such as Tangalooma's EcoMarines, established to enable young children to participate in community engagement advocacy and action to protect waterways, rivers, oceans and wildlife (36) and SeaWorld's Rescue Ranger Program where children learn about threats to marine life and future protection strategies, supported with up-close animal experiences (37).

Education access points

There are few official data sources about the use of sites in and around the Moreton Bay area as they are often accessed by individuals and groups independently. The following overview was determined inductively and focuses on formal, school-based education. Informal education through recreation and tourism also plays an important role in Moreton Bay but is more difficult to characterise.

Mainland foreshores

The mainland foreshores are the most heavily visited as they offer the easiest access usually only requiring a bus for school, recreational and tourist groups. Students regularly use a number of sites, including Point Lookout for rocky shore studies, Nudgee Beach, Wynnum foreshore, Myora Springs, Jacobs Well, and around Paradise Point for mangroves.

Boardwalks at Nudgee Beach, Wynnum and Paradise Point draw larger numbers to these areas. Seagrass habitats are commonly accessed around Nudgee Beach and Wynnum foreshores as well as around Myora Springs.

Moreton Bay islands

The Bay islands that are commonly accessed for education include North Stradbroke, which is served by regular commercial ferry and barge services, and to a lesser extent Moreton Island, where access to the various ecosystems is more difficult. Some groups also access Coochiemudlo Island using the passenger ferry services. South Stradbroke Island is regularly accessed by Jacobs Well EEC and their vessel *Educat* and less often by Griffith University students using water taxis.

Open Bay

The open Bay waters are the most difficult for students to access as chartering a suitable vessel is challenging. Class groups are regularly taken into Moreton Bay by Moreton Bay EEC on their vessel *Inspiration* and by Jacobs Well EEC on their vessel *Educat*. A number of schools maintain their own smaller vessels as part of their marine studies. UQ's Moreton Bay Research Station has a number of aluminium-hulled vessels with a capacity of 5 people and several rigid-hull inflatable boats (RIBS) that carry up to 12 people. All are less than 6m in overall length and can be skippered by suitably experienced individuals with a Queensland Recreational boat driver's licence and a VHF radio operator's licence (less then 6m). UQ St Lucia campus also hosts a number of vessels from punts to RIBS and a 7.5m aluminium vessel. The Centre for Marine Science at UQ offers boat- handling courses specific to Moreton Bay conditions at introductory, intermediate (foul weather and night) and advanced (bar crossing) levels.

Conclusion

Summary of stakeholders

The focus on experiential learning and immersing students in authentic learning and the Bay environment has been a recurring theme in our conversations with stakeholders. These conversations helped identify the following three features as contributing most to the value of Moreton Bay education:

- Moreton Bay is easily accessible, close to a major city and possesses a wide range of biologically diverse habitats such as seagrass, mud flats, mangroves, coral reef, rocky shores and open beaches;
- There is significant human impact on these ecosystems in the western Bay and much less in the eastern Bay which can be seen as a benefit to educators focusing on human impacts and how to best manage them; and
- Iconic species in the Bay, such as turtles, dugongs, dolphins, sharks, whales and migratory shorebirds, increase student engagement.

The stakeholders identified some of the limits to education in Moreton Bay including:

- the price of such excursions, including transport and access costs;

- the time required to obtain a Moreton Bay Marine Park permit (currently ca 9 months);
- the restrictions imposed by OH&S standards limiting students opportunities to be in the water and snorkel; and
- a lack of suitable large vessels to explore the area.

Future directions

Education in Moreton Bay has been a longstanding priority among school groups and researchers with programs run since the 1880s to the present day. No doubt the future of education in Moreton Bay will likely see an increase in the sophistication and resolution of technologies used to monitor and assess its flora and fauna, such as satellites and drones. Citizen science will become increasingly easier and more available with phone and tablet apps available to the public. Other developments that may improve education in Moreton Bay include an increase in the number of vessels with which groups can directly access the Bay and improving accessibility to some of the Bay's diverse ecosystems, particularly through snorkelling. Learners can further develop their understanding of how the health and sustainability of the Bays' waterways, wetlands and catchments are connected with the availability of these new technologies and services.

References

1. Institute for Global Environment Strategies. 2004. EE – Introduction: Environmental education in Asia-Pacific. [Accessed: 11 October 2016]. Available from: pub.iges.or.jp/contents/ eLearning/ee/introduction.htm
2. Barr A, Gillard J, Firth V, Scrymgour M, Welford R, Lomax-Smith J, Bartlett D, Pike B, Constable E. 2008. Melbourne declaration on educational goals for young Australians. Dec. Ministerial Council on Education, Employment, Training and Youth Affairs. PO Box 202 Carlton South Victoria, 3053, Australia.
3. Berger C, Alcalay L, Torretti A, Milicic N. 2011. Socio-emotional well-being and academic achievement: Evidence from a multilevel approach. Psicologia: reflexao e critica. 24(2):344-51. http://dx.doi.org/10.1590/S0102-79722011000200016
4. ACARA. 2016. Cross-curriculum priorities - Sustainability. Australian Curriculum. 2016 [Accessed: 11 October 2016]. Available from: https://www.australiancurriculum.edu.au crosscurriculumpriorities/sustainability/overview
5. Ballantyne R, Packer J. 2009. Introducing a fifth pedagogy: Experience-based strategies for facilitating learning in natural environments. Environmental Education Research. 15(2):243-62. http://dx.doi.org/10.1080/13504620802711282
6. Thearle J, Pearn J, Roe C. 1986. Roe's Kamp: A pioneer experiment in secondary education. Journal of the Royal Historical Society of Queensland. 12(6):432-40.
7. Greenwood J.2004. A brief history of the Moreton Bay Research Station and study centre (unpublished report). University of Queensland. Brisbane, Qld.
8. Queensland Government. 2016. Department of National Parks, Sport and Racing. NPSR. [Accessed: 12 October 2016]. Available from: https://www.npsr.qld.gov.au/
9. Queensland Government. 2016. Department of Agriculture and Fisheries. DAF. [Accessed: 12 October 2016]. Available from: https://www.daf.qld.gov.au/

10. Queensland Government. 2016. Outdoor and environmental education centres (O&EECs). Department of Education and Training. [Accessed: 11 October 2016]. Available from: https://education.qld.gov.au/schools/environment/outdoor/
11. Queensland Government. 2016. Queensland Museum. [Accessed: 11 October 2016]. Available from: http://www.shop.qm.qld.gov.au/default/
12. Moreton Bay Regional Council. 2016. Environment centres. Environment. [Accessed: 11 October 2016]. Available from: www.moretonbay.qld.gov.au/environmentaleducation/
13. Redland City Council. 2010. Redlands IndigiScapes Centre. IndigiScapes. [Accessed: 11 October 2016]. Available from: www.indigiscapes.com.au
14. Department of Education and Training. 2016. About us. Moreton Bay Environmental Education Centre. [Accessed: 12 October 2016]. Available from: https://moretoneec.eq.edu.au/ about-us
15. Department of Education and Training. 2016. About us. Nudgee Beach Environmental Education Centre. [Accessed: 12 October 2016]. Available from: https://nudgeebheec.eq.edu.au/
16. Department of Education and Training. 2016. About us. Jacobs Well Environmental Education Centre. [Accessed: 12 October 2016]. Available from: https://njacobseec.eq.edu.au/
17. Reid C. 2016. Education in Moreton Bay (unpublished). [Phone interview, 1 September 2016] Brisbane, Qld.
18. Marine Teachers Association of Queensland. 2010. About MTAQ. Marine Teachers Association of Queensland. [Accessed: 12 October 2016]. Available from: https://www.marineteachers.org.au
19. Stevens T. 2016. Education in Moreton Bay (unpublished). [Phone interview, 26 August 2016] Brisbane, Qld
20. Tibbetts I. 2016. Education in Moreton Bay (unpublished). [E-mail communication, 29 August 2016] Brisbane, Qld.
21. Townsend K. 2016. Education in Moreton Bay (unpublished). [Phone interview, 26 August 2016] Brisbane, Qld.
22. Griffith University. 2016. Marine Science: Study. [Accessed: 12 October 2016]. Available from: https://www.griffith.edu.au/study/environment-planning-architecture/marine-science
23. The University of Queensland. 2016. About Us. Centre for Marine Science. [Accessed: 12 October 2016]. Available from: https://marine.uq.edu.au/introduction
24. The University of Queensland. 2016. Education and science camps. Moreton Bay Research Station. [Accessed: 12 October 2016]. Available from: https://www.uq.edu.au/moreton-bay-research-station/education-and-science-camps
25. Stubbs L. 2016. Education in Moreton Bay (unpublished). [Phone interview, 31 August 2016] Brisbane, Qld.
26. Queensland Government. 2016. About us. Department of Environment and Heritage Protection. [Accessed: 12 October 2016]. Available from: https://environment.des.qld.gov.au
27. Queensland Government. 2016. Education. Department of Education and Training. [Accessed: 12 October 2016]. Available from: https://environment.des.qld.gov.au
28. Australian Marine Conservation Society. 2016. Moreton Bay Marine Park. Marine Conservation. [Accessed: 12 October 2016]. Available from: https://www.marineconservation.org.au/pages/moreton-bay-marine-park

29. Orchard R. 2016. Education in Moreton Bay (unpublished). [Phone interview, 31 August 2016] Brisbane, Qld.
30. Healthy Land and Water. 2018. Who we are. Healthy Land and Water. [Accessed: 3 November 2018]. Available from: https://hlw.org.au/who-we-are/
31. Bolzenius J. 2016. Education in Moreton Bay (unpublished). [Phone interview, 1 September 2016] Brisbane, Qld.
32. AUSMEPA. 2009. Home. Australian Marine Environment Protection Association (AUSMEPA). [Accessed: 12 October 2016]. Available from: https://www.ausmepa.org.au/
33. Port of Brisbane Pty Ltd. 2010. Home. Port of Brisbane - Queensland's largest cargo port. [Accessed: 12 October 2016]. Available from: www.portbris.com.au/home
34. Ecotourism Australia. 2016. Why choose ecotourism? Ecotourism.org.au. [Accessed: 12 October 2016]. Available from: www.ecotourism.org.au/eco-experiences/why-choose-ecotourism/
35. Tangalooma Island Resort. 2016. Discover education at Tangalooma. Tangalooma Island Resort. [Accesed: 12 October 2016]. Available from: www.tangalooma.com/ info/education/
36. Village Roadshow Theme Parks. 2015. Home. SeaWorld. [Accessed: 12 October 2016]. Available from: seaworld.com.au/
37. Merlin Entertainments. 2016. Home. Underwater World SEALIFE Mooloolaba. [Accessed: 12 October 2016]. Available from: www.underwaterworld.com.au/
38. Moreton Bay Regional Council. 2016. Brisbane Whale Watching. Discover. [Accessed: 12 October 2016]. Available from: www.moretonbay.qld.gov.au/ general.aspx?id=17957