THE UNIVERSITY OF QUEENSLAND
AUSTRALIA

CREATE CHANGE

Moreton Bay Research Station

SCIENCE CAMPS

Activities, Lectures and Small Group Projects

Enhance student education with practical field work and real world experiences on Minjerribah (North Stradbroke Island), Quandamooka Country

Welcome to the Moreton Bay Research Station science camps

An important part of any learning process is hands on experience in the field. This provides the opportunity for students to put into practice the knowledge acquired in the classroom. Capitalising on the unique marine and terrestrial environments, the history and culture of North Stradbroke Island, the Moreton Bay Research Station provides the perfect setting for an extensive array of educational experiences.

The island offers a unique chance to easily access marine, freshwater and terrestrial habitats. During our Science Camps, students can:

- learn about the interactions between abiotic and biotic parameters, species diversity, and interconnections between different ecosystems;

- explore the adaptations that allow animals and plants to live in a particular habitat;

- investigate how human activities contribute to land-cover transformations that impact the abiotic and biotic characteristics of the environment;

- use a range of technical instruments to measure chemical and physical parameters;

- practice species identification skills using dedicated ID guides.

Our tutors will guide the students in organising and managing the data collection to answer specific research questions, and will show them how data can be analysed to estimate species diversity, classify an ecosystem, assess water quality and quantify human impacts on the environment.

Our programs are suitable for both domestic and international students and can be customised to suit the specific requirement of your group.

In this document you will find a description of our activities, lectures, guided walks and small group projects. Curricula maps are provided to help teachers align the programs to the senior QCAA syllabi. Examples of single and multiple day programs will help you organise your trip.

Our permits cover all the activities we offer. Educational groups utilizing our science camp programs are, therefore, not required to independently apply for any permit. Activities conducted outside of our science camps may require associated permits that can take over six months to process.

To book your science camp, please contact us:

Moreton Bay Research Station
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Dunwich Qld 4183

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E: mbrs@uq.edu.au
W: science.uq.edu.au/mbrs

Table of contents

Terrestrial

Freshwater

Marine

Low tide only (1hr either side)

High tide only (1hr either side)

All tides

Students may get wet

Times are indicative and may vary depending on the number of sites visited, the size and specific requirements of your group. They do not include transfer times to and from the Station or between sites, nor bathroom or meal breaks. To obtain a better idea of time requirements, please see the example programs.

Activities

Environmental weeds

1hr

Aim 1: Assess the impacts of environmental weeds on natural ecosystems.

Aim 2: Investigate the spatial patterns of land cover change at a local scale, and the challenges weeds pose for sustainable land cover management across Australia.

Field activity 1: Collect vegetation data within an exotic pine plantation and neighbouring native woodland on North Stradbroke Island.

Lab activity: Nil.

Comparison: Nil.

Pairing lecture: Nil.

Fire ecology

1-2hr

Aim 1: Investigate the interactions between fire and the abiotic and biotic components of an ecosystem.

Aim 2: Observe plant adaptations to fire.

Aim 3: Discuss historical and modern approaches to fire management.

Field activity 1: Collect abiotic and biotic data in burned bushland to study flora adapted to survive and recover following fires.

Lab activity: Nil.

Comparison: This activity compares two sites at different stages of recovery from recent fires.

Pairing lecture: Fire in the Australian landscape.

Natural and disturbed sclerophyll forest

1.5-4hr

Aim 1: Investigate the physical and biological impacts of anthropogenic disturbance.

Aim 2: Examine land cover transformations resulting from mining activities.

Aim 3: Investigate species diversity, abundance and distribution in relation to human disturbance in a typical sclerophyll forest.

Field activity 1: Quantify biophysical differences in vegetation and soil profiles between sites subject to disturbance from past mining activities and a neighbouring undisturbed forest.

Lab activity: Nil.

Comparison: This activity compares an undisturbed (natural) forest and a disturbed (mined and revegetated) forest.

Pairing lecture: Sand mining and human impacts on North Stradbroke Island.

Specht's classification system

1hr

Aim 1: Adopt a stratified sampling method to classify an ecosystem within a tract of North Stradbroke Island's sclerophyll forest.

Field activity 1: Collect data on the structural form, height and foliage cover of the vegetation and apply Specht's classification system to characterise it.

Lab activity: Nil.

Comparison: Nil.

Pairing lecture: Nil.

Sand dune succession

1.25-4hr

Aim 1: Examine patterns of sand dune succession, species diversity and changes in land cover on a coastal sand dune system.

Aim 2: Investigate species diversity, abundance, and distribution of vegetation in relation to abiotic factors across a sand dune.

Field activity 1: Conduct a transect and quadrats survey of the coastal dunes to measure abiotic factors along a seaward-landward gradient.

Field activity 2: Identify plant species and quantify their abundance across the sand dunes.

Lab activity: Nil.

Comparison: Quadrats along the sand dunes can be compared to each other to examine changes in abiotic factors and in vegetation biodiversity, abundance and distribution.

Pairing lecture: Geographical origins and geology of North Stradbroke Island.

Freshwater ecosystems: perched and window lakes

1.25-2.5hr

Aim 1: Assess the biodiversity of freshwater macroinvertebrates to evaluate water quality.

Aim 2: Explore the relationship between surface water and the underlying regional aquifer.

Aim 3: Understand the challenges of water resource management.

Field activity 1: Measure a range of abiotic factors including pH, temperature, salinity, turbidity, oxygen saturation and nitrogen concentration.

Field activity 2: Collect and identify macroinvertebrates.

Lab activity: Nil.

Comparison: This activity can be repeated at two different locations: Brown Lake (a perched lake) and 18 Mile Swamp (a window aquifer).

Pairing lecture: Freshwater ecosystems of North Stradbroke Island.

Impact of marine debris

1.5-4hr

Aim 1: Understand the impact marine debris has on marine ecosystems.

Aim 2: Assess the origin of the most abundant debris found on our beaches.

Field activity 1: Collect marine debris from popular beaches on North Stradbroke Island and categorise it by type.

Field activity 2: Investigate clues to the origins of the debris.

Lab activity: Nil.

Comparison: This activity can be replicated at two different locations: a beach on the leeward side of the island, and one on the windward side.

Pairing lecture: Impacts of marine debris.

Intertidal rocky shore

1.25-4hr

Aim 1: Investigate species diversity, abundance and distribution on a typical rocky shore.

Aim 2: Explore the adaptations of intertidal organisms to survive challenging conditions created by periodic inundation and emersion.

Field activity 1: Use transects and quadrats to sample intertidal organisms.

Field activity 2: Measure a range of abiotic factors including pH, temperature, salinity, and wind speed.

Lab activity: Nil.

Comparison: This activity can be replicated at two different locations: a high energy rocky shore exposed to the open ocean, and a low energy rocky shore facing the calm waters of Moreton Bay.

Pairing lectures: Intertidal rocky shore, Poisonous and venomous marine animals.

Coral and fish diversity

7-9hr

Aim 1: Investigate coral and fish biodiversity.

Aim 2: Assess coral health.

Field activity 1: Using transects and quadrats, investigate coral type, cover and bleaching on the shallow reefs of Moreton Bay. Data is collected by swimming with a mask and snorkel.

Field activity 2: Deploy baited remote underwater video equipment to capture fish footage.

Lab activity: Identify fish and estimate diversity using underwater footage.

Comparison: This activity can be replicated at two different locations: a coral reef within a marine national park (green zone), and a coral reef within a conservation park (yellow zone). The two zones show clear differences in turbidity and coral structure.

Pairing lectures: An introductory lecture is included as part of the briefing for this activity. Also consider the Management of marine parks and Impacts of climate change lectures.

Mangrove investigation

1.5hr

Aim 1: Understand the role mangroves play in marine food webs, carbon cycles and in maintaining coastal water quality.

Aim 2: Understand the challenges that mangroves face in the intertidal zone.

Field activity 1: Use field instruments to measure abiotic factors of this challenging habitat.

Field activity 2: Observe the adaptations mangroves evolved to survive in the intertidal zone.

Field activity 3: Identify mangrove species and estimate their density, health and distribution according to tidal elevation.

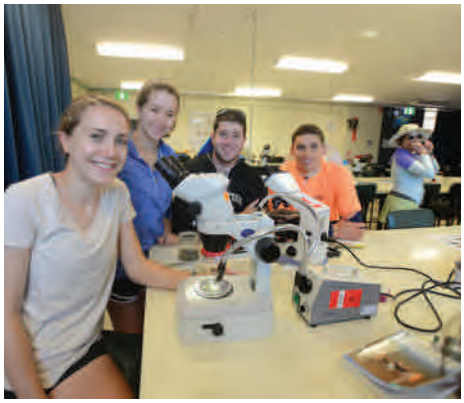
Lab activity: Nil.

Comparison: This activity can be replicated at different sites of the mangrove forest that are submerged for variable amount of time.

Pairing lecture: Mangroves and seagrasses.

Plankton investigation

1.5- 2hr



Aim 1: Understanding the role of plankton in oxygen production, marine food webs, life cycles, species dispersion mechanism and the connection between ecosystems.

Aim 2: Examine the adaptations of planktonic organisms to life suspended in the water column.

Field activity 1: Collection of plankton samples.

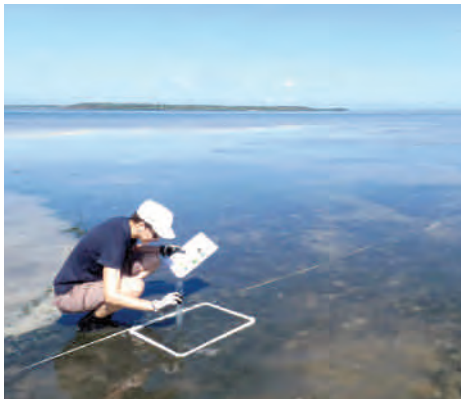
Lab activity: Use microscopes to observe the characteristic features of planktonic organisms to identify adaptations and classify taxa.

Comparison: Nil.

Pairing lecture: An introductory lecture is included as part of the lab component of this activity.

Seagrass investigation

2hr



Aim 1: Assess seagrass abundance and distribution within intertidal meadows on North Stradbroke Island.

Aim 2: Recognise the value of seagrass meadows in coastal regions and the importance of monitoring their extent and status.

Field activity 1: Use transects and quadrats to identify seagrasses and measure the percent cover at various tidal elevations.

Lab activity: This activity could be paired with the small group project Extreme freshwater flows impact submerged vegetation.

Comparison: Nil.

Pairing lecture: Mangroves and seagrasses.

Seine netting and fish identification

2.5hr

Aim 1: Understand how fish morphology relates to feeding strategies, life history characteristics and predator avoidance.

Field activity 1: Haul a seine net in the shallow waters of Moreton Bay to collect, photograph and release live fish.

Lab activity: Identify photographed fish species and distinguish their morphological characteristics.

Comparison: Nil.

Pairing lecture: Poisonous and venomous marine animals.

Lectures

Our lectures include a variety of current environmental topics and are designed to complement our field and laboratory activities. The lectures are 30 minutes to 1.5 hours long, including question time to clarify concepts or discuss further detail. The lectures are recommended for students following the Queensland high school curricula and working on a specific assignment. These students will benefit from an extensive introductory lecture associated with their project topic, a classroom section to prepare for fieldwork (specific for the QCAA Senior Biology curriculum) as well as a debrief to collate the data and complete some preliminary analyses. The lectures are also valuable for international students that may benefit from an introduction to the local environments, flora and fauna.

Fire in the Australian landscape

Fire has played an important role in shaping Australian vegetation for millennia and remains a significant feature of our environment to this day. This talk takes the students on a journey through the history of fire–adapted ecosystems in Australia and discusses modern-day fire management practices.

1hr

Sand mining and human impacts on NSI

This lecture digs into the history of sand mining on the island and discusses the changes to the landscape resulting from it. We follow changes in the legislation as it progressively adopted more environmentally responsible approaches to mining processes. We discuss the merits of various rehabilitation activities.

1hr

Geographical origins and geology of NSI

This lecture explores the biophysical forces and the geographical processes that have shaped NSI and Moreton Bay. We cover how the island was formed and how it became the place that we know today, from the mudflats of the turbid western shores to the turquoise sandbanks of the eastern shores.

1hr

Freshwater ecosystems

This talk explores freshwater ecosystems typical of coastal sand islands, from perched and window lakes to swamps, streams and springs. We examine how these unique ecosystems formed, and the diversity of life they support. The lecture discusses the effect of invasive species and the challenges of assessing and maintaining water quality.

1hr

Impacts of marine debris

This lecture looks at how the innovative invention of plastic a century ago turned into a widespread problem. We explore the major sources of plastic debris in the world's oceans, its dispersal, and its impact on marine fauna. We review the steps that have already being implemented to reduce marine plastics and discuss actions individuals can take.

1hr

Intertidal rocky shore

Intertidal shores experience variable conditions as the sea continuously ebbs and flows. Despite being a relatively harsh environment, the land-sea border has a rich and diverse flora and fauna. We will discover the adaptations these species possess for coping with dramatic changes in abiotic conditions and look at the major taxa that live here.

1hr

Impacts of climate change on marine ecosystems

In this lecture, the students are walked through the basic mechanisms of climate change and the complexity of their effects on our planet. We review such impacts on the common marine ecosystems found in Moreton Bay, such as mangrove forests, seagrass meadows and coral reefs. We conclude with a discussion on how to mitigate them.

1hr

Management of marine parks

Moreton Bay sits at the interface between subtropical and temperate waters. This generates a unique and diverse array of habitats. Sightseers and recreational and commercial fishers converge on the Bay to enjoy the abundant wildlife it supports. This lecture reviews the objectives of marine park management and protection to ensure a sustainable future for the area.

1hr

Mangroves and seagrasses

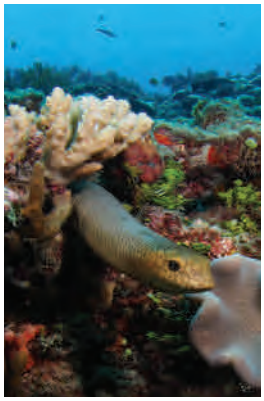
This talk looks at what mangroves and seagrasses are and the vital roles they play in coastal marine ecosystems, from improving water quality to promoting the biodiversity of marine fauna. We discuss the direct and indirect anthropogenic factors driving loss of both habitats and what individuals can do to promote protection and restoration of these valuable plants.

1hr

Marine mammals

Resident dolphins and dugongs frequent the waters surrounding North Stradbroke Island year-round, while in winter, migrating humpback whales journey past in large numbers during their annual migration. In this talk, we look back to the days of commercial hunting and outline how populations of these charismatic animals are studied and managed today.

1hr



Poisonous and venomous marine animals

Australia's waters are among the most diverse in the world, and the creatures within them have evolved a wide array of hunting and self-defence mechanisms involving the use of chemical weapons. This talk explains the differences between poisonous, toxic and venomous animals and explores the variety of delivery mechanisms used.

1hr

Turtles and manta rays

Every summer, manta rays aggregate in large numbers on the ocean side of North Stradbroke Island. Six species of sea turtle are also found in the waters around the island. This provides researchers the opportunity to study these beautiful animals, investigating a variety of topics from their feeding habits to their migration patterns. In this talk we summarise their findings.

1hr

Sampling design

As scientists, we study plants, animals and habitats to understand how natural systems function. Measurement is one of the most fundamental steps in this process and almost all forms of research involve quantification of some kind. This lecture explores the range of sampling approaches we undertake around the island and why we apply them.

0.5hr

Student experiment preparation

This classroom activity is specific for the QCAA Senior Biology curriculum. With tutor guidance, the students design a scientific project. They appraise and select a suitable ecological surveying technique to employ in the field for data collection on a topic of interest; and/or they design lab based experiments and develop associated methods.

1hr

Debrief - Collate and analyse field data

Working collaboratively and sharing data is key to modern scientific research. In this session, our tutors help the students collate the data they collected into a shared dataset. The tutors also guide the students through some preliminary data analyses to highlight the prevailing patterns and provide suggestions for interpreting results.

1-1.5hr

Individual and small group projects

Students design, conduct, and present the results of an extended investigation into a guided topic, either individually or in small groups. Most projects are typically conducted for a minimum of half a day, plus data analysis and presentation time. Ideally, projects follow a day or more of activity participation to introduce students to different research techniques and to the local environment. The effects of floods on aquatic plants project is completely lab based, while the other projects include specimen collection in the field and an experimental component in the lab. Please contact us for more information on these options, or to discuss how to tailor the projects to your requirements.

Effects of floods on aquatic plants

Floods carry suspended solids and nutrients from the catchment into receiving estuaries and bays. In this lab exercise, students investigate the effects of high sediment loads on aquatic plants by manipulating turbidity levels and measuring photosynthesis rates. We discuss implications for food webs and broader environmental impacts under current climate change predictions.

1-1.5hr

Physical stress on a rocky shore

On intertidal rocky shores tides ebb and flood. In this harsh environment, organisms need to survive extreme changes in abiotic factors, such as temperature, salinity, and sunlight. In this experiment, students manipulate various physical and chemical parameters to examine how gastropods are adapted to deal with these environmental stressors.

2-8hr

Burrowing rates of the soldier crab

Soldier crabs are deposit feeders abundant on tidal sand flats. At low tide, they emerge from their burrows in dense ‘armies’ to forage, becoming a target for several species of shorebirds that prey on them. In this experiment, students investigate the mechanical and physiological aspects of the escape response of crabs under threat.

2-4hr

Hiding on a rocky shore

Crabs are common on sheltered intertidal rocky shores. Usually, they remain inactive on flood tides, and only forage during ebb tides. The threat from predators is high during this phase and holes and crevices represent important spatial refuges. Here, students investigate how crabs use these shelters to hide from predators.

2-4hr

Guided walks

During these guided walks, our tutors lead the group along easy terrains to discover some of the flora and fauna of North Stradbroke Island. The walks are not academically intensive activities, and are a great way to include a more relaxed component to your program. They are memorable experiences that can provide students time to recharge and process what they are learning and are ideal for non-local students who wish to explore the island further. Our walks do not require any previous experience and are suitable for most fitness levels.

Gorge Walk

The Gorge at Point Lookout is a rocky headland and an excellent vantage point to observe marine megafauna, such as dolphins, turtles, rays and sharks. From June to October it is one of the best places to spot pods of humpback whales migrating along the coast. This guided walk pairs well with the marine mammals, and turtles and manta rays lectures.

1-1.5hr

Koala and dolphin spotting

This guided walk starts with a visit to the jetty at Amity Point, from where you will have a chance to observe the Australian humpback dolphins that frequent this area. Our tutors will then guide you nearby through the eucalyptus forest where we often spot koalas. If you are lucky, you may also see kookaburras, goannas, and snakes.

1.25hr

Tidal flats

The seemingly barren landscape of the tidal flats belies a diversity of creatures. Armies of soldier crabs graze on microscopic algae, while small tidal pools created by sting rays offer refuge to bubble snails and toadfish. Among the seagrass, students will likely find sea cucumbers, sea stars, and even the venomous blue lined octopus.

1hr

Bird watching

Grab a pair of binoculars and explore the diverse birdlife of NSI. This walk begins on the beach, where both migratory and resident shorebirds such as spoonbills and oystercatchers feed on the tidal fauna. You will then be guided towards parkland to observe the terrestrial species such as honeyeaters, eastern curlews and rainbow lorikeets.

1hr

QCAA Senior Biology - Curriculum alignment

ACTIVITIES AND PROJECTS	Environmental weeds	Fire ecology	Natural and disturbed sclerophyll forest	Specht's classification system	Sand dune succession	Freshwater ecosystems	Impacts of marine debris	Intertidal rocky shore	Coral and fish diversity	Mangrove investigation	Plankton investigation	Seagrass investigation	Seine netting and fish identification	Effects of floods on aquatic plants	Physical stress on a rocky shore	Burrowing rates of the soldier crab	Hiding on a rocky shore
Unit 3: Biodiversity and the interconnectedness of life																	
Topic 1: Describing biodiversity																	
Biodiversity																	
Subject matter: recognise that biodiversity includes the diversity of species and ecosystems			•		•	•		•	•								
Subject matter: determine diversity of species using measures such as species richness, evenness (relative species abundance), percentage cover, percentage frequency and Simpson's diversity index			•		•	•		•	•								
Subject matter: use species diversity indices, species interactions and abiotic factors to compare ecosystems across spatial and temporal scales			•		•	•		•	•								
Subject matter: explain how environmental factors limit the distribution and abundance of species in an ecosystem					•			•		•		•			•		
Mandatory practical: Determine species diversity of a group of organisms based on a given index			•		•	•		•	•								
Suggested practical: Measure abiotic factors in the field (e.g. dissolved oxygen, light, temperature, wind speed, infiltration rate)			•		•	•		•	•	•							
Classification processes																	
Subject matter: interpret data to classify and name an ecosystem				•													
Subject matter: explain how the process of classifying ecosystems is an important step towards effective ecosystem management				•													
Mandatory practical: Use the process of stratified sampling to collect and analyse primary biotic and abiotic field data to classify an ecosystem				•													
Topic 2: Ecosystem dynamics																	
Population ecology																	
Suggested practical: Conduct an abundance and distribution study, including abiotic and biotic factors			•		•			•	•	•		•					
Changing ecosystems																	
Subject matter: explain the concept of ecological succession		•			•												
Subject matter: differentiate between the two main modes of succession: primary and secondary		•			•												
Subject matter: identify the features of pioneer species (ability to fixate nitrogen, tolerance to extreme conditions, rapid germination of seeds, ability to photosynthesise) that make them effective colonisers			•		•												
Mandatory practical: Select and appraise an ecological surveying technique to analyse species diversity between two spatially variant ecosystems of the same classification			•		•	•		•									
Summative internal assessment 2 (IA2): Student experiment			•		•	•		•									

QCAA Senior Biology - Curriculum alignment

LECTURES	Fire in the Australian landscape	Sand mining and human impacts on NSI	Geographical origins and geology of NSI	Freshwater ecosystems	Impacts of marine debris	Intertidal rocky shore	Impacts of climate change	Management of marine parks	Mangroves and seagrasses	Marine mammals	Poisonous and venomous marine animals	Turtles and manta rays	Sampling design	Student experiment preparation	Debrief - Collate and analyse field data
Unit 3: Biodiversity and the interconnectedness of life															
Topic 1: Describing biodiversity															
Biodiversity															
Subject matter: determine diversity of species using measures such as species richness, evenness (relative species abundance), percentage cover, percentage frequency and Simpson's diversity index															•
Subject matter: explain how environmental factors limit the distribution and abundance of species in an ecosystem						•	•		•						
Mandatory practical: Determine species diversity of a group of organisms based on a given index														•	•
Topic 2: Ecosystem dynamics															
Population ecology															
Suggested practical: Conduct an abundance and distribution study, including abiotic and biotic factors						•			•						
Changing ecosystems															
Subject matter: explain the concept of ecological succession (refer to pioneer and climax communities and seres)	•		•												
Subject matter: differentiate between the two main modes of succession: primary and secondary	•		•												
Subject matter: identify the features of pioneer species (ability to fixate nitrogen, tolerance to extreme conditions, rapid germination of seeds, ability to photosynthesise) that make them effective colonisers			•												
Mandatory practical: Select and appraise an ecological surveying technique to analyse species diversity between two spatially variant ecosystems of the same classification (e.g. a disturbed and undisturbed dry sclerophyll forest)		•	•	•		•							•	•	•
Summative internal assessment 2 (IA2): Student experiment		•	•	•		•							•	•	•

QCAA Senior Geography - Curriculum alignment

ACTIVITIES AND PROJECTS

	Environmental weeds	Fire ecology	Natural and disturbed sclerophyll forest	Specht's classification system	Sand dune succession	Freshwater ecosystems	Impacts of marine debris	Intertidal rocky shore	Coral and fish diversity	Mangrove investigation	Plankton investigation	Seagrass investigation	Seine netting and fish identification	Effects of floods on aquatic plants	Physical stress on a rocky shore	Burrowing rates of the soldier crab	Hiding on a rocky shore
Unit 3: Responding to land cover transformations																	
Topic 2: Responding to local land cover transformations																	
Subject matter - Explain the geographical processes that result in particular physical features (e.g. dunes systems, river systems, deserts, forests, grasslands) that shape the identity of places at the local level			•		•	•				•							
Subject matter - Explain the importance of Aboriginal peoples' and Torres Strait Islander peoples' connection to Country/Place and understanding of natural features and elements of the local ecosystem/s	We recommend booking a Goompi trail, a historical walk with a local Aboriginal guide (www.minjerribahcamping.com.au). This can be easily integrated with our programs.																
Subject matter - Interpret land use maps to identify where changing land cover (e.g. deforestation, land reclamation, agricultural practices, urbanisation, land drainage, pastoralism, mining) has had an impact on the biophysical environment in the local area			•														
Subject matter - Identify Aboriginal peoples' and Torres Strait Islander peoples' care for land (as applicable to their local area, where relevant) and the impacts of these practices on land cover over time	We recommend booking a Goompi trail, a historical walk with a local Aboriginal guide (www.minjerribahcamping.com.au). This can be easily integrated with our programs.																
Subject matter - Explain geographical processes that have contributed to land cover change in a local area, including: anthropogenic processes, e.g. urbanisation and resource exploitation; natural processes, e.g. natural hazards	•	•	•		•					•							
Subject matter - Recognise the spatial changes to land cover at the local level and represent these on maps using spatial technologies	•		•		•												
Subject matter - Identify the implications for environments and people of the changing land cover, including on spiritual and cultural features of value for Aboriginal peoples and Torres Strait Islander peoples, where relevant			•														
Subject matter - Use a conceptual model to identify a local land or water management challenge, e.g. threats to biodiversity, reduced water quality or availability, diminished riparian health, salinity, loss of coastal protection through diminished mangroves or dune systems, waste management (e.g. landfill), coral reef loss or destruction	•	•	•		•	•	•			•							
Mandatory practical – Conduct a field study to collect primary data for investigating a land or water management challenge on a local scale			•														

QCAA Senior Geography - Curriculum alignment

LECTURES

	Fire in the Australian landscape	Sand mining and human impacts on NSI	Geographical origins and geology of NSI	Freshwater ecosystems	Impacts of marine debris	Intertidal rocky shore	Impacts of climate change	Management of marine parks	Mangroves and seagrasses	Marine mammals	Poisonous and venomous marine animals	Turtles and manta rays	Sampling design	Student experiment preparation	Debrief - Collate and analyse field data
Unit 3: Responding to land cover transformations															
Topic 2: Responding to local land cover transformations															
Subject matter - Explain the geographical processes that result in particular physical features (e.g. dunes systems, river systems, deserts, forests, grasslands) that shape the identity of places at the local level			•	•					•						
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Subject matter - Explain geographical processes that have contributed to land cover change in a local area, including: anthropogenic processes, e.g. urbanisation and resource exploitation; natural processes, e.g. natural hazards	•	•		•			•		•						
Subject matter - Recognise the spatial changes to land cover at the local level and represent these on maps using spatial technologies		•													
Subject matter - Identify the implications for environments and people of the changing land cover, including on spiritual and cultural features of value for Aboriginal peoples and Torres Strait Islander peoples, where relevant		•					•								
Subject matter - Use a conceptual model to identify a local land or water management challenge, e.g. threats to biodiversity, reduced water quality or availability, diminished riparian health, salinity, loss of coastal protection through diminished mangroves or dune systems, waste management (e.g. landfill), coral reef loss or destruction	•	•		•	•		•	•	•						
Mandatory practical – Conduct a field study to collect primary data for investigating a land or water management challenge on a local scale		•													•

QCAA Senior Marine Science – Curriculum alignment

ACTIVITIES AND PROJECTS	Environmental weeds	Fire ecology	Natural and disturbed sclerophyll forest	Specht's classification system	Sand dune succession	Freshwater ecosystems	Impacts of marine debris	Intertidal rocky shore	Coral and fish diversity	Mangrove investigation	Plankton investigation	Seagrass investigation	Seine netting and fish identification	Effects of floods on aquatic plants	Physical stress on a rocky shore	Burrowing rates of the soldier crab	Hiding on a rocky shore
Unit 2: Marine biology																	
Topic 1: Marine ecology and biodiversity																	
Biodiversity																	
Subject matter - Identify the variety of ecosystems (e.g. estuaries, coastal lakes, saltmarshes, mangroves, seagrass, rocky shores, temperate reefs, coral reefs, lagoons, shelf and deep water) that constitute Australia's marine biomes								•	•	•		•					
Subject matter - Describe the implications of connectivity to marine ecosystems										•							
Subject matter - Calculate the biodiversity of a marine ecosystem using Simpson's diversity index (SDI)								•	•								
Biotic components of marine ecosystems																	
Suggested practical - Estimate populations, e.g. survey count, quadrats, species density, percentage coverage, indirect or direct observation, catch and release								•	•	•		•					
Suggested practical - Use field guides to identify to a genus level								•	•	•	•	•	•				
Suggested practical - Use a range of field equipment to measure abiotic factors related to marine environments								•	•	•							
Abiotic components of the marine ecosystem																	
Subject matter - Distinguish abiotic components of marine ecosystems: light availability, depth, stratification, temperature, currents (water and wind), tides, sediment type and nutrient availability								•		•		•					
Subject matter - Understand the importance of limiting factors and tolerance limits in population distributions								•		•		•		•	•	•	•
Subject matter - Assess data to identify an organism's tolerance limit								•				•		•	•		
Subject matter - Apply the concept of zonation using the following terms: intertidal, pelagic (neritic, oceanic), benthic and abyss								•				•					
Mandatory practical - Conduct an investigation to determine factors of population dynamics (e.g. density or distribution) and assess abiotic components of a local ecosystem case study. Emphasis should be placed on assessing the processes and limitations of the chosen technique (e.g. quadrat, transect). When students identify and describe marine species, they should use field guides and identification keys								•	•	•		•			•	•	•
Adaptation																	
Subject matter - Categorise different groups of animals using structural characteristics								•	•		•	•	•				
Subject matter - Identify and classify adaptations as anatomical (structural), physiological (functional) or behavioural								•	•	•	•		•				

QCAA Senior Marine Science - Curriculum alignment

ACTIVITIES AND PROJECTS	Environmental weeds	Fire ecology	Natural and disturbed sclerophyll forest	Specht's classification system	Sand dune succession	Freshwater ecosystems	Impacts of marine debris	Intertidal rocky shore	Coral and fish diversity	Mangrove investigation	Plankton investigation	Seagrass investigation	Seine netting and fish identification	Effects of floods on aquatic plants	Physical stress on a rocky shore	Burrowing rates of the soldier crab	Hiding on a rocky shore
Subject matter - Describe the role of adaptation in enhancing an organism's survival in a specific marine environment								●		●	●		●		●	●	●
Suggested practical - Identify physical structures of a specific marine organism								●	●	●	●	●	●			●	●
Topic 2: Marine environmental management																	
Resources and sustainable use																	
Subject matter - Compare the strategies and techniques used for marine environmental planning and management with reference to a specific case study									●								
Subject matter - Evaluate the marine environmental planning and management process using primary or secondary data of a specific case study									●								
Unit 3: Marine systems — connections and change																	
Topic 1: The reef and beyond																	
Coral reef development																	
Subject matter - Classify a specific coral to genus level only, using a relevant identification key									●								
Subject matter - Assess data of abiotic factors (e.g. dissolved oxygen, salinity, substrate) that affect the distribution of coral reefs									●								
Reef, habitats and connectivity																	
Subject matter - Recognise that corals are habitat formers or ecosystem engineers									●								
Subject matter - Explain that habitat complexity (rugosity), established by corals, influences diversity of other species									●								
Subject matter - Explain connectivity between ecosystems and the role this plays in species replenishment									●	●	●	●					
Subject matter - Understand that fish life cycles are integrated within a variety of habitats including reef and estuarine systems									●	●	●	●					
Subject matter - Describe how fish, particularly herbivore populations, benefit coral reefs									●								
Subject matter - Assess the diversity of a reef system using a measure that could include (but is not limited to) line intercept transects, quadrats and fish counts using underwater video survey techniques, benthic surveys, invertebrate counts and rugosity measurements									●								
Subject matter - Analyse reef diversity data, using an index, to determine rank abundance									●								
Subject matter - Recognise that some of the factors that reduce coral cover (e.g. crown-of-thorns) are directly linked to water quality									●								

QCAA Senior Marine Science - Curriculum alignment

ACTIVITIES AND PROJECTS	Environmental weeds	Fire ecology	Natural and disturbed sclerophyll forest	Specht's classification system	Sand dune succession	Freshwater ecosystems	Impacts of marine debris	Intertidal rocky shore	Coral and fish diversity	Mangrove investigation	Plankton investigation	Seagrass investigation	Seine netting and fish identification	Effects of floods on aquatic plants	Physical stress on a rocky shore	Burrowing rates of the soldier crab	Hiding on a rocky shore
Mandatory practical - Examine the concept of connectivity in a habitat by investigating the impact of water quality on reef health									•	•		•					
Summative internal assessment 2 (IA2) - Student experiment									•								
Unit 4: Ocean issues and resource management																	
Topic 1: Oceans of the future																	
Management and conservation																	
Subject matter - Evaluate the success of a named protected marine area									•								
Topic 2: Managing fisheries																	
Fisheries and population dynamics																	
Subject matter - Assess rugosity data and link this to fish diversity									•								
Subject matter - Identify the factors (e.g. sampling techniques, fish behaviour, temporal and spatial movement, life history) that determine the reliability of fisheries population data and consider the limitations of these factors									•								

QCAA Senior Marine Science – Curriculum alignment

LECTURES	Fire in the Australian landscape	Sand mining and human impacts on NSI	Geographical origins and geology of NSI	Freshwater ecosystems	Impacts of marine debris	Intertidal rocky shore	Impacts of climate change	Management of marine parks	Mangroves and seagrasses	Marine mammals	Poisonous and venomous marine animals	Turtles and manta rays	Sampling design	Student experiment preparation	Debrief - Collate and analyse field data
Unit 2: Marine biology															
Topic 1: Marine ecology and biodiversity															
Biodiversity															
Subject matter: Identify the variety of ecosystems (e.g. estuaries, coastal lakes, saltmarshes, mangroves, seagrass, rocky shores, temperate reefs, coral reefs, lagoons, shelf and deep water) that constitute Australia's marine biomes						•			•						
Subject matter: Describe the implications of connectivity to marine ecosystems							•								
Subject matter: Calculate the biodiversity of a marine ecosystem using Simpson's diversity index (SDI)															•
Biotic components of marine ecosystems															
Suggested practical: Estimate populations, e.g. survey count, quadrats, species density, percentage coverage, indirect or direct observation, catch and release													•		
Abiotic components of the marine ecosystem															
Subject matter: Distinguish abiotic components of marine ecosystems: light availability, depth, stratification, temperature, currents (water and wind), tides, sediment type and nutrient availability						•	•								
Subject matter: Understand the importance of limiting factors and tolerance limits in population distributions						•	•		•						
Subject matter: Assess data to identify an organism's tolerance limit															•
Subject matter: Apply the concept of zonation using the following terms: intertidal, pelagic (neritic, oceanic), benthic and abyss						•			•						
Mandatory practical: Conduct an investigation to determine factors of population dynamics (e.g. density or distribution) and assess abiotic components of a local ecosystem case study. Emphasis should be placed on assessing the processes and limitations of the chosen technique (e.g. quadrat, transect). When students identify and describe marine species, they should use field guides and identification keys													•		•
Adaptation															
Subject matter: Categorise different groups of animals using structural characteristics						•			•						
Subject matter: Identify and classify adaptations as anatomical (structural), physiological (functional) or behavioural						•			•						
Subject matter: Describe the role of adaptation in enhancing an organism's survival in a specific marine environment						•			•						
Suggested practical: Identify physical structures of a specific marine organism						•			•			•			

QCAA Senior Marine Science - Curriculum alignment

LECTURES	Fire in the Australian landscape	Sand mining and human impacts on NSI	Geographical origins and geology of NSI	Freshwater ecosystems	Impacts of marine debris	Intertidal rocky shore	Impacts of climate change	Management of marine parks	Mangroves and seagrasses	Marine mammals	Poisonous and venomous marine animals	Turtles and manta rays	Sampling design	Student experiment preparation	Debrief - Collate and analyse field data
Topic 2: Marine environmental management															
Resources and sustainable use															
Subject matter: Compare the strategies and techniques used for marine environmental planning and management with reference to a specific case study								•							
Subject matter: Evaluate the marine environmental planning and management process using primary or secondary data of a specific case study															•
Unit 3: Marine systems — connections and change															
Topic 1: The reef and beyond															
Reef, habitats and connectivity															
Subject matter: Explain connectivity between ecosystems and the role this plays in species replenishment							•								
Subject matter: Understand that fish life cycles are integrated within a variety of habitats including reef and estuarine systems							•								
Subject matter: Analyse reef diversity data, using an index, to determine rank abundance															•
Mandatory practical: Examine the concept of connectivity in a habitat by investigating the impact of water quality on reef health							•								
Topic 2: Changes on the reef															
Anthropogenic change															
Subject matter: Describe the specific pressures affecting coral reefs (i.e. surface run-off, salinity fluctuations, climate change, cyclic crown-of-thorns outbreaks, overfishing, spills and improper ballast)							•								
Subject matter: Explain the concept of coral bleaching in terms of Shelford's law of tolerance							•								
Subject matter: Interpret thermal threshold data for reefs in the northern, central and southern sections of the Great Barrier Reef in relation to the likelihood of a bleaching event							•								
Subject matter: Describe the conditions necessary for recovery from bleaching events							•								
Subject matter: Compare the responses to bleaching events between two regions, while recognising that coral cover increases on resilient reefs once pressures are reduced or removed							•								
Summative internal assessment 2 (IA2): Student experiment							•						•	•	•

QCAA Senior Marine Science - Curriculum alignment

LECTURES	Fire in the Australian landscape	Sand mining and human impacts on NSI	Geographical origins and geology of NSI	Freshwater ecosystems	Impacts of marine debris	Intertidal rocky shore	Impacts of climate change	Management of marine parks	Mangroves and seagrasses	Marine mammals	Poisonous and venomous marine animals	Turtles and manta rays	Sampling design	Student experiment preparation	Debrief - Collate and analyse field data
Unit 4: Ocean issues and resource management															
Topic 1: Oceans of the future															
Management and conservation															
Subject matter: Recall and use the arguments for preserving species and habitats (i.e. ecological, economic, aesthetic, ethical) through identifying their associated direct and indirect values in a given case study								•							
Subject matter: Identify management strategies used to support marine ecosystem health (e.g. managing threats, zoning, permits, plans, longitudinal monitoring)								•							
Future scenarios															
Subject matter: Understand that average global temperature increases impact on marine environments by altering thermal regimes and changing physical and chemical parameters of the ocean (e.g. aragonite saturation levels and rising sea levels)							•								
Topic 2: Managing fisheries															
Fisheries and population dynamics															
Subject matter: Understand the value of marine protected areas including estuarine and open-water environments to fisheries sustainability								•							

QCAA Senior Biology - Example programs

The programs are tailored to the individual groups and can be modified based on your requirements. To complete the data collection for the students' assignment, we recommend a three day program.

Example 1-day program

Time	Activities
9.00	Arrive at MBRS, induction
9.15	Load bus for Brown Lake
9.30	**A: Freshwater ecosystems - Perched lake**
10.45	*Morning tea (takeaway)*
11.15	**A: Specht's classification system**
12.15	Load bus for MBRS
12.30	*Lunch*
13.15	Load bus for Deadman's Beach
13.45	**A: Intertidal rocky shore - High energy**
15.15	Load bus for MBRS
15.45	*Afternoon tea*
16.00	**A: Intertidal rocky shore - Low energy**
17.00	Load bus for ferry
17.30	Load ferry to Cleveland

Example 2-day program

Time	Activities
9.00	Arrive at MBRS, induction
9.15	Settle into rooms
9.30	*Morning tea*
10.00	Load bus for Brown Lake
10.15	**A: Freshwater ecosystems - Perched lake**
11.45	**A: Specht's classification system**
12.45	Load bus for MBRS
13.00	*Lunch*
14.00	Load bus for Amity turnoff
14.30	**A: Natural and disturbed sclerophyll forest**
16.00	Load bus for Amity Point
16.15	*Afternoon tea (takeaway)*
16.30	**W: Koala and dolphin spotting**
17.30	Load bus for MBRS
18.00	*Dinner*
19.00	**L: Intertidal rocky shore**
20.00	End of activities for the day
7.00	Pack and check out of rooms
7.30	*Breakfast*
8.30	**L: Sampling design**
9.00	**L: Student experiment preparation**
10.00	*Morning tea*
10.30	Load bus for Deadman's Beach
11.00	**A: Intertidal rocky shore - High energy**
13.00	Load bus for MBRS
13.30	*Lunch (takeaway)*
13.45	**A: Intertidal rocky shore - Low energy**
15.30	*Afternoon tea*
16.00	Load bus for ferry
16.30	Load ferry to Cleveland

Example 3-day program

Time	Activities
9.00	Arrive at MBRS, induction
9.15	Settle into rooms
9.30	*Morning tea*
10.00	Load bus for Brown Lake
10.15	**A: Freshwater ecosystems - Perched lake**
11.45	Load bus for MBRS
12.00	Free time
12.15	*Lunch*
13.15	**L: Sand mining and human impacts on NSI**
14.15	Load bus for Amity turnoff
14.45	**A: Disturbed sclerophyll forest**
15.45	*Afternoon tea (takeaway)*
16.15	**A: Natural sclerophyll forest**
17.00	Load bus for MBRS
17.30	Free time, showers
18.00	*Dinner*
19.00	**L: Intertidal rocky shore**
20.00	End of activities for the day
7.00	*Coffee and tea*
7.15	**L: Sampling design**
7.45	*Breakfast*
8.30	**L: Student experiment preparation**
10.00	*Morning tea*
10.30	**A: Intertidal rocky shore - Low energy**
12.30	*Lunch*
13.30	**L: Debrief - Collate and analyse data**
15.00	*Afternoon tea*
15.30	Load bus for Point Lookout
16.00	**W: Gorge Walk**
17.30	Load bus for MBRS
18.00	*Dinner*
19.00	**A: Plankton investigation**
20.30	End of activities for the day
7.00	Pack and check out of rooms
7.30	*Breakfast*
8.15	Load bus for Brown Lake
8.30	**A: Specht's classification system**
9.30	Load bus for MBRS
9.45	*Morning tea*
10.15	Load bus for Deadman's Beach
10.45	**A: Intertidal rocky shore - High energy**
12.45	Load bus for MBRS
13.15	*Lunch*
14.15	**L: Debrief - Collate and analyse data**
15.30	Load bus for ferry
16.00	Load ferry to Cleveland

QCAA Senior Geography - Example programs

The programs are tailored to the individual groups and can be modified based on your requirements. To complete the data collection for the students' assignment, we recommend a two or three day program.

Example 1-day program

Time	Activities
9.00	Arrive at MBRS, induction
9.15	**L: Sand mining and human impacts on NSI**
10.15	*Morning tea*
10.45	Load bus for Amity turnoff
11.15	**A: Disturbed sclerophyll forest**
12.45	Load bus for Amity Point
12.50	*Lunch (takeaway)*
13.55	Load bus for Amity turnoff
14.00	**A: Natural sclerophyll forest**
15.30	Load bus for MBRS
16.00	*Afternoon tea*
16.30	**L: Debrief - Collate and analyse data**
17.30	Load bus for ferry
18.00	Load ferry to Cleveland

Example 2-day program

Time	Activities
9.00	Arrive at MBRS, induction
9.15	Settle into rooms
9.30	*Morning tea*
10.00	**L: Freshwater ecosystems**
11.00	Load bus for Causeway
11.15	**A: Freshwater ecosystems - Window lake**
12.30	Load bus for Brown Lake
12.45	*Lunch (takeaway)*
13.45	**A: Freshwater ecosystems - Perched lake**
14.45	*Afternoon tea (takeaway)*
15.15	**A: Environmental weeds**
16.15	Load bus for MBRS
17.30	Free time, showers
18.00	*Dinner*
19.00	**L: Sand mining and human impacts on NSI**
20.00	End of activities for the day
7.00	Pack and check out of rooms
7.30	*Breakfast*
8.15	**Goompi trail**
9.30	*Morning tea*
10.00	Load bus for Amity turnoff
10.30	**A: Disturbed sclerophyll forest**
12.00	Load bus for Amity Point
12.05	*Lunch (takeaway)*
12.55	Load bus for Amity turnoff
13.00	**A: Natural sclerophyll forest**
14.30	Load bus for MBRS
15.00	**L: Debrief - Collate and analyse data**
16.30	Load bus for ferry
17.00	Load ferry to Cleveland

Example 3-day program

Time	Activities
9.00	Arrive at MBRS, induction
9.15	Settle into rooms
9.30	*Morning tea*
10.00	**L: Freshwater ecosystems**
11.00	Load bus for Causeway
11.15	**A: Freshwater ecosystems - Window lake**
12.30	Load bus for Brown Lake
12.45	*Lunch (takeaway)*
13.45	**A: Freshwater ecosystems - Perched lake**
14.45	*Afternoon tea (takeaway)*
15.15	**A: Environmental weeds**
16.15	Load bus for MBRS
17.30	Free time, showers
18.00	*Dinner*
19.00	End of activities for the day
7.30	*Breakfast*
8.30	**L: Sand mining and human impacts on NSI**
9.30	*Morning tea*
10.00	Load bus for Amity turnoff
10.30	**A: Disturbed sclerophyll forest**
12.00	Load bus for Amity Point
12.05	*Lunch (takeaway)*
12.55	Load bus for Amity turnoff
13.00	**A: Natural sclerophyll forest**
14.30	Load bus for Amity Point
14.35	**W: Koala and dolphin spotting**
16.00	*Afternoon tea (takeaway)*
16.30	Load bus for MBRS
17.00	Free time, showers
17.30	*Dinner*
18.30	**L: Debrief - Collate and analyse data**
20.00	End of activities for the day
7.30	*Breakfast*
8.15	Pack and check out of rooms
8.30	Load bus for Myora Springs
8.45	**A: Mangrove investigation**
10.15	Load bus for Point Lookout
10.45	*Morning tea*
11.15	**W: Gorge walk**
12.30	*Lunch (takeaway)*
13.15	Load bus to MBRS
13.45	**Goompi trail**
15.00	Load bus for ferry
15.30	Load ferry to Cleveland

QCAA Senior Marine Science - Example programs

The programs are tailored to the individual groups and can be modified based on your requirements. To complete the data collection for the students' assignment, we recommend a three day program.

Example 1-day program

Time	Activities
9.00	Arrive at MBRS, induction
9.15	*Morning tea*
9.45	**A: Seine netting and fish ID (collection)**
10.45	**A: Seine netting and fish ID (lab)**
11.45	*Lunch*
12.45	Load bus for Deadman's Beach
13.15	**A: Intertidal rocky shore - High energy**
14.45	Load bus for MBRS
15.15	*Afternoon tea (takeaway)*
15.30	**A: Intertidal rocky shore - Low energy**
16.45	**L: Debrief - Collate and analyse data**
17.30	Load bus for ferry
18.00	Load ferry to Cleveland

Example 2-day program

Time	Activities
9.00	Arrive at MBRS, induction
9.15	Settle into rooms
9.30	**L: Intertidal rocky shore**
10.30	*Morning tea*
11.00	L: Impacts of climate change
12.00	*Lunch*
13.00	Free time
13.45	Load bus for Myora Springs
14.00	**A: Mangrove investigation**
15.30	Load bus for MBRS
15.45	*Afternoon tea*
16.00	**A: Intertidal rocky shore - Low energy**
17.30	Free time
18.00	*Dinner*
19.00	**A: Plankton investigation**
20.30	End of activities for the day
7.15	Pack and check out of rooms
7.30	*Breakfast*
8.30	**A: Seine netting and fish ID (collection)**
9.30	**A: Seine netting and fish ID (lab)**
10.30	*Morning tea*
11.00	**L: Debrief - Collate and analyse data**
12.00	*Lunch*
13.00	Load bus for Deadman's Beach
13.30	**A: Intertidal rocky shore - High energy**
15.00	Load bus for MBRS
15.30	*Afternoon tea*
16.00	**A: Seagrass investigation**
17.30	Load bus for ferry
18.00	Load ferry to Cleveland

Example 3-day program

Time	Activities
9.00	Arrive at MBRS, induction
9.15	Settle into rooms
9.30	**L: Intertidal rocky shore**
10.30	*Morning tea*
11.00	L: Impacts of climate change
12.00	*Lunch*
13.00	Free time
13.45	Load bus for Myora Springs
14.00	**A: Mangrove investigation**
15.30	Load bus for MBRS
15.45	*Afternoon tea*
16.00	**A: Intertidal rocky shore - Low energy**
17.30	Free time
18.00	*Dinner*
19.00	**A: Plankton investigation**
20.30	End of activities for the day
7.30	*Breakfast*
8.30	**A: Seine netting and fish ID (collection)**
9.30	**A: Seine netting and fish ID (lab)**
10.30	*Morning tea*
11.00	L: Management of marine parks
12.00	*Lunch*
13.00	Load bus for Deadman's Beach
13.30	**A: Intertidal rocky shore - High energy**
15.00	Load bus for MBRS
15.30	*Afternoon tea*
16.00	**A: Seagrass investigation**
17.30	Pick up snorkelling gear
18.00	*Dinner*
19.00	**Snorkelling briefing**
20.30	End of activities for the day
7.15	Pack and check out of rooms
7.30	*Breakfast*
8.30	Change into snorkelling gear
9.00	Walk to jetty
9.15	Load boat for Green zone
9.30	**A: Coral and fish diversity**
10.45	Load boat for Yellow zone
11.00	*Morning tea (takeaway)*
11.15	**A: Coral and fish diversity**
12.15	Load boat for jetty
12.30	Walk to MBRS
12.45	Clean gear and showers
13.30	*Lunch*
14.30	**L: Debrief - Collate and analyse data**
16.00	Load bus for ferry
16.30	Load ferry to Cleveland

International visitors - Example programs

The following example programs are ideal for international visitors that want to explore the island and learn about its flora and fauna. The programs can be tailored to the individual groups based on specific interests. We recommend our international guests to include the Goompi trail in their program. This is a historical walk with a local Aboriginal guide, that can be easily integrated with our activities. Please note that the Goompi trail must be booked and paid separately through Minjerribah Camping (www.minjerribahcamping.com.au).

Example 1-day program

Time	Activities
9.00	Arrive at MBRS, induction
9.15	**Goompi trail**
10.30	*Morning tea*
11.00	**L: Marine mammals**
12.00	Load bus for Point Lookout
12.30	*Lunch (takeaway)*
13.30	**W: Gorge Walk**
15.00	Load bus for Amity Point
15.30	*Afternoon tea (takeaway)*
16.00	**W: Koala and dolphin spotting**
17.15	Load bus for ferry
18.00	Load ferry to Cleveland

Example 2-day program

Time	Activities
9.00	Arrive at MBRS, induction
9.15	Settle into rooms
10.30	*Morning tea*
11.00	**Goompi trail**
12.15	*Lunch*
13.00	**L:** Poisonous and venomous marine animals
14.00	**A: Seine netting and fish ID (collection)**
15.00	*Afternoon tea*
15.30	**A: Seine netting and fish ID (lab)**
16.00	Load bus for Amity Point
16.30	**W: Koala and dolphin spotting**
17.30	Load bus for MBRS
18.00	*Dinner*
19.00	**A: Plankton investigation**
20.30	End of activities for the day
6.00	*Coffee and tea*
6.15	**W: Bird watching**
7.15	Pack and check out of rooms
7.30	*Breakfast*
8.30	**W: Tidal flats**
9.30	*Morning tea*
10.00	**L: Impacts of marine debris**
11.00	Load bus for Point Lookout
11.30	**A: Impacts of marine debris**
13.00	*Lunch (takeaway)*
14.00	**W: Gorge Walk**
15.30	*Afternoon tea (takeaway)*
16.00	Load bus for ferry
17.00	Load ferry to Cleveland

Example 3-day program

Time	Activities
9.00	Arrive at MBRS, induction
9.15	Settle into rooms
10.30	*Morning tea*
11.00	**Goompi trail**
12.15	*Lunch*
13.00	**L:** Poisonous and venomous marine animals
14.00	**A: Seine netting and fish ID (collection)**
15.00	*Afternoon tea*
15.30	**A: Seine netting and fish ID (lab)**
16.00	Load bus for Amity Point
16.30	**W: Koala and dolphin spotting**
17.30	Load bus for MBRS
18.00	*Dinner*
19.00	**A: Plankton investigation**
20.30	End of activities for the day
7.00	Get snorkelling gear
7.30	*Breakfast*
8.30	**Snorkelling briefing**
9.45	*Morning tea*
10.15	Change into snorkelling gear
10.45	Walk to jetty
11.00	Load boat for Goat Island
11.15	**A: Coral and fish diversity**
12.15	Load boat for jetty
12.30	Walk to MBRS
12.45	Clean gear and showers
13.30	*Lunch*
14.30	Free time
15.00	Load bus for Brown Lake
15.15	**A: Freshwater ecosystems - Perched lake**
16.15	*Afternoon tea (takeaway)*
16.15	Optional swim
17.00	Load bus for MBRS
17.15	Free time
18.00	*Dinner*
19.00	End of activities for the day
6.00	*Coffee and tea*
6.15	**W: Bird watching**
7.15	Pack and check out of rooms
7.30	*Breakfast*
8.30	**W: Tidal flats**
9.30	*Morning tea*
10.00	**L: Impacts of marine debris**
11.00	Load bus for Point Lookout
11.30	**A: Impacts of marine debris**
13.00	*Lunch (takeaway)*
14.00	**W: Gorge Walk**
15.30	*Afternoon tea (takeaway)*
16.00	Load bus for ferry
17.00	Load ferry to Cleveland

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