



RECOVERY OF THE GREAT BARRIER REEF



PLANNING CHECKLIST

PLANNING CHECKLIST

IMMEDIATELY

- Make sure you understand and agree to [Earthwatch's Terms and Conditions](#) and the [Participant Code of Conduct](#).
- If you plan to purchase additional travel insurance, note that some policies require purchase at the time your expedition is booked.

6 MONTHS PRIOR TO EXPEDITION

- Log in at au.earthwatch.org to complete your participant forms.
- If traveling internationally, make sure your passport is current and, if necessary, obtain a visa for your destination country.
- Bring your level of fitness up to the standards required (see the Project Conditions section).

90 DAYS PRIOR TO EXPEDITION

- Pay any outstanding balance for your expedition.
- Book travel arrangements (see the Travel Planning section for details).
- Make sure you have all the necessary vaccinations for your project site.

60 DAYS PRIOR TO EXPEDITION

- Review the packing list to make sure you have all the clothing, personal supplies, and equipment needed.

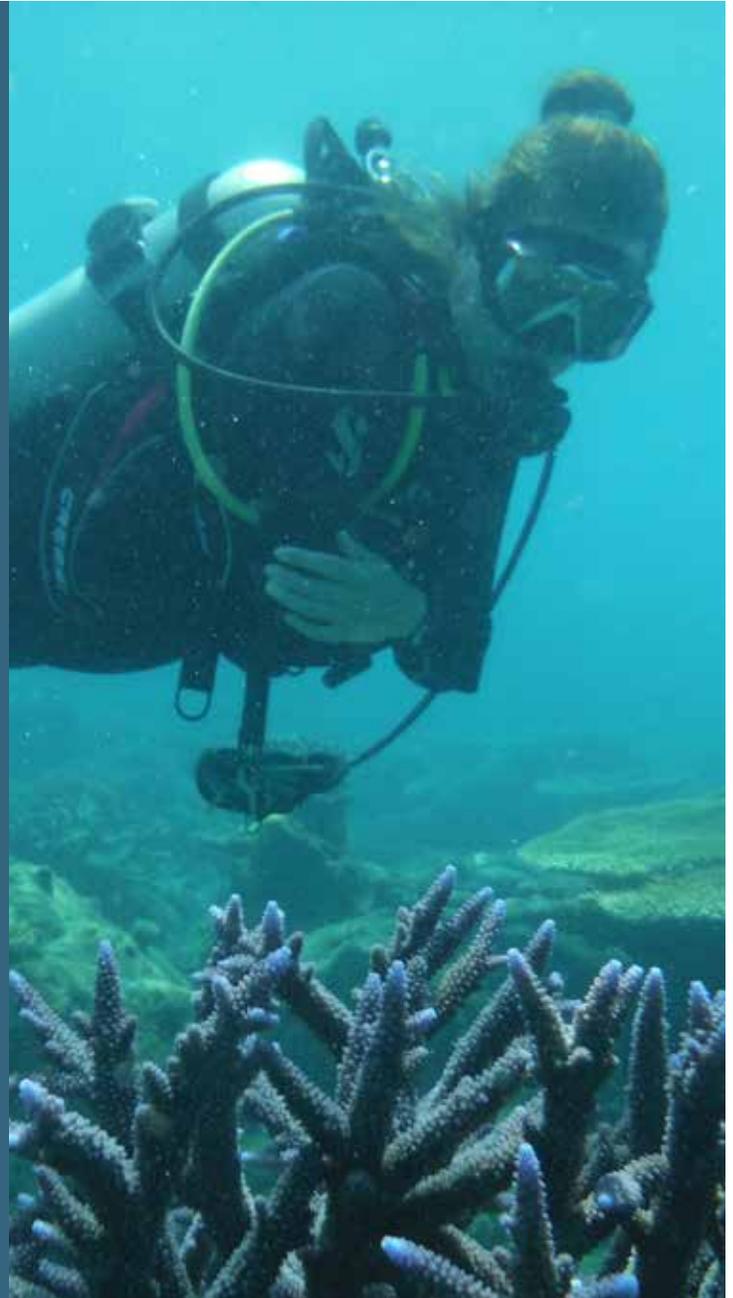
30 DAYS PRIOR TO EXPEDITION

- Leave the Earthwatch 24-hour helpline number with a parent, relative, or friend.
- Leave copies of your photo ID and flight reservation number with a parent, relative, or friend.

READ THIS EXPEDITION BRIEFING THOROUGHLY. It provides the most accurate information available at the time of your Earthwatch scientist's project planning, and will likely answer any questions you have about the project. However, please also keep in mind that research requires improvisation, and you may need to be flexible. Research plans evolve in response to new findings, as well as to unpredictable factors such as weather, equipment failure, and travel challenges. To enjoy your expedition to the fullest, remember to expect the unexpected, be tolerant of repetitive tasks, and try to find humor in difficult situations. If there are any major changes in the research plan or field logistics, Earthwatch will make every effort to keep you well informed before you go into the field.

TABLE OF CONTENTS

NOTE FROM THE PI	2
THE RESEARCH.....	4
DAILY LIFE IN THE FIELD	8
ACCOMMODATIONS AND FOOD.....	10
PROJECT CONDITIONS.....	12
POTENTIAL HAZARDS	15
HEALTH & SAFETY.....	16
TRAVEL TIPS	17
EXPEDITION PACKING CHECKLIST	18
PROJECT STAFF	20
RECOMMENDED READING	21
EMERGENCY NUMBERS	22



NOTE FROM THE PI

DEAR EARTHWATCHER

Welcome to Recovery of the Reef, which is jointly supported by Earthwatch and James Cook University. We are very pleased to have your involvement in a challenging yet rewarding field of science that will focus on understanding the impacts and causes of diseases of declining reef health across the Great Barrier Reef.

Coral reefs around the world are under increasing threats from direct human activities and global climate shifts, which together are contributing to accelerating rates of reef deterioration. In Australia, the Great Barrier Reef is fundamental to our nation's economy and a national icon that needs to be preserved to ensure ongoing sustainability of our marine resources. Warming seawater temperatures, ocean acidification, and increased freshwater inputs carrying pollutants on to these reefs all disrupt the sensitive symbiotic associations that determine the health of corals, the major group of organisms that build the structural framework of coral reefs. Understanding how these environmental stressors cause declining coral health and cover is critical for preventing the loss of coral reefs and an important step towards preserving them for future generations.

This project will be conducted on Magnetic Island, just off the coast of Townsville in the central inshore section of the Great Barrier Reef Marine Park. The island is home to approximately 3000 people, and hence offers excellent facilities for hosting scientists and participants and provides convenient access to surrounding coral reefs.

Research supported by this Earthwatch program focuses on macroalgae, which have come to dominate the inshore reefs around Magnetic Island, and many other inshore reefs throughout the Great Barrier Reef Marine Park. While the direct cause of these benthic community shifts has been debated, it is clear that recent pressures necessitate more direct recovery actions for reef conservation and management to be effective in the future. Macroalgal removal has been proposed as an active intervention measure to aid reef recovery, through reduced competition and increased available substrate for coral recruitment. The baseline information on the effects (both positive and negative) of macroalgal removal on reef community structure and ecology have not been rigorously generated however. This Earthwatch project therefore is focused on quantifying the ecological effects of macroalgal removal on reefs surrounding Magnetic Island through assessing abundance of coral and algal taxa, fish assemblages, coral recruitment levels and the photobiology of coral colonies in permanent replicate quadrats with and without active algal removal. In light of current threats to coral reef systems, it is important to investigate the effectiveness of active reef recovery actions. This is where your help is required; we need to provide the scientific evidence to allow reef managers to make decisions on if macroalgal removal is a good or bad idea for improving reef health.

We look forward to meeting and engaging with you in these scientific activities.

Sincerely,
David Bourne





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THE RESEARCH

RECOVERY OF THE GREAT BARRIER REEF



@IanMcLeod

THE STORY

The Great Barrier Reef (GBR) supports one of the most diverse marine ecosystems on the planet and also provides large economic benefits through fisheries, tourism and other marine-related industries. However, a long-term reef-monitoring program has shown that coral cover on the GBR has halved in the last three decades. Some of the largest identified contributors to the decline of GBR corals are storm-derived physical damage, bleaching and disease. Whether coral reefs damaged by severe disturbance events undergo coral recovery (i.e. the restoration of abundance and composition of coral communities) or a phase shift to ecosystems dominated by non-coral organisms (e.g. macroalgae) defines the resilience of coral reefs, and is often influenced by ecological conditions. In addition to researching coral disease, previous Recovery of the Great Barrier Reef expeditions on Orpheus Island has helped to understand the recovery of coral communities after severe disturbance and the underlying mechanism of coral recovery. For example, it has been shown that branching corals are quick to recolonize areas, and that areas of high wave exposure have higher density of new coral colonies following disturbances.

These studies have provided invaluable information on the fine-scale processes involved in the recovery of coral reefs, specifically around the dynamics of coral populations that are essential for determining reef resilience following major disturbance. However we have moved into an era when repeated disturbance impacts (storms, bleaching, disease outbreaks) have resulted in concerning ongoing declines of reef health globally. Active management intervention has now become a priority for many reef managers, including the Great Barrier Reef Marine Park Authority (GBRMPA). In July 2018, GBRMPA updated its "Reef 2050" plan, the overarching framework for protecting and managing the reef with practical and novel interventions to improve reef health. The baseline information provided by earlier work that established how reefs recover from disturbance can therefore be used to assess the success of any active reef intervention strategy.



Macroalgae flourishes under conditions where terrestrial runoff, increased sedimentation and nutrient loading creates an environment more conducive to macroalgal growth. However other disturbance events such as storms, mass bleaching, and even reduced herbivory creates space for further opportunistic macroalgae proliferation, thereby additionally reducing the opportunity for coral recovery. These conditions can prompt a shift from a coral to a less desirable macroalgae-dominated regime and the return of coral dominance is rare once newly dominant fleshy macroalgae communities have established. While many of the fundamental mechanisms that underpin macroalgae regime shifts have been identified, their persistence and reasoning for why macroalgae regimes are difficult to reverse back to a coral dominated environment are still poorly understood.

The key drivers of coral decline need to be addressed, however active management options offer potential avenues for increasing reef resilience. Macroalgal removal is one such reef recovery method. By increasing space for growth of existing coral colonies and enhancing available space to facilitate coral recruitment, removal of macroalgae has been proposed as one effective local-scale measure to promote reef recovery. However, like other active interventions it has been controversial. Advocates of active algal removal argue that the continuing degradation of coral reefs is evidence enough for the failure of current passive management actions. The negative effects of macroalgae on corals has been documented and includes shading, physical and chemical recruitment inhibition, and abrasion. The removal of macroalgae has been promoted as reducing these negative impacts on corals. Critics of algal removal argue that intervention can harm reef systems both directly, through physical damage caused by the act of removal, and indirectly, through the potential negative impacts on associated fish and invertebrate species. Indeed, in moderate abundances macroalgae are part of healthy ecosystem function, providing food and shelter for a number of species. This debate highlights that a more comprehensive understanding of the positive and negative effects of macroalgal removal is needed to assess its effectiveness. The impacts of macroalgal removal at Magnetic Island have not been assessed, and this work aims to fill critical knowledge gaps which will further the ability of managers to make decisions regarding these active reef interventions.

RESEARCH AIMS

This project has three themed objectives:

1. To test and develop best practices for macroalgae removal on the Great Barrier Reef;
2. To elucidate the effects of macroalgae removal on corals by assessing changes in coral and algal cover, photobiology and coral recruitment success;
3. To elucidate the effects of macroalgae removal on the abundance and diversity of other reef organisms (i.e. fish and other reef invertebrates).

Considering the increasing incidence of macroalgae on coral reefs due to anthropogenic factors, management strategies based on outcomes from this study will be applicable to reef management agencies worldwide.



@Natasha McCuhan

HOW YOU WILL HELP

Participants will assist scientists in a number of activities throughout the project and all activities can be conducted on snorkel or scuba (or a mix of both) depending on the tide height. Planned activities include:

- Establishing replicate quadrats (5X5m) in representative bays around Magnetic Island. This will require fixing star pickets in the hard substrate at sites, marking the sites with underwater buoys and ensuring accurate GPS coordinates and physical maps of the area and plots within the areas.
- Assess the baseline information of abundance of coral, macroalgae, fish and other species within all plots prior to removal of algae.
- Removal of macroalgae from the bottom reef substrate in replicate 5X5m quadrat plots.
- In situ algal height will also be recorded prior to algal removal, and continue in order to evaluate re-growth in treatment plots.
- The whole 5x5m area will be photographed in 1x1m subsections and coral and algal cover will be estimated and monitored for change over the course of the project (for both control and algae removed plots).
- The photobiology of the dominant species of coral colonies will be assessed in each quadrat at each survey time using a diving pulse amplitude fluorometer (PAM).
- Coral recruitment tiles will be conditioned and deployed in each plot (5 per plot) and retrieved after three months and replaced with new sets of conditioned tiles. Retrieved tiles will be examined with a dissecting microscope to identify juvenile corals and determine whether recruitment levels differ between plots with and without macroalgal removal.
- Stationary point counts will be conducted to estimate fish diversity and abundance. For each survey the number, species and size of fish observed over 15 minutes will be recorded.
- 'Cryptic crawls' will also be conducted in each plot. Swimming close to the bottom in a grid-like pattern the number, species and size of cryptic and nocturnal species will be recorded.

All underwater photo and video recording of benthic and fish assemblages both pre-and post macroalgal removal are important activities which will require assistance.

A range of environmental data will also be collected.

For example to assess if removing macroalgae changes sedimentation dynamics for the benthic organisms at the sites, sediment trays will be fastened to the substrate for the duration of the project. Sediment trays will be placed in the control plots, the treatment plots before removal (as macroalgae removal will likely increase displaced sediments) and the treatment plots after removal. In addition, water quality samples will be taken and data loggers recording temperature, will be deployed and retrieved at periods during the study.

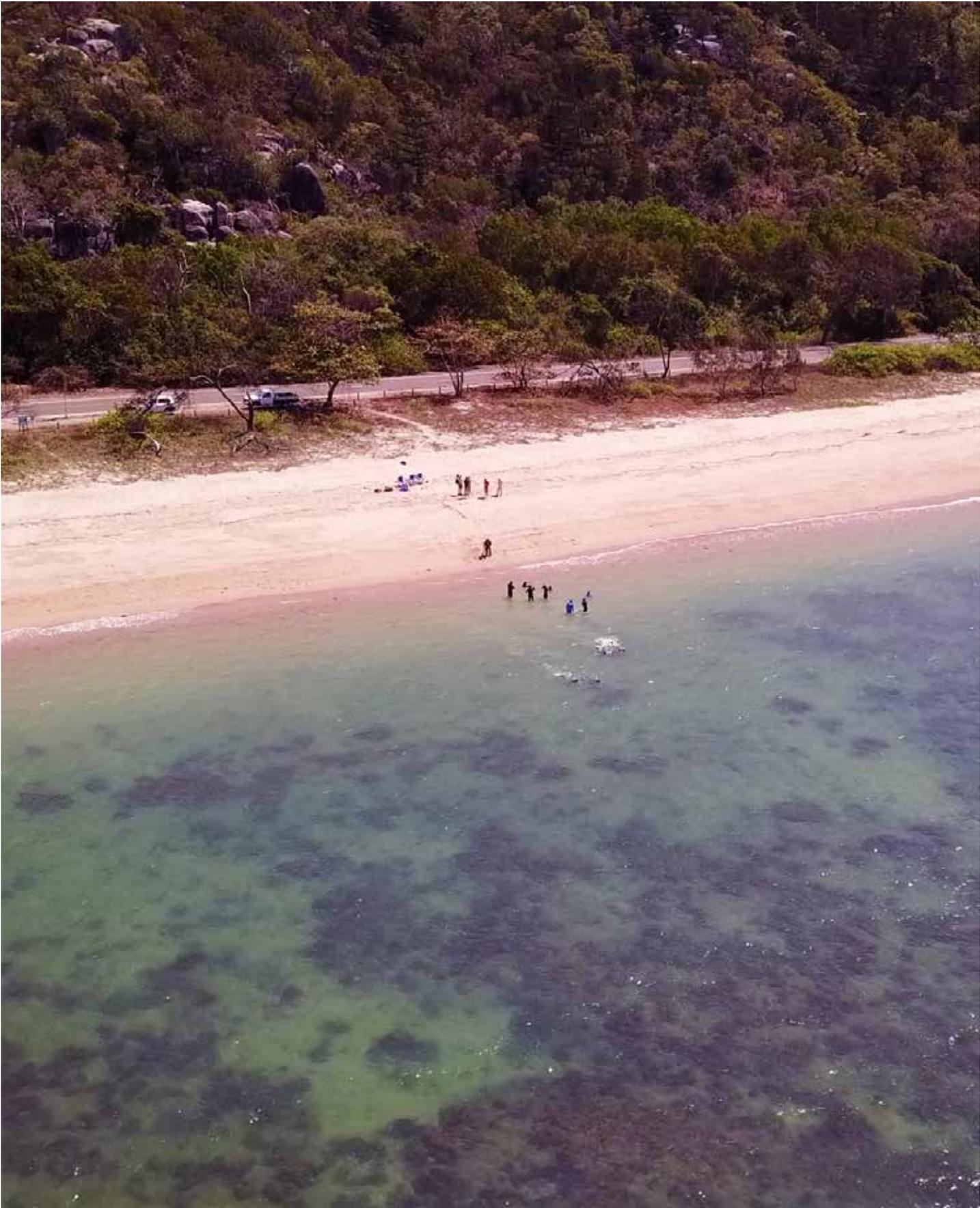
WHY FIELD RESEARCH?

As an Earthwatch participant, you will spend a significant amount of time each day assisting scientists with data collection. Some of this work will be repetitive, but it is fundamental to our scientific understanding of nature. Ecosystems are incredibly complex. The only way to begin to unravel this complexity is by designing good experiments, and carefully collecting as much data as possible. Without the work of thousands of dedicated scientists, we would know little about climate change, the effects of pollution, the thinning of the ozone layer, the extinction of species, or how to find cures for diseases or improve crops. Without science we would be blind to the world. This is your chance to be part of the scientific effort, to find solutions to pressing environmental and cultural problems, and to enjoy the beauty and diversity of nature as you work.



@Lisa Boström Einarsson





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DAILY LIFE IN THE FIELD

PLANS FOR YOUR TEAM



@Nathan Cook

TRAINING

This expedition is conducted at the picturesque Magnetic Island near Townsville in Queensland, Australia. Magnetic Island is approximately 12 kilometers offshore from the city of Townsville and accessed via a regular passenger and vehicle ferry. The team will stay in Picnic Bay for ease of access to the research sites around the island including Nelly Bay, Arthur Bay, and Florence Bay. Before the start of each day's diving activities a 'toolbox session' will be undertaken, to fully explain the aims of the snorkelling and diving activities and how the daily tasks will be performed and achieved. This will include assigning snorkel/dive buddies, work tasks both above and below the water and the expected outcomes. Any potential hazards or dangers will be discussed especially in relation to updated weather conditions. All participants and project staff will wear full wetsuits, dive booties, fins, snorkel and masks. There will be sun exposure risks for all participants whilst in the field, and many visitors underestimate the strength of the Australian sunshine. High factored waterproof sun block should be worn on exposed areas, and hats should be worn while working outside and above water. During each evening a summary of activities from that day will be undertaken and any problems or issues raised and discussed.

On the first day an overview of the project will be given, providing a brief summary of the goals of the project highlighting the benefits this research can bring to the coral ecology field.

Participants do not need any prior training in research methodologies. All methods, tasks and use of equipment will be outlined and demonstrated at the beginning of the project.

TRANSPORT AND DRIVING POLICY

Transport to Magnetic Island will be provided in a small people mover. After the rendezvous in Townsville participants will be taken to the ferry in the project vehicles for transfer to Magnetic Island. The transfer is approximately 40 minutes.

If participants have driven themselves to the project, they may not drive whilst on the project. This includes driving to and from Magnetic Island on the ferry. Participants who ignore this policy and do drive or ride in another participant's vehicle during the project will be doing so at their own risk and will not be covered under the Earthwatch insurance policy for the expedition.

SAFETY BRIEFING

Once participants have settled into the accommodation on Magnetic Island, a further project and safety briefing will be conducted in the common room at the accommodation. This briefing will specifically highlight any safety issues on the Island and sort out basic operating procedures including timetables for cooking, cleaning and planned field activities.



GENERAL DIVE PROCEDURES

To help in training of participants for the fieldwork, a dive and snorkel induction will be carried out in the calm water near the accommodation. This is planned for the first day just after arrival on Magnetic Island. Participants can acclimatize themselves to the diving and snorkeling activities including preparation, communication involved and familiarization with any equipment to be used (e.g. cameras, transect tapes etc.). After the dive, a debrief will occur to highlight any issues or concerns for participants prior to the start of the science based activities.

An Earthwatch Dive Supervisor (certified Dive Master or Instructor) will be present on all Earthwatch projects that involve SCUBA. The Dive Supervisor is responsible for all aspects of safe diving and snorkelling. He/she will also inform divers about safety procedures, environmental rules and regulations, and safe diving limits. The Dive Supervisor has the right to exclude anyone from participating in SCUBA activities if they fail their checkout dive, dive unsafely, or place themselves or others in a situation of undue risk. The Dive Supervisor may limit or modify the planned diving activities if he/she determines that a participant does not have suitable abilities to participate safely. If the Dive Supervisor determines that the conditions are not suitable for diving, he/she may halt SCUBA or other in-water activities at any time.

For further information on Earthwatch Diving Operations please contact the Earthwatch Australia office: +61 (0) 3 9016 7590.

ITINERARY AND DAILY SCHEDULE

Weather and research needs can lead to changes in the daily schedule. We appreciate your cooperation and understanding.

DAY 1 ARRIVAL/TRAVEL DAY

11:00 a.m.–3:00 p.m.	<ul style="list-style-type: none"> • Arrive at Townsville and meet the team. • Travel to Magnetic Island • Settle in accommodation • Safety briefing and orientation
Afternoon	Organization of research equipment and dive/snorkel gear
Late afternoon	Preliminary dive/snorkel to assess ability of all participants—area near the accommodation
6:00 p.m.–7:30 p.m.	Dinner

DAYS 2–4 FIELDWORK DAYS

7:00 a.m.–8:00 a.m.	Breakfast
8:00 a.m.–9:00 a.m.	<ul style="list-style-type: none"> • Morning brief on the day's activities: • Outline the aims for the field-based activities for that day. • Prepare all equipment and supplies and load the boats in preparation for leaving.
9:00 a.m.–9:30 a.m.	Travel to the site for that day.
9:30 a.m.–4:00 p.m.	<ul style="list-style-type: none"> • Undertake the day's field activities, which will usually include 2 x 90 minute snorkels/dives with more than 1-hour surface interval. • Lunch taken between dives.
4:00 p.m.–5:00 p.m.	<ul style="list-style-type: none"> • Return to accommodation • Wash all gear, clean required equipment and fill scuba tanks for the next day
5:00 p.m.–6:00 p.m.	• Free time for showers, personal activities
6:00 p.m.–7:30 p.m.	• Dinnertime
7:30 p.m.–8:30 p.m.	• Summary of the day's activities plus a scientific talk on relevant marine topics.

DAY 5 TRAVEL DAY

Morning	Breakfast, pack and tidy up and depart Magnetic Island and return to Townsville.
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ACCOMMODATIONS AND FOOD

ABOUT YOUR HOME IN THE FIELD



The project is delivered on Magnetic Island, and participants will stay at a beachfront holiday home in Magnetic Island. Single gender rooms are assigned with 2 participants per room. Participants will have access to the kitchen and recreational facilities offered there (e.g. swimming pool).

SLEEPING

Rooms are shared; gender segregated. Couple room requests can be accommodated depending on the available space at the holiday home. Each room is equipped with a ceiling fan, air conditioner, and has screened windows. Bed linens (flat and fitted sheet, pillow and pillowcase are provided). Participants on Team 2 (July) may encounter cooler overnight temperatures, and so a blanket/sleeping bag (appropriate for the temperatures encountered) may be required depending on how cool you feel at night. Participants will also need to bring towels (two lightweight travel towels are recommended).

BATHROOMS

There are 4 bathrooms throughout the house. These shared facilities offer hot water showers and toilets. Participants may wish to bring a pair of sandals for the shower.

ELECTRICITY

There is 24-hour electricity and all rooms are equipped with working power sockets. Participants are asked to conserve energy wherever possible to help conserve power consumption. Additionally due to changes in load demand, this may result in low level surges in the power supply. It is recommended that if visitors are using sensitive electronic equipment to bring surge protection boards.

PERSONAL COMMUNICATIONS

There is no Wi-Fi at the accommodation, neither desktop internet nor computers so participants will have to bring their own laptop and Wi-Fi dongles should they wish or need to use internet during the expedition. Mobile phone reception is widely available on Magnetic Island. Telstra Mobile tends to have the best coverage in Australia. Communication between teams of participants on-site will be via VHF radio.



FACILITIES AND AMENITIES

Magnetic Island is home to ~3000 people, and so the island has shops and amenities available to participants. However, variety and supply may be limited, so participants who require any specialty items (dietary, personal), are recommended to bring them and not expect that they will be available on the island.

DISTANCE TO THE FIELD SITE

Participants will be transported to the field locations, and the furthest distance between sites is ~8 km by land. All sites are within the bays of Magnetic Island and so accessible from shore. A boat will provide support for in water activities, though this will depend on what activities are planned for the day/season.

FOOD AND WATER

Earthwatch will provide all food during your stay at the research site.

Participants and staff will be responsible for making their own continental breakfasts in the morning.

Lunch will be had in the field, and participants and project staff will be expected to make their own sandwiches in the morning before departing. Fruit and snack foods (e.g., muesli bars) will be available to pack as well.

Dinner will be a cooked meal and all participants will be expected to participate in the preparation of meals according to a roster. Be prepared to have a little fun with this! The Principal Investigator organizes a friendly "master chef" style competition from the cooking roster, and many participants enjoy this wholeheartedly. Evening meals will be hearty and comprise meats, vegetables, pastas, rice etc. BBQs will be planned but will be dependent on weather.

Housekeeping will be shared, with small teams assigned to duties each day. Tasks may include washing and drying dishes, sweeping the kitchen floor, wiping benches, cleaning the bathroom, packing away chairs and tables after meals etc. A roster with full tasks will be established on the first day of the project.

Fresh drinking water will always be available at the accommodation quarters. Magnetic Island is supplied with treated potable town water and is suitable for drinking without treatment. Water should not be wasted however as the Island is in the dry tropics.

Tea and coffee will also be readily available at the accommodation.

The following are examples of foods you may find in the field. Variety depends on availability. We appreciate your flexibility.

TYPICAL MEALS

BREAKFAST	Cereal, toast and spreads.
LUNCH	Sandwich meats, spreads and salads, cheese, fresh fruit, muesli bars.
DINNER	Pasta, curries, stir-fry, BBQ meat and salads, sauces, etc.
SNACKS	Crackers, fruits, sweet biscuits, muesli bars.
BEVERAGES	Coffee, tea, milk, fruit juices / cordial, water.

SPECIAL DIETARY REQUIREMENTS

Please alert Earthwatch to any special dietary requirements (e.g., diabetes, lactose intolerance, nut or other food allergies, vegetarian or vegan diets) as soon as possible, and note them in the space provided on your participant forms.

Accommodating special diets is not guaranteed and can be very difficult due to availability of food, location of field sites, and other local conditions.



PROJECT CONDITIONS

THE FIELD ENVIRONMENT



@Ole Brodnicke

The following are averages. Please check weather resources for your team dates for more accurate weather predictions. Projects have experienced unseasonable weather at all times of year.

The weather is expected to vary within the limits below.

The climate at Magnetic Island is tropical, with the summer (November to April) hot and humid with the temperature in the high 20s °C (mid 80s °F). The rainy months are during December to March with an average annual rainfall of 1200mm (3.9 ft.). Summer winds are variable, with extended calm periods. Cyclones developing in the Coral Sea (November to May) may produce strong winds and heavy rains, but rarely threaten the island. Southeast trade winds dominate the cool, sunny, dry season from June to November. During this period daily temperatures may be variable and a range of attire is recommended with overnight temperatures dropping to 20° Celsius.

Water temperatures range from 25 to 27° Celsius (82 to 86° Fahrenheit) in summer and can drop as low as 23° Celsius (75° Fahrenheit) in winter.

GENERAL CONDITIONS			
	MAY	JULY	OCTOBER
HUMIDITY	65%	62%	67%
TEMPERATURE RANGE	17-27° C / 65-80° F	15-24° C / 55-75° F	20-30° C / 68-85° F
AVERAGE RAINFALL	50mm/ 1.8 inches	20mm/ 0.5 inches	35mm/ 1.1 inches
ALTITUDE	Sea level	Sea level	Sea level



WATER CONDITIONS			
	MAY	JULY	OCTOBER
TYPICAL WATER TEMPERATURE AT WORKING DEPTHS	24°C / 75°F	22°C / 72°F	24°C / 75°F
TYPICAL WATER VISIBILITY:	2–10m / 6.6–33ft, variable based on winds and season		
TYPICAL MAXIMUM WATER DEPTH (BOTTOM DEPTH) IN AREA:	3–10m / 9.8–33.4 ft.		
SITE DIVING TYPE:	Fringing Reef		
ANTICIPATED DEPTH OF DIVES:	3–10m / 9.8–33 ft.		
ANTICIPATED NUMBER OF DIVES PER DAY:	2–3		
DIVES INITIATED FROM:	Shore and Boats		
TIMING OF DIVES:	During the day		
ACCESS AND EGRESS INTO/FROM WATER	From shore or by boat		
DIVING BOTTOM LIMIT (20M/65FT IS MAX. UNDER EARTHWATCH POLICY):	10m/ 33ft		



@Ole Brodnicke

ESSENTIAL ELIGIBILITY REQUIREMENTS:

PHYSICAL DEMANDS: The project can be very demanding physically, due to strong currents and sea swell. Those who are prone to seasickness should bring preventative treatments with them. If you feel nauseous, it is best to stay in the water rather than get back on board the vessel, as the rocking of the boat is likely to make you feel worse.

EXPECTED DEMANDS OF THE PROJECT: Please keep in mind that conditions may change and the project could potentially be more or less strenuous than these points indicate.

All participants must be able to:

- Follow verbal and/or visual instructions independently or with the assistance of a companion.
- Enjoy being outdoors all day in all types of weather, in the potential presence of wild animals and insects.
- Dive/Swim/Snorkel twice a day for 90 minutes each.
- Sit for 2–3 hours per day (travel via vehicle or boat, evening lectures).
- Walk some distance over rough terrain (up to 1 km) to access research sites (the bays may be away from the roads).
- Carry their dive equipment to and from the boat and/or shore and may help carry research equipment. The distance differs according to the tide level and boat support for the activities, and it may be in shallow water (up to 50 cm).
- Bend up to two hours per day when doing field work and cleaning field gear.
- Work on a boat for 4–6 hours a day. Travel to some research sites may be via boat and take no longer than 30 minutes. One hour surface time will be spent on the boat or on shore depending on weather conditions.
- Adhere to the briefing guidelines, be aware of their limitations and apply common sense while participating.

BOATING REQUIREMENTS

In order to assist on the research boat you will need to be relatively fit and agile. Although research boats may have a canopy for shading, sun protection is required for the one-hour surface interval and other field activities. Depending on winds, the trip may be bumpy and participants may feel cold on the return trip after being in the water all day. An all-weather proof or windbreaker jacket may be advisable.



DIVING REQUIREMENTS

Diving is a physically demanding activity with inherent risks. Safety procedures are established to minimize the risk associated with diving and should be adhered to closely. If you intend to dive, you must be in good physical condition and must have undergone a recent physical examination by a certified SPUMS Dive Examiner. An individual with heart trouble, current cold or congestion, ear infection, epilepsy, asthma, a severe medical problem or is under the influence of alcohol or drugs should not dive without a physician's explicit approval.

In order to register as a scuba diver on this project, you need to meet the requirements and supply copies of all supporting documentation (see below). In addition, this project in particular requires competent divers. Divers must have experience in low visibility and strong currents. You may be required to present documentation (written log) demonstrating this, therefore the original documents may need to be brought along.

Costs may vary between doctors and you may be required to have a chest x-ray as well. You will need to have your x-ray and x-ray report with you for the Occupational/Commercial Dive Medical examination. If you are unable to see a SPUMS registered doctor before your arrival in Australia, you will need to organize an appointment in Australia prior to fielding. It is necessary that you bring your original chest x-ray and doctor's x-ray report (in English) from your country of residence with you in order for the Occupational/ Commercial Dive Medical to be completed within Australia. You may also be able to have an equivalent medical done in the United States (or elsewhere) through doctors certified by the Undersea and Hyperbaric Medical Society (UHMS) to undertake commercial divers exams.

Please note that you will have to arrive at least a day before the project's commencement if you are seeing a doctor in Australia.

CHECK	REQUIREMENTS	DOCUMENTATION REQUIRED
<input type="checkbox"/>	Hold at least an 'Open-Water' diver certification from a recognized diver training agency	Dive Certification Card
<input type="checkbox"/>	Have a working familiarity with the short form DCIEM Air Decompression Tables	No documentation required
<input type="checkbox"/>	Pass an Occupational/commercial dive medical within 12 months prior to diving by a medical practitioner appropriately trained in underwater medicine and registered with SPUMS*	Supply a diving medical exam (equivalent to an AS/NZS 2299 medical) from a SPUMS registered doctor dated within 12 months of the start date of the project stating that the diver is fit to dive using compressed air, as well as noting any limitations imposed by the doctor. Please contact the Earthwatch offices by phone or email to ensure that your appointment is for the correct type of medical exam.
<input type="checkbox"/>	Have logged at least 30 dives since completion of 'Open-Water' dive course, with at least one of those dives logged within six months of the start date of the project, and in waters similar to those of the planned dive (e.g. temperate)	Copy of last 30 dives from dive log (Please bring full dive log on trip) with evidence that your last dive was within six months of the start date of the project
<input type="checkbox"/>	If intending to use your own SCUBA diving equipment, it must be serviced 12 months prior to diving and will be inspected by the Dive Supervisor prior to diving	Evidence to show that the equipment is in current test and/or has been serviced within 12 months prior to diving
<input type="checkbox"/>	Hold dive insurance, which provides emergency evacuation service as well as dive accident treatment cover.	DAN Dive Insurance Card or equivalent (stating what type of coverage is provided (e.g. Standard, Preferred or Master). See danasiapacific.org/index.php .

* You can find a doctor nearest to you at the South Pacific Underwater Medicine Society site (SPUMS): spums.org.au/diving-doctors-commercial by clicking the commercial diving doctor list.



POTENTIAL HAZARDS

RECOVERY OF THE GREAT BARRIER REEF

HAZARD TYPE	ASSOCIATED RISKS AND PRECAUTIONS
Transportation	Some driving may involve rough roads on 4WD tracks. All vehicles are equipped with airbags, seatbelts, spare tires, first aid kit with Emergency Response Plan and mobile phone. Only experienced and suitably qualified project staff will drive vehicles and they will obey all road rules. Passengers and driver will be instructed to wear seat belts at all times whilst the vehicle is in motion. Participants are not allowed to drive (including their own vehicles) while on an Earthwatch team.
Working in boats	Boats are well maintained, and include VHF radio, life preservers, emergency flares, fire extinguisher, and first aid kit. Life jackets are available for all passengers. All participants and project staff will be wearing wetsuits, which assist with buoyancy. All participants must be able to swim, and must disclose their swimming ability to project staff in advance. The boat is only used in daylight hours and only when sea state is acceptable to the skipper. The skipper is certified and experienced in driving boats in the area. Boat communications include EPIRB, flares, VHF radio and mobile phones. There is a communications plan with the team outlining boat return time, destination and people manifest.
Slips and Trips	Participants may need to board the boat by the boat ramp or by walking out onto the beach to the closest point where the boat can get in due to tides. Participants are instructed to be careful when embarking and disembarking the vessel and should hold onto the handrail or sides of boat. Participants should always wear their booties when walking out on the reef and boarding the boat.
Diving	Scuba diving is a physically demanding activity with inherent risks. Safety procedures are established to minimize the risk associated with diving and should be adhered to closely. As with all diving activities there is a risk of a decompression illness (DCI). There isn't a recompression chamber on the island; therefore, there will be strict diving restrictions imposed. Only participants who have passed a dive medical, have appropriate insurance, and have provided evidence of significant dive experience can participate on Earthwatch dive projects. A Dive Supervisor is always present with divers. Oxygen is kept on board the boat. Project staff are first aid qualified. Participants are buddied up based on experience. Participants are guided down and up slowly in order to prevent descending and ascending too quickly. There is a diver response plan in place.
Poisonous and stinging marine animals	There is potential for participants or staff to be stung or bitten by some species of marine life present (for example stonefish, sea snakes, stingrays, and various jellyfish). Participants should wear wetsuits, flippers and mask, which will provide protection from most stinging wildlife. Participants are instructed not to pick anything up or touch any marine creatures. If participants are stung they should alert project staff and apply first aid according to what has caused the sting. Participants should wear booties or some closed footwear when walking in the water and shallow reefs in the bay.
Sharks/Crocodiles	There is low risk of encountering a dangerous shark or a crocodile on the project. If a shark or crocodile is present nearby and advance warning has been given to the team via the local authorities, then research activities will be cancelled in that location. Sharks will most likely demonstrate aggressive behavior before they strike, however crocodiles are known to be 'ambush predators', and so precautions will be taken when near the water (when not on scuba) if a crocodile is known to be present in the area. If a shark is spotted and displaying aggressive behavior, all participants will evacuate the water as quickly as possible.
Heat related illnesses, dehydration	Participants should bring waterproof sunscreen. Participants should drink plenty of water throughout the day. If participants start to feel unwell they should notify a project staff member immediately and rest in a shaded area, whilst cooling themselves with water.
Coral rubble and sharp shells	Participants should not go barefoot when walking around the accommodation or when walking out on the reef.
Gas stove	Participants will be cooking on gas stoves and the risk of burns is possible. Participants will be briefed about the cooking facilities and warned to take care when using any gas elements.
Snakes	Venomous snakes are found on the island. If participants come across a snake, they should not try to catch it or kill it. Participants should back away from the snake and let it be. Participants will be briefed on snakes on arrival and advised to wear closed in shoes when walking around the island.



HEALTH & SAFETY

RECOVERY OF THE GREAT BARRIER REEF

EMERGENCIES IN THE FIELD

The nearest medical care and pharmacy is available on Magnetic Island. Participants would be transported by project vehicle to medical assistance, which takes approximately 25 minutes at most. For more serious injuries participants would be transferred directly to the hospital in Townsville. This would take approximately 40 minutes via boat to Townsville then ambulance (if necessary) to the hospital. For life threatening injuries, Royal Flying Doctors will be called and participants would be airlifted from the island directly to Townsville hospital.

For emergency assistance in the field, please contact Earthwatch's 24-hour emergency hotline number on the last page of this briefing. Earthwatch is available to assist you 24 hours a day, seven days a week; someone is always on call to respond to messages that come into our live answering service.

PROXIMITY TO MEDICAL CARE

PHYSICIAN, NURSE, OR EMT ON STAFF: Project staff are not medical professionals.

STAFF CERTIFIED IN SAFETY TRAINING: All JCU team members are qualified in CPR and hold a First Aid / oxygen provider certificate. All Earthwatch Team Leaders are qualified in CPR and hold a First Aid certificate.

NEAREST MEDICAL TREATMENT

MAGNETIC ISLAND HEALTH SERVICE CENTRE

76 Swooning Street, Nelly Bay
Magnetic Island 4819 Queensland
+61 (0)7 4778 5107

Located in Nelly Bay near the project site.

THE TOWNSVILLE HOSPITAL

100 Angus Smith Drive
Douglas, QLD 4814

Mailing Address: P.O. Box 670, Townsville QLD 4810

Telephone: (within Australia) (07) 4796 1111
(International) +61 7 4796 1111

Fax: (07) 4796 1197

Travel time from project: 15 km/40 minutes by boat and ambulance

IMMUNIZATIONS

Please be sure your routine immunizations are up-to-date (for example: diphtheria, pertussis, tetanus, polio, measles, mumps, rubella and varicella) and you have the appropriate vaccinations for your travel destination. Medical decisions are the responsibility of each volunteer and his or her doctor, and the following are recommendations only. Visit the cdc.gov or who.int for guidance on immunizations.

If traveling from countries or region where yellow fever is endemic, you must have a certificate of vaccination.

MEDICAL CONDITIONS OF SPECIAL CONCERN

Hydrophobia, discomfort in or around boats; uncontrolled inner ear infections, conditions that reduce or limit your ability to equalize pressure in one's ears; conditions that affect balance, blood clotting issues and/or any condition that interferes or limits a participants' swimming or breathing should be considered carefully. If you are pregnant, you should inform your doctor prior to diving. If you suffer from motion or seasickness and intend to treat this with either over-the-counter or prescribed medication, please discuss the use and side effects with your doctor.

CONDITION CONCERNS AND PRECAUTIONS

Medical Complaints	Due to the remoteness of the area and the time it takes to evacuate, those who may require quick access to medical care due to any medical complaints should not take part on this project.
Allergies	Those with known allergies to dust, grasses, mammals, plants or insects (including mosquitoes and sandflies) should bring appropriate medications in order to participate on this project. Those with severe bee sting allergies should bring an Epi-Pen and carry it with them at all times.
Back or neck problems	Those with chronic or constant back or neck pain should be aware that some days may require travelling on the boat in bumpy conditions and should reconsider their ability to participate.
Knee or ankle problems	This project requires bending and lifting as well as participants to walk over uneven and steep terrain.
Physical limitations	Participants with physical limitations should be aware that the work involved generally requires a good level of fitness.

NOTE: Any prescription medication brought into Australia needs to be accompanied with a letter from your doctor for Customs Inspection purposes.



TRAVEL TIPS

SUGGESTIONS FOR THE ROAD



YOUR DESTINATION

LANGUAGE: English

TIME ZONE: GMT/UTC +10 hours

LOCAL CURRENCY: Australian Dollar

PERSONAL FUNDS: No funds are required for the expedition, however participants may wish to take some cash (AUD\$) with them to buy snacks and beverages. For those traveling from overseas, airports and most major towns will offer banks and/or ATM's for cash withdrawals (please check with your bank beforehand to see if your cards are compatible with Australian ATMs). In most locations you can use EFTPOS or credit cards for large purchases but smaller purchases are typically paid for with cash.

Please also check with your bank in regards to accessing your money within Australia. You may require additional funds while traveling before/after your expedition—MasterCard and Visa are widely accepted throughout Australia, however cash is preferred for small purchases.

COUNTRY AND PROJECT ENTRY REQUIREMENTS

Entry visa requirements differ by country of origin, layover, and destination, and do change unexpectedly. For this reason, please confirm your visa requirements at the time of booking and, again, 90 days prior to travel. Please apply early for your visa (we recommend starting 6 months prior to the start of your expedition). Refunds will not be made for volunteers cancelling due to not obtaining their visa in time to meet the team at the rendezvous. You can find up to date visa requirements via the following site:

www.travisa.com

If a visa is required, participants should apply for a TOURIST visa. In most cases, this can be done online through Australia's Electronic Travel Authority. For more information, please see: <https://immi.homeaffairs.gov.au/visas/getting-a-visa/visa-listing/electronic-travel-authority-601>

Generally, passports must be valid for at least six months from the date of entry and a return ticket is required.

CONTACT INFORMATION

You may be required to list the following contact information on your visa application and immigration form, or if your luggage does not make it to baggage claim at your destination:

Andrea Haas, *Field Operations Manager*
Suite G-07, Ground Floor
60L Green Building, 60 Leicester Street
Carlton
VIC 3053, Australia

Email: ahaas@earthwatch.org.au

Ph.: +61 (0) 3 9016 7590



EXPEDITION PACKING LIST

WHAT TO BRING

EXPEDITION PACKING CHECKLIST

GENERAL

- This expedition briefing
- Your travel plans, rendezvous details, and Earthwatch's emergency contact information
- Photocopies of your passport, flight itinerary, and credit cards in case the originals are lost or stolen; the copies should be packed separately from the original documents
- Passport and/or visa (if necessary)
- Certification of vaccination (if necessary)
- Documentation for travel by minors (if necessary)
- AUSTRALIAN RESIDENTS ONLY:** Please bring your Medicare card and (if applicable) your private health insurance and ambulance cover policy numbers

DIVE GEAR

NOTE: These items may not be available on the island and should be brought with you. There are dive shops on the island which might carry spare equipment although supply cannot be guaranteed at the last minute.

- Dive booties, thick soled for walking across the reef
- Mask
- Snorkel
- Fins
- Full wetsuit (long arms and legs).
For July trip, 3–5mm is recommended.
- Gloves
- Hood (optional, if you feel the cold).

FOR DIVERS:

- BCD
- Regulator

DOCUMENTS FOR SCUBA PARTICIPANTS

- Dive insurance card (stating what coverage is provided)
- Dive log
- Dive qualifications
- Commercial/Occupational dive medical from certified SPUMS doctor.

CLOTHING/FOOTWEAR FOR FIELDWORK

- Long-sleeved shirt or rash guard for sun protection on the boat, and to wear under wetsuit
- Warm wind/waterproof jacket
- Wide-brimmed hat
- Swimsuit(s)
- Sunglasses (polarized lenses are best)—neck strap recommended

CLOTHING/FOOTWEAR FOR LEISURE

- Shorts
- T-shirts
- Footwear for walking around island (thongs, sandals or sneakers)
- Pajamas or other sleepwear (please see the temperatures anticipated on your team to determine how warm your sleepwear should be).

FIELD SUPPLIES

- Small daypack (large enough to hold below listed items)
- Dry-bag or plastic sealable bags (good for protecting equipment such as camera from dust, humidity, and water)
- Insect repellent spray
- Water bottle(s)
- Waterproof sunscreen with SPF 30 or higher
- Beach Towel

BEDDING AND BATHING

NOTE: Sheets, pillows (and pillowcases) are provided on this expedition. Team 2 will have cooler evening/overnight weather and participants on that team may wish to bring a blanket or a sleeping bag for additional warmth.

- Towel (**PLEASE NOTE:** Two towels are recommended, one for showering, one for in the field—as under “Field Supplies”)



EXPEDITION PACKING CHECKLIST

PERSONAL SUPPLIES

- Personal toiletries (biodegradable soaps and shampoos are encouraged)
- Antibacterial wipes or lotion (good for cleaning hands while in the field)
- Personal first aid kit (e.g., anti-diarrhea pills, antibiotics, antiseptic, itch-relief, pain reliever, bandages, blister covers, etc.) and medications
- Spending money

OPTIONAL ITEMS

- Flashlight or headlamp with extra batteries and extra bulb
- Earplugs for light sleepers
- Hardware for sharing digital photographs at the end of the expedition
- Travel guidebook
- Books, games, journal, art supplies, etc. for recreational/rest time and travel

- Water-resistant wristwatch
- Underwater camera, film/memory card(s), extra camera battery (if you bring a digital camera, bring your interface cables for downloading)
- Binoculars
- Pencil, pen, notebook
- Bathrobe
- Dive Computer or tables
- Visual dive safety signal (an inflatable "safety sausage")
- Dive knife (preferably small and mounted on your body or equipment, as opposed to placed in a pocket)

NOTE: Do not bring more luggage than you can carry and handle on your own. If traveling by air and checking your luggage, we advise you to pack an extra set of field clothing and personal essentials in your carry-on bag in case your luggage is lost or delayed.



PROJECT STAFF

YOUR RESOURCES IN THE FIELD



NOTE: The specific staff scheduled to run your team is subject to change.

EARTHWATCH SCIENTIST ASSOC. PROF. DAVID BOURNE holds a joint appointment at James Cook University and the Australian Institute of Marine Science (AIMS). Over the past three years his focus has been on developing a research, teaching, and research-training program around macro and micro ecology of coral reefs with a particular emphasis on the benthic invertebrates such as corals which build the reef structure. This work extends to understanding how environmental degradation is and will further impact coral reefs globally. His training is in the area of molecular microbial ecology with a strong research focus on investigation of microbial diversity, structure and function in complex marine ecosystems. Although having a broad research profile around impacts on marine ecosystems and coral reefs in particular he has specifically focused research essentially into two areas, the first investigating the normal microbial communities associated with corals and their functional roles in maintaining coral fitness. The second research focus is to elucidate pathogens and mechanism of disease onset in corals and the implications this has on a stressed reef ecosystem in light of climate change being a major driver of coral reef degradation. **David is the Principal Investigator on Recovery of the Reef and will be present on all teams.**

NOTE: In addition, there will be various Research Assistants joining the expedition. A staffing schedule is still to be announced.



RECOMMENDED READING

YOUR RESOURCES AT HOME

RESOURCES

BOOKS

- Introduction to Marine Biology. George Karleskint, Richard Turner, James Small. (2006) Brooks/Cole, USA.
- Coral Reefs in the Microbial Seas (Forest Rohwert).
- Corals of the World (Chalie Veron)

ARTICLES

- "Major Reef Building Coral Diseases 2010"
<http://coris.noaa.gov/about/diseases/>

FILMS

- Coral Reef Adventure (coralfilm.com)
- The Blue Planet (BBC)
- Chasing Coral (NetFlix)
- Saving Atlantis (Oregon University)

PROJECT RELATED LINKS

- Townsville: townsville.qld.gov.au/Pages/default.aspx
- James Cook University: www.jcu.edu.au
- Australian Institute of Marine Science: www.aims.gov.au

SOCIAL MEDIA: EARTHWATCH AUSTRALIA

- FACEBOOK: facebook.com/EarthwatchAustralia
- TWITTER: twitter.com/Earthwatch_Aus
- YOUTUBE: youtube.com/user/EarthwatchAus
- INSTAGRAM: instawebgram.com/i/earthwatch_aus

SOCIAL MEDIA: EARTHWATCH INTERNATIONAL

- FACEBOOK: facebook.com/Earthwatch
- TWITTER: twitter.com/earthwatch_org
- INSTAGRAM: instagram.com/earthwatch
- BLOG: <https://blog.earthwatch.org/>
- YOUTUBE: youtube.com/earthwatchinstitute



EMERGENCY NUMBERS

AROUND-THE-CLOCK SUPPORT



MESSAGE FROM EARTHWATCH

DEAR EARTHWATCHER,

Hello and welcome to the team!

You will soon be embarking on an exciting and meaningful adventure to some of the most spectacular regions of our planet. It's a special place here on Earth, and with your help we are working hard to keep it that way for all life that exists.

We unfortunately face a variety of environmental pressures today and by joining this Earthwatch expedition you are not only saying you care, but more significantly, that you are prepared to do something about it. The work you will undertake will help contribute to solving critical environmental issues, help shape policies and behaviours and enhance protection of culture, wildlife and ecosystems. Without your help scientists would need to spend weeks, months or even years collecting the same amount of data you and your team will collect in just a few days!

We can't thank you enough for your choice to take a slightly different holiday this year, and we hope you get out of the experience as much as we do by bringing scientists and volunteers together to work towards a better future.

If you have questions as you prepare for your expedition, please contact our Earthwatch office. Thank you for your support, and enjoy your expedition!

Best regards,

Cassandra Nichols
Chief Executive Officer, Earthwatch Australia





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