



EARTHWATCH 2017

# PROJECT MANTA NINGALOO REEF



## DEAR EARTHWATCHER,

Welcome to the Project Manta Ningaloo Reef expedition! Your journey will begin in Coral Bay at the heart of the Ningaloo Reef in Western Australia. Ningaloo Reef has only recently been inscribed on the UNESCO World Heritage register, acknowledging its place as a globally significant natural wonder whilst putting it on the world stage as a tourism destination. The expedition you are joining will highlight to you the reasons for this inscription, as you interact with the plethora of mega fauna and micro fauna within a few kilometers of the shore. At the same time you will gain an appreciation of the threats this amazing ecosystem faces in light of climate change and the unique natural safeguards currently keeping these threats at bay.

Manta rays play a key role in any habitat they interact with, regulating recruitment of organisms by actively preying on their larvae in a methodical manner. The exact influence they have though and the repercussions of their absence are far from known and comprise some of the main gaps in our understanding of manta ray ecology. At Ningaloo, over 800 individual manta rays have been identified, with a core resident population present on the reef year-round. Globally Manta rays are under threat from both direct fishing pressure and the changing state of the planktonic assemblage through ocean acidification. Ningaloo reef with its healthy reef ecosystem and protection from fishing pressures provides a perfect environment to study manta rays and how they should be interacting with their environment, in a safe accessible lagoonal system.

As a volunteer on this expedition, you will help gather information vital to our understanding of where manta rays fit into the Ningaloo Reef ecosystem. During your time as a member of our field team you will immerse yourself daily in the aqua blue of Ningaloo, collecting data at all levels of the food chain. From observing and photographing manta rays themselves, capturing planktonic prey to assess its availability and quality, to recording sightings of reef and tiger sharks, your daily activities will help us further protect not only manta rays themselves but their key habitats within the Ningaloo Coast World Heritage Area, and further afield along the Western Australian coast.

We look forward to meeting you where the desert meets the sea, sharing our knowledge, sharing new discoveries, and welcoming you to our manta family!

Best wishes

Frazer McGregor and Dr. Mike Van Keulen  
Earthwatch Scientists

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# GENERAL INFORMATION

## PROJECT MANTA NINGALOO REEF



### EARTHWATCH SCIENTISTS

**Frazer McGregor** (Murdoch University)

**Dr. Mike van Keulen** (Murdoch University)

### RESEARCH SITE

Coral Bay, Western Australia, Australia.

### EXPEDITION DATES

**Team 1:** May 14–May 20, 2017

**Team 2:** Oct. 8–Oct. 14, 2017

**Complete travel information is not available in this version of the briefing.**

**Please contact Earthwatch with any questions.**



# TRIP PLANNER

## PROJECT MANTA NINGALOO REEF

### TRIP PLANNER

#### 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 when your expedition is booked.

#### 90 DAYS PRIOR TO EXPEDITION

- Log in at [earthwatch.org](http://earthwatch.org) to complete your volunteer forms.
- Pay any outstanding balance for your expedition.
- Book travel arrangements (see the Travel Planning section for details).
- If traveling internationally, make sure your passport is current and, if necessary, obtain a visa for your destination country.

#### 60 DAYS PRIOR TO EXPEDITION

- Make sure you have all the necessary vaccinations for your project site.
- Review the Packing Checklist 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 relative or friend.
- Leave copies of your passport, visa, and airline tickets with a 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



# THE RESEARCH

## PROJECT MANTA NINGALOO REEF



### THE STORY

Manta rays are the largest ray species on the planet reaching over 7m in disc width. There are two species known to occur in Western Australian (WA) waters, *Manta birostris* the large migratory oceanic species, which has a highly seasonal pattern of visitation and *Manta alfredi*, a slightly smaller species that claims the title of the largest resident planktivore at coral reefs along the coast. At Ningaloo Reef the coastal manta ray is present within the shallow lagoons year round providing researchers with a unique opportunity to investigate the role manta rays play in maintaining reef health.

Although manta rays are commonly seen and dived with along the coast and research has been undertaken for several years, there is relatively little known about their biology, ecology and life history throughout their range.

For example, there is a need to collect ongoing data along the WA coast to better understand:

- Population dynamics
- Migration and genetic mixing
- Affinities to certain sites
- Reproductive and life histories
- Resource partitioning between species
- Threats: both anthropogenic and other

Project Manta WA aims to build on what information has been collected by our lead scientists and rectify this paucity of data through a comprehensive and collaborative study, which reaches from the southern WA coast right up to Indonesia. The manta rays' global distribution and easily identifiable shape makes it an excellent indicator species through which to monitor the effects of environmental change on our oceans and reefs. As the effects of climate change cause marked changes to global oceanic conditions including changes in water temperature, current patterns and ocean acidification, we need to understand potentially dramatic consequences on the distribution, movements and behaviors of manta rays and the reefs on which they depend. Correlating manta distribution and movements with large-scale oceanographic changes will help scientists to identify and monitor global oceanic health.

Individual manta rays can be identified by the pattern found on their underside. This pattern is as unique as a fingerprint providing a non-intrusive method of identifying individuals. A database has now been developed on both the east and west coasts of Australia, allowing both divers and snorkelers to upload his or her photographs and have them matched to current records. During this project participants will take identification photos of manta rays and assist in observing and gathering data to contribute to filling the knowledge gap on population status at the key aggregation site along the Western Australian coast. Behaviors and distributions fundamental to conservation of the species are tagged to each photo record, enabling the database to become the best available source of data on which to base decisions about species and habitat management. Findings from the database will be utilized to inform government, conservation agencies and commercial operators about how best to protect manta populations while increasing the opportunities for sustainable ecotourism, which provides an economic alternative to fishing these animals.

Equally important is an understanding of the habitat on which manta rays rely and the species, which coexist within it. Top order reef predators such as reef sharks aggregate adjacent key manta ray aggregation sites at this location, both dependent on the ongoing health of the surrounding coral reef and its benthic inhabitants.



## RESEARCH AIMS

This research program is endeavoring to take a whole of ecosystem approach, whereby research into the primary species manta rays is complimented by the concurrent collection of data on reef sharks and benthic rays, as well as the reef habitat itself, which provides numerous pulses of prey for manta rays. Key components, which participants will be involved in, include:

- Manta Rays
- Ongoing monitoring of population dynamics through photo ID
- Assessment of cleaning station health through survey
- Movements through sighting data, acoustic and satellite tagging
- Long-term studies of prey availability and viability through plankton collection
- Sharks and rays
- Sighting and census data
- Cohabitation and fidelity to cleaning stations
- Reef health
- Using reef check to determine sources of mero-plankton at several snorkel sites

## HOW YOU WILL HELP

Your time will be split equally amongst 3 key activities:

### (1) SNORKEL ACTIVITIES—TOURISM INTERACTIONS (BOAT BASED):

Act as research ambassadors aboard a local tourism vessel, collecting data at snorkel sites and whilst interacting with manta rays. Key duties will include: Photographing manta rays, observing and recording manta ray behavior; Recording daily sightings of all megafauna using the citizen science app CoastalWalkabout; collecting log book data for days events; conducting reef check surveys at tourism snorkel sites and when comfortable informing visiting tourists about Project Manta WA.

### (2) SNORKEL ACTIVITIES—MANTA RAY CLEANING STATIONS (BOAT BASED):

Participate in the survey and mapping of remote cleaning stations to determine the effectiveness of locations within and external to sanctuary zones. Key duties will include: mapping of benthic habitat; act as spotters for manta rays, photograph manta rays and observe and record manta ray behavior; help download and deploy acoustic listening stations; assist with tag deployment and conduct plankton tows.

### (3) LAB BASED ACTIVITIES:

Participate in the photo identification and collation of database information from various sources. Key duties will include: entering manta ray log book and photo data into the manta ray electronic database; downloading images from each snorkel onto laptop computers, whilst details are entered in the database; comparing each new manta ray record to previously identified manta rays to determine if the animal is new; If a new animal is found, participants will use the photographs and video taken to draw the identifying marks and spots of the manta ray and add it to the collective database. (There may even be the opportunity to name your own manta ray!)

During the day land based teams will also leave the lab and walk about a kilometer to conduct visual surveys of a shallow lagoon where blacktip and grey reef sharks as well as several ray species aggregate. Survey data will be entered into a database and form part of a larger Department of Parks and Wildlife monitoring program.

## 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 nothing 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.



# DAILY LIFE IN THE FIELD

## PLANS FOR YOUR TEAM

**TRAINING:** Participants will receive a safety briefing on Day 1 of the project. All research methodologies and participant activities will be outlined and explained at the start of the project, and participants will be able to practice the use of research equipment where appropriate in the inshore lagoon adjacent the Coral Bay town site before research activities begin.

The Earthwatch scientist will give the team a more detailed on-site project briefing when you arrive.

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.

Since Coral Bay is a remote location it is important to highlight potential dangers and hazards and any procedures to be followed in the unlikely event of an emergency.

**TRANSPORT AND DRIVING POLICY:** Transport from the airport to Coral Bay will be provided in a small people mover. The transfer takes approximately two hours.

Participants who have driven themselves to the project may not drive whilst on the project. This includes driving to and from Coral Bay. 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 received facility inductions and settled into the accommodation at Coral Bay, a further project and safety briefing will be conducted. This briefing will specifically highlight any safety issues and sort out basic operating procedures including timetables for breakfast, lunch and dinner preparation, cleaning and planned field activities.

**GENERAL SNORKEL PROCEDURES:** The tourism boat team will be under the general supervision of the vessel master, observing vessel and snorkeling safety regulations as set out by the tour company. In water snorkeling research activities including key species counts and manta ID photographic collection will have pre-tour training and be conducted unsupervised within safe distances of the vessel. (You will work independent of tourists where possible).

Land based activities will involve lab based training prior to and during activities. Shark and ray surveys will include in field training in the first instance and continue unsupervised on subsequent occasions. Log on/off procedures will be explained during initial training.

Any potential hazards or dangers will be discussed daily especially in relation to updated weather conditions.

All participants and project staff will wear wetsuits, dive booties, fins, snorkel and masks. There will be sun exposure risks for all participants whilst travelling on the boat, therefore snorkelers should be extra cautious. High factored waterproof sunblock should be worn on exposed areas, and hats should be worn whilst on the boat.

For further information on Earthwatch Snorkeling operations please contact the Earthwatch Australia office: +61 (0) 3 9016 7590. During each evening a summary of activities from that day will be undertaken and any problems or issues raised and discussed.



## ITINERARY

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

### DAY 1: ARRIVAL DAY

Time of Day	Activity
11:30 a.m.–2:00 p.m.	Arrive at Learmonth Airport and meet the team. Drive to Coral Bay
2:00 p.m.–3:00 p.m.	Arrive at Coral Bay and have lunch
3:00 p.m.–6:00 p.m.	Orientation of site, safety briefing and test swim
6:00 p.m.–7:00 p.m.	Settle into accommodation, free time until dinner
7:00 p.m.–8:00 p.m.	Dinner

Teams will be on a rotating daily roster whereby each team participates in all activities as below.

### DAY 2–6: FIELDWORK DAYS (TOURISM TEAM—ABOARD UTOPIA VESSEL)

Time of Day	Activity
6:00 a.m.–7:30 a.m.	Breakfast
8:30 a.m.–9:00 a.m.	Meet at dive shop and travel to boat
9:00 a.m.–3:00 p.m.	Depart for day's tour including two snorkels, manta ray interactions and lunch.
3:00 p.m.–3:30 p.m.	Return from tour
3:30 p.m.–5:30 p.m.	Data entry
5:30 p.m.–6:30 p.m.	Free time for showers, personal activities
6:30 p.m.–7:30 p.m.	Dinner
8:00 p.m.–9:00 p.m.	Presentations on selected nights, other activities such as photo ID work and data entry

### DAYS 2–6: FIELDWORK DAYS (SNORKEL TEAM—ABOARD RESEARCH VESSEL)

Time of Day	Activity
6:00 a.m.–7:30 a.m.	Breakfast
8:00 a.m.–8:30 a.m.	Depart accommodation
8:30 a.m.–12:30 p.m.	Snorkeling activities
12:30 p.m.–2:00 p.m.	Lunch on the water
2:00 p.m.–4:00 p.m.	Afternoon snorkeling activities
4:00 p.m.–4:30 p.m.	Return from research vessel
4:30 p.m.–5:30 p.m.	Data entry
5:30 p.m.–6:30 p.m.	Free time for showers, personal activities
6:30 p.m.–7:30 p.m.	Dinner
7:00 p.m.–8:00 p.m.	Presentations on selected nights, other activities such as photo ID work and data

### DAYS 2–6: FIELDWORK DAYS (LAND BASED TEAMS)

Time of Day	Activity
6:00 a.m.–7:30 a.m.	Breakfast
8:00 a.m.–10:00 a.m.	Photo ID work
10:00 a.m.–12:00 p.m.	Shark survey
12:00 p.m.–1:00 p.m.	Lunch
1:00 p.m.–3:00 p.m.	Photo ID work
3:00 p.m.–5:00 p.m.	Shark survey
5:00 p.m.–5:30 p.m.	Photo ID work
5:30 p.m.–6:30 p.m.	Free time for showers, personal activities
6:30 p.m.–7:30 p.m.	Dinner
7:00 p.m.–8:00 p.m.	Presentations on selected nights, other activities such as photo ID work and data

### DAY 7: DEPARTURE DAY

Time of Day	Activity
Morning	Breakfast, pack and tidy up, depart and return to Learmonth Airport

# ACCOMMODATIONS AND FOOD

## ABOUT YOUR HOME IN THE FIELD



Teams will be staying in a holiday home on the edge of Coral Bay Township. The holiday home is less than 5 minute walk to the Coral Bay Research Station, where some activities are conducted.

The home is equipped with basic facilities including electricity and hot water, and sleeps up to eight guests. Participants will have access to the laboratory and office facilities at the research station including computer and Internet. The kitchen is equipped with a large refrigerator, a gas stove and a sink connected to running water. The homes freshwater supply is derived entirely from rainwater. Consequently visitors are asked to conserve water at all times and restrictions may be put in place during prolonged dry periods. Telstra has the best mobile service in the region for those wishing to remain connected while on the expedition.

Private accommodations are available in Coral Bay for those who would prefer their own. Please email Andrea Haas at [ahaas@earthwatch.org.au](mailto:ahaas@earthwatch.org.au) for further information.

### SLEEPING

There are three bedrooms in the house, with a total number of eight beds. Most of the beds are comfortable bunk bed style. There may be the possibility of a private room with double bed for a couple, so please contact Earthwatch to find out if this is available. Linen is provided.

### BATHROOMS

There is one bathroom with shower and a separate toilet in the house. This will be shared between all participants. Showers must be kept to a minimum time (three minutes) as Western Australia is a very dry area and the water supply comes from the rainwater tanks. The shower room has laundry facilities.



## ELECTRICITY

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.

## INTERNET AND COMMUNICATIONS

Coral Bay Research Station offers the use of computer and Internet free of charge. Mobile phone reception is patchy, with the most reliable network being Telstra. Optus signal is sometimes available but not reliable.

Communication between teams of participants on-site will be via UHF radio. For further information on Coral Bay Research Station see <http://nwra.murdoch.edu.au/index.html>

## DISTANCE TO FIELD SITE

Travel to field locations will vary depending on activities each day. Travel will be via boat or on foot with a maximum travel time of one hour to field location.

## 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.

Participants will have dinner together at a local restaurant. Meals will be pre ordered. Please be aware that guests will not have the option to choose from the menu. Please indicate any dietary requirements on your participation form and we will try to cater to these.

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.

Below are examples of the foods you might expect in the field. Variety depends on availability, and while this list provides a general idea of food types, please be flexible.

## TYPICAL MEALS

<b>BREAKFAST</b>	Cereal, toast and spreads.
<b>LUNCH</b>	Sandwich meats, spreads and salads, cheese, fresh fruit, muesli bars.
<b>DINNER</b>	Pasta, curries, stir fries, BBQ meat and salads, sauces, etc.
<b>SNACKS</b>	Crackers, fruits, sweet biscuits, muesli bars.
<b>WATER</b>	Fresh drinking water will always be available at the accommodation quarters. All freshwater on the island comes from rainwater tanks, which is filtered and safe to drink. Water should not be wasted.
<b>BEVERAGES</b>	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

The information that follows is as accurate as possible, but please keep in mind that conditions may change.

The weather is expected to vary within the limits below.

The climate in Coral Bay is warm and dry throughout the year. Summer months (December to February) can be hot with temperatures reaching the early 40° Celsius. During May the average temperature is from 16° Celsius to 29° Celsius with a small amount of rainfall. At this time of year the water temperature is around 20–24° Celsius. During October the average temperature is from 16° Celsius to 33° Celsius and usually there is very little rainfall. At this time of year the water temperature is around 20–24° Celsius.

### GENERAL CONDITIONS

	MAY	OCT
Temperature	16–28° C / 61–82° F	16–33° C / 61–91° F
Rainfall Monthly average	44.0 mm / 1.73 in	1.6 mm / 0.06 in
Average Humidity	49%	34%
Altitude	Sea level	Sea level

### WATER CONDITIONS

	MAY	OCT
Typical water temperature	19–22°C / 66–72°F	20–24°C / 68°–75°F
Typical water visibility	2–10m / 6.6–33 ft.	2–10m / 6.6–33 ft.
Typical maximum water depth	3–30m / 9.8–98.4 ft.	3–30m / 9.8–98.4 ft.
Site type	Fringing Reef	Fringing Reef
Snorkels initiated from	Boats	Boats
Timing of snorkels	During the day	During the day

### 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 presence of wild animals and insects.
- Sit for 2–5 hours per day (travel via boat, working in the lab, evening lectures).
- Walk for up to 5 km a day to and from land based research sites.
- Help carry research equipment
- Swim/Snorkel 2–3 times a day for 90 minutes each.
- Work on a boat for 2–6 hours a day.
- Adhere to the briefing guidelines, be aware of your own 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 1hr 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-weatherproof or windbreaker jacket may be advisable.

### SNORKELLING REQUIREMENTS

In order to participate in the project you should have had some dive experience, even if you are joining as a snorkeler. Dive experience is important as it teaches you important fin technique, and how to clear your mask under difficult conditions. Having dive experience should also mean that one is likely to feel more comfortable in open water with strong currents. The risks involved with snorkeling and duck diving are similar to those experienced when diving. Therefore, we do require that participants visit a General Practitioner and get their approval for their suitability on this project. The doctor's form to be signed will be provided at time of booking.



# POTENTIAL HAZARDS

## PROJECT MANTA NINGALOO REEF

HAZARD TYPE	ASSOCIATED RISKS AND PRECAUTIONS
Transportation	Vehicles will be driven on sealed roads to Coral Bay Research Station. All vehicles are equipped with airbags, seatbelts, spare tires, first aid kit with Emergency Response Plan and mobile phone. Only experienced project staff will drive vehicles and they will obey all road rules. Passengers and driver will be instructed to wear seatbelts at all times whilst the vehicle is in motion. Participants are not allowed to drive (including their own vehicles) whilst on an Earthwatch team.
Working in boats	Boats are well maintained, and include, UHF 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. 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, UHF radio and mobile phones. There is a communications plan with the research station outlining boat return time, destination and people manifest
Slips and Trips	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 dive booties or thick soled shoes when walking out on the reef and boarding the boat.
Snorkeling	Only participants with appropriate swimming abilities and fitness are allowed to participate in the research. Participants are paired up so that a strong snorkeler is matched with a weaker snorkeler. An experienced project staff member is always present, in order to supervise snorkelers. Participants will wear wetsuits, which provide buoyancy. During the safety briefing participants learn snorkeling safety signals, and are advised how to use them if they run into trouble.
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 e.g. stone fish, cone shells, 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 dangerous 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 reef in the bay.
Sharks	There is a risk of encountering a dangerous shark on the project. If a dangerous shark is present nearby and advance warning has been given to the team then research activities will be cancelled in that location. These large sharks will most likely demonstrate aggressive behavior before they strike. 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, get out of the water as quickly as possible, and rest in a shaded area, whilst cooling themselves with water.
Coral rubble and sharp shells	Participants should not go barefoot when walking around base camp or when walking out on the reef.
Gas stove	Participants may 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 around Coral Bay. 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.



# SAFETY

## HEALTH INFORMATION



### EMERGENCIES IN THE FIELD

The nearest medical care is the Coral Bay Nursing Post. The service operates 24 hours on call and is open Monday to Friday. For more serious injuries participants would be transferred to Exmouth Hospital Emergency department. This would take approximately 2 hours driving from Coral Bay. For life threatening injuries, Royal Flying Doctors will be called and participants will be airlifted from the Coral Bay directly to Exmouth or Carnarvon hospital.

### PHYSICIAN, NURSE, OR EMT ON STAFF

Project staff are not medical professionals.

### STAFF CERTIFIED IN SAFETY TRAINING

All scientists and research assistants 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 CENTERS

#### CORAL BAY NURSING POST

Robinson Street,  
Coral Bay, WA 6701

**TELEPHONE:** (**within Australia**) [08] 9942 6100  
(**International**) +61 8 9942 6100  
(**Satellite Phone**) 0147 148 121

**FAX:** [08] 9942 6100

**TRAVEL TIME FROM PROJECT:** < 5 minutes

#### EXMOUTH HOSPITAL

Lyon Street,  
Exmouth, WA 6707

**TELEPHONE:** (**within Australia**) [08] 9949 3666  
(**International**) +61 8 9949 3666

**FAX:** [08] 9949 3611

**TRAVEL TIME FROM PROJECT:** 2 hours drive or ambulance.

#### CARNARVON MULTI PURPOSE SERVICE

Cleaver Street,  
Carnarvon, WA 6701

**TELEPHONE:** (**within Australia**) [08] 9941 0555  
(**International**) +61 8 9941 0555

**FAX:** [08] 9941 0310

**TRAVEL TIME FROM PROJECT:** 3 hours drive or ambulance.





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, 7 days a week; someone is always on call to respond to messages that come into our live answering service.

### IMMUNIZATIONS

Please be sure your routine immunizations are up-to-date (for example: diphtheria, pertussis, tetanus, polio, measles, mumps, rubella and varicella). Medical decisions are the responsibility of each participant and his or her doctor, and the following are recommendations only. Visit the Healix Travel Oracle website through the “Travel Assistance and Advice” page in your Earthwatch portal, [cdc.gov](http://cdc.gov) or [who.int](http://who.int) for guidance on immunizations.

### PROJECT VACCINATIONS

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

**RECOMMENDED FOR HEALTH REASONS:** Tetanus is generally recommended for health reasons.

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

### 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 participant’s swimming or breathing should be considered carefully. If you are pregnant, you should inform your doctor prior to snorkeling. 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.



# TRAVEL TIPS

## SUGGESTIONS FOR THE ROAD

### YOUR DESTINATION

**LANGUAGE:** English

**TIME ZONE:** AWST (UTC/GMT +8 hours).

**LUGGAGE:** Do not bring more luggage than you can carry and handle on your own. If travelling by air and checking your luggage, you are advised to pack an extra set of field clothing and personal essentials in your carry-on bag in case your luggage is lost and/or takes several days to catch up with you. Many airlines have strict baggage policies. Please check with your airline(s) on baggage weight limits, liquid restrictions, fees for checked baggage, etc.

**TRANSFERRING LUGGAGE:** If you will take an international flight with one or more connections in the country of your destination, you must collect any checked bags at the airport where you first arrive in the destination country. After proceeding through customs, you must recheck your luggage before flying on to your final destination.

**PACKING YOUR LUGGAGE:** Make sure to check the Expedition Packing Checklist for a complete list of what you will need to take with you. You are encouraged to go through the list and mark off each required item right before you leave for your expedition. Also take weather conditions into consideration when packing.

**ELECTRICITY:** V240 volts, 50 Hz, three-pronged plug with flat blades.

**TELEPHONE DIALING CODES:** When calling Australia from another country, dial the country's international dialing code, followed by 61 and the number. When calling within Australia, omit the 61. When calling another country from Australia dial 0011, followed by the other country's country code and the number. **NOTE:** you should check with your cell phone provider to obtain any carrier-specific dialing codes you may need; many providers have dialing procedures that may differ in whole or in part from these directions.

### MONEY MATTERS

**LOCAL CURRENCY:** Australian Dollar

**PERSONAL FUNDS:** No funds are required during the expedition (unless you will be renting snorkel equipment which you will need to arrange directly with a dive shop before arriving), however participants may wish to bring some cash (AUD\$) to buy snacks and beverages during the expedition. Coral Bay has a small shopping arcade including a supermarket, bakery, newsagent & post office.

For those travelling from overseas, airports and major cities such as Perth will offer banks and/or exchange bureaus during business hours, as well as ATM's for cash withdrawals (please check with your bank beforehand to see if yours cards are compatible with Australian ATM's). Coral Bay has one ATM machine and it will charge a small fee for cash withdrawals. In most locations you can use EFTPOS or credit card for large purchases but smaller purchases are paid for with cash.

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

### PASSPORTS AND VISAS

Passport and visa requirements are subject to change. Check with your travel advisor, embassy or consulate in your home country for requirements specific to your circumstances. Generally, passports must be valid for at least six months from the date of entry and a return ticket is required.

CITIZENSHIP	PASSPORT REQUIRED?	VISA REQUIRED?
UNITED STATES	Yes	Yes
UNITED KINGDOM	Yes	Yes
EUROPE	Yes	Yes
AUSTRALIA	No	No
JAPAN	Yes	Yes

If a visa is required, participants should apply for a TOURIST visa. Please note that obtaining a visa can take weeks or even months. We strongly recommend using a visa agency, which can both expedite and simplify the process.

### 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, 60-66 Leicester Street  
Carlton  
VIC 3053, Australia

**Email:** [ahaas@earthwatch.org.au](mailto: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

#### SNORKEL GEAR

- NOTE:** Mask, snorkel, fins and wetsuits provided by project.
- Dive booties, thick soled for walking in shallows

#### CLOTHING/FOOTWEAR FOR FIELDWORK

- Earthwatch T-shirt
- 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 Coral Bay (thongs, sandals or sneakers)

#### 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)
- Lunch box

- Waterproof sunscreen with SPF 30 or higher (Zinc based sunscreens are very effective around the water)
- Beach Towel

#### BEDDING AND BATHING

**NOTE:** Blankets, pillows and linen will be provided by the project

- Towel (please note two towels are recommended, one for showering, one for in the field—as under “Field Supplies”)

#### 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

- Underwater camera, film/memory card(s), extra camera battery (if you bring a digital camera, bring your interface cables for downloading)
- Hardware for sharing digital photographs at the end of the expedition
- Books, games, art supplies, etc. for free time
- Earplugs for light sleepers
- Flashlight or headlamp with extra batteries and extra bulb
- Travel guidebook
- Water-resistant wristwatch
- Binoculars
- Pencil, pen, notebook

**NOTE:** Required and optional items lists are accurate to the best of Earthwatch's knowledge at the time of publication.

**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



**EARTHWATCH SCIENTIST FRAZER MCGREGOR** has been a tour guide and skipper for 10 of his 15 years in Coral Bay, and has spent the last nine completing a PhD in marine ecology at Murdoch University. Frazer's thesis has been instrumental in the implementation of the Manta Ray Identification catalogue. His research has collected data on almost 800 different manta rays that visitors have the opportunity to interact with. His studies have provided key baseline information on all aspects of manta ray ecology within Ningaloo reef including population ecology, foraging ecology and localized movements. **Frazer will be present on all teams.**



**EARTHWATCH SCIENTIST MIKE VAN KEULEN** is Senior Lecturer in Marine Biology at Murdoch University and Director of the Coral Bay Research Station. Mike undertook undergraduate studies at James Cook University, the University of Western Australia and Murdoch University, obtaining a BSc with Honors and PhD from Murdoch University in Perth. He worked as a researcher with CSIRO Marine Research and as a postdoctoral fellow on marine restoration before taking up his current post as lecturer in Marine Biology at Murdoch University in 1998. Mike has diverse research interests, including the biology and ecology of marine plants, coral reef ecology, environmental restoration and marine wildlife ecology. **Mike will be present on teams in October.**

**NOTE:** In addition, there may be various Research Assistants and/or Team Leaders joining the expedition. A staffing schedule is still to be announced.

**NOTE:** Staff schedules are subject to change.



# RECOMMENDED READING

## YOUR RESOURCES AT HOME

### RESOURCES

#### ARTICLES

- McGregor, F., Meekan, M., van Keulen, M., & Waite, A. (2011). Manta ray (*Manta alfredi*) visitation to Ningaloo Reef, WA—The importance of residence! In: 48th Annual Conference of the Australian Marine Science Association, 3–7 July, Fremantle, Western Australia.
- Venables, S., McGregor, F., Brain, L., & van Keulen, M. (2016). Manta ray tourism management, precautionary strategies for a growing industry: a case study from the Ningaloo Marine Park, Western Australia. *Pacific Conservation Biology*.
- Couturier, L. I., Dudgeon, C. L., Pollock, K. H., Jaine, F. R. A., Bennett, M. B., Townsend, K. A., ... & Richardson, A. J. (2014). Population Dynamics of the reef manta ray *Manta alfredi* in eastern Australia. *Coral Reefs*, 33(2), 329-342.
- Townsend, K. (2012). Lifting the blanket: Project manta. *Wildlife Australia*, 49(3), 24.
- Jaine, F. R., Couturier, L. I., Weeks, S. J., Townsend, K. A., Bennett, M. B., Fiora, K., & Richardson, A. J. (2012). When giants turn up: sighting trends, environmental influences and habitat use of the manta ray *Manta alfredi* at a coral reef. *PLoS One*, 7(10), e46170.
- Marshall, A., Kashiwagi, T., Bennett, M. B., Deakos, M., Stevens, G., McGregor, F., ... & Sato, K. (2012). *Manta alfredi* IUCN Red List of Threatened Species.
- Armstrong, A. O., Armstrong, A. J., Jaine, F. R., Couturier, L. I., Fiora, K., Uribe-Palomino, J., ... & Richardson, A. J. (2016). Prey Density Threshold and Tidal Influence on Reef Manta Ray Foraging at an Aggregation Site on the Great Barrier Reef. *PLoS one*, 11(5), e0153393.

#### BOOKS & JOURNALS

- Introduction to Marine Biology. George Karleskint, Richard Turner, James Small. (2006) Brooks/Cole, USA.

#### WEBSITES

- **PROJECT MANTA WA VIDEO:**  
[youtube.com/watch?v=NHnI0\\_hlaQU&feature=youtu.be](https://www.youtube.com/watch?v=NHnI0_hlaQU&feature=youtu.be)
- **MANTA RAY, AUSTRALIAN MUSEUM:**  
[australianmuseum.net.au/manta-ray-manta-birostris](http://australianmuseum.net.au/manta-ray-manta-birostris)
- **PROJECT MANTA WA FACEBOOK:**  
[facebook.com/Project-Manta-WA-663009110478274/timeline](https://www.facebook.com/Project-Manta-WA-663009110478274/timeline)

#### FILMS & TV

- The Blue Planet (BBC)

#### PROJECT RELATED LINKS

- **CORAL BAY RESEARCH STATION:**  
[nwra.murdoch.edu.au/CBRResearchStation](http://nwra.murdoch.edu.au/CBRResearchStation)
- **CORAL BAY:** [coralbay.org](http://coralbay.org)

#### SOCIAL MEDIA: EARTHWATCH AUSTRALIA

- **FACEBOOK:** [facebook.com/EarthwatchAustralia](https://www.facebook.com/EarthwatchAustralia)
- **TWITTER:** [twitter.com/Earthwatch\\_Aus](https://twitter.com/Earthwatch_Aus)
- **YOUTUBE:** [youtube.com/user/EarthWebBoy](https://www.youtube.com/user/EarthWebBoy)
- **INSTAGRAM:** [instawebgram.com/i/earthwatch\\_australia/](https://www.instagram.com/i/earthwatch_australia/)
- **PINTEREST:** [pinterest.com/earthwatchaus/](https://www.pinterest.com/earthwatchaus/)
- **GOOGLE+:** [plus.google.com/+EarthwatchSouthMelbourne/posts](https://plus.google.com/+EarthwatchSouthMelbourne/posts)

**FLICKR:** [flickr.com/photos/earthwatchaustralia/](https://www.flickr.com/photos/earthwatchaustralia/)

#### SOCIAL MEDIA: EARTHWATCH INTERNATIONAL

- FACEBOOK:** [facebook.com/Earthwatch](https://www.facebook.com/Earthwatch)
- TWITTER:** [twitter.com/earthwatch\\_org](https://twitter.com/earthwatch_org)
- INSTAGRAM:** [instagram.com/earthwatch](https://www.instagram.com/earthwatch)
- BLOG:** [earthwatchunlocked.wordpress.com](http://earthwatchunlocked.wordpress.com)
- YOUTUBE:** [youtube.com/earthwatchinstitute](https://www.youtube.com/earthwatchinstitute)



# EMERGENCY NUMBERS

## AROUND-THE-CLOCK SUPPORT



### **EARTHWATCH'S 24-HOUR EMERGENCY HOTLINE**

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Call Earthwatch's 24-hour on-call duty officer in the U.S.:

+1 (978) 461.0081

+1 (800) 776.0188 (toll-free for calls placed from within the U.S.)

After business hours, leave a message with our live answering service. State that you have an emergency and give the name of your expedition, your name, the location from which you are calling, and if possible, a phone number where you can be reached. An Earthwatch staff member will respond to your call within one hour.

### **TRAVEL ASSISTANCE PROVIDER: HEALIX INTERNATIONAL**

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+44.20.3667.8991 (collect calls and reverse charges accepted)

**U.S. TOLL FREE:** +1.877.759.3917

**U.K. FREE PHONE:** 0.800.19.5180

**E-MAIL:** earthwatch@healix.com

You may contact Healix International at any time. They can assist in the event of a medical or evacuation emergency or for routine medical and travel advice, such as advice on visas and vaccine requirements.

### **FOR VOLUNTEERS BOOKED THROUGH THE EARTHWATCH AUSTRALIA OFFICE:**

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### **Earthwatch Australia 24-Hour Emergency Helpline**

+61.0.3.8508.5537





# 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.

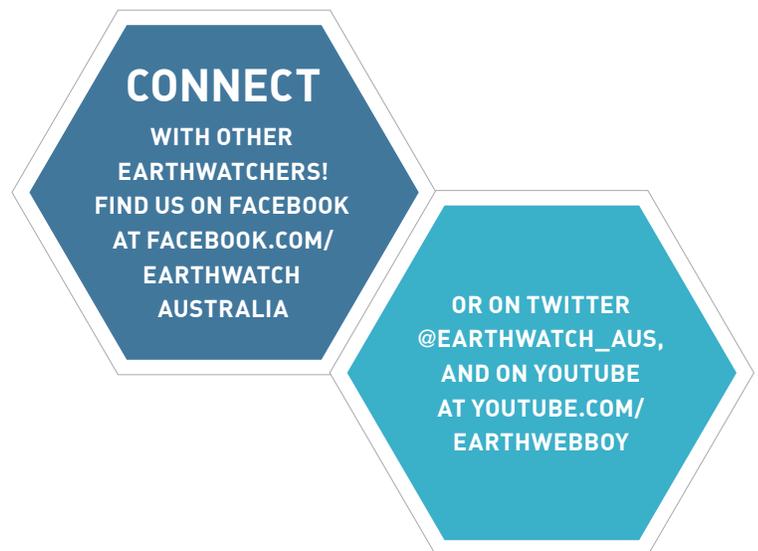
We unfortunately face a variety of environmental pressures today and by joining this Earthwatch expedition you are not only saying you care, but more significantly, that you are prepared to do something about it. The work you will undertake will help contribute to solving critical environmental issues, 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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