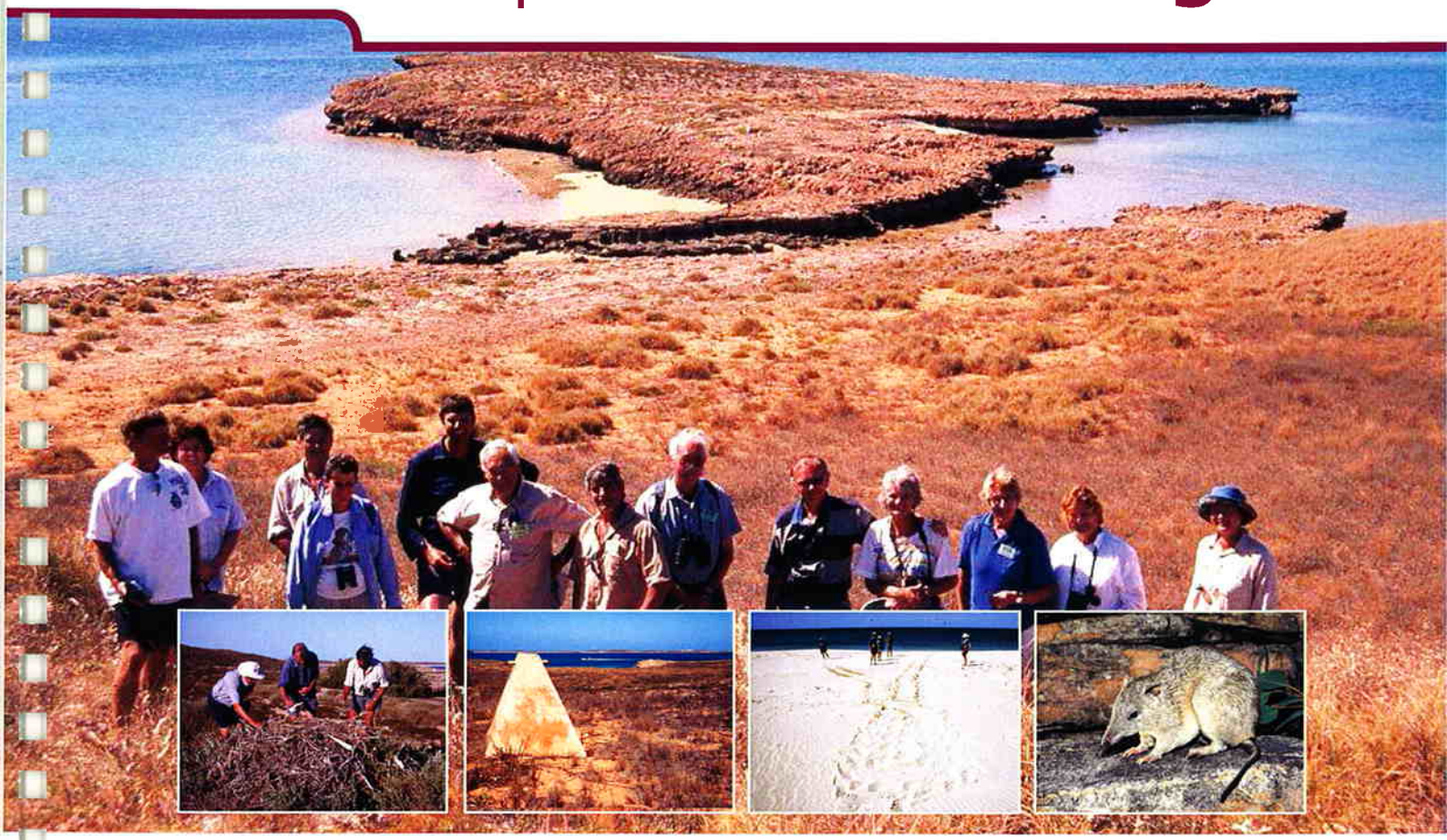
LANDSCOPE EXPEDITIONS
Working at the Frontier of Discovery

Expedition **Briefing**



Expedition members on the Montebello Islands in 2000 (photo – Kevin Coate). Insets (from left) inspecting an osprey nest; ground zero marker at the site of British nuclear testing on the Montebellos; turtle tracks on a Montebello Island beach (photos Kevin Coate); golden bandicoot (*Isoodon auratus*) (photo DEC).

Sanctuaries of the Sea

Wildlife of the Montebello Islands

Montebello Islands
5–12 October 2009

Leaders:

Keith Morris	Leader, Fauna Conservation Program, DEC Science Division, Woodvale Research Centre
Dr Peter Kendrick	Regional Ecologist, DEC Pilbara Region, Karratha

This expedition is offered by LANDSCOPE, *the Department of Environment and Conservation's (DEC's) quarterly magazine devoted to wildlife, conservation and environmental issues in Western Australia.* LANDSCOPE *Expeditions are run in association with UWA Extension, The University of Western Australia.*

LANDSCOPE Expeditions - Working at the Frontier of Discovery

Department of
Environment and Conservation
Our environment, our future

in association with

UWA EXTENSION
THE UNIVERSITY OF WESTERN AUSTRALIA

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Wildlife of the Montebello Islands

October 5 - 12 2009

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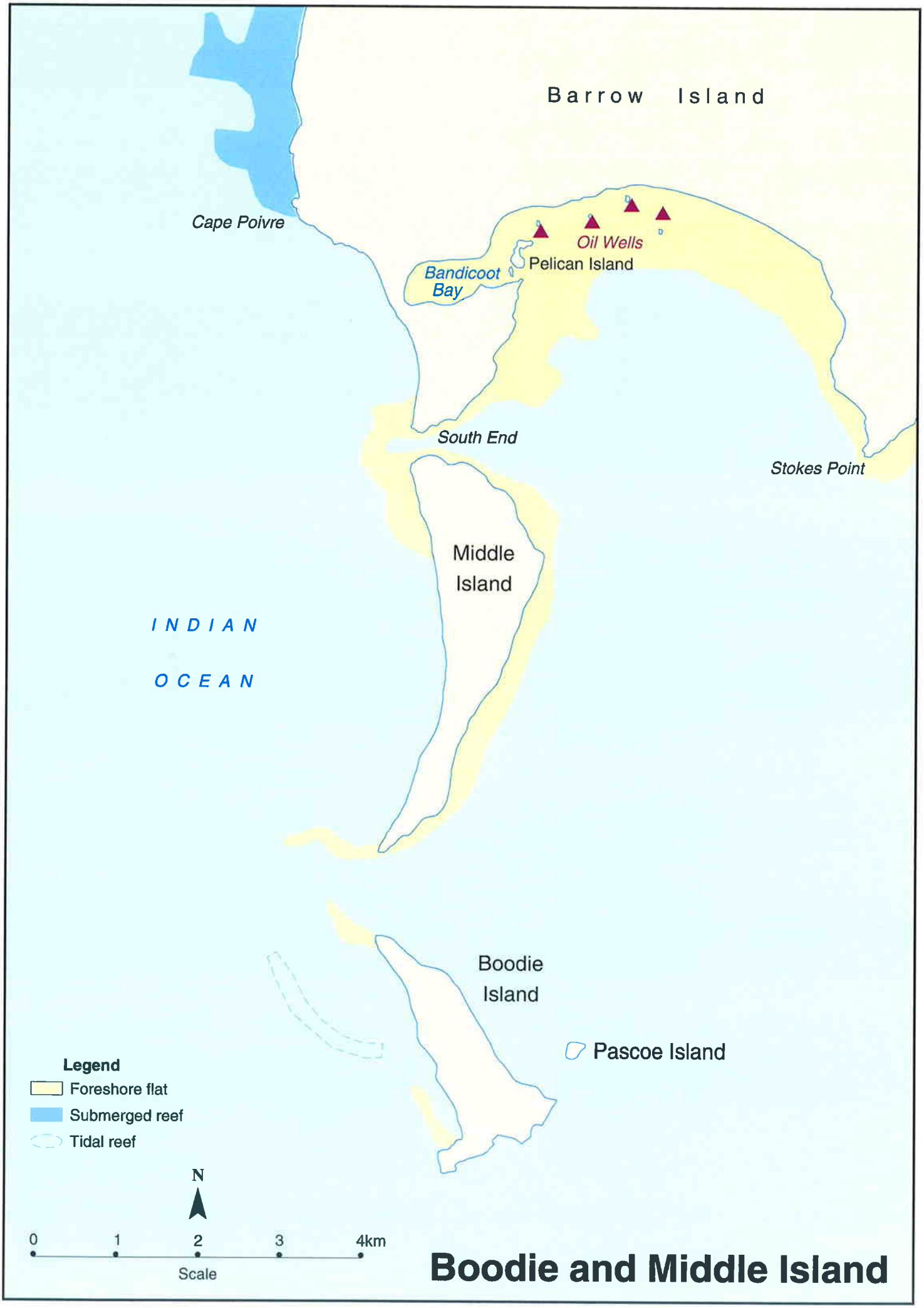

Boodie and Middle Island

Montebello Islands

RESEARCH LOCATION

The Montebello Islands are situated off the Pilbara Coast of Western Australia, about 20 kilometres north of the northern tip of Barrow Island and 80 kilometres north-west of Cape Preston on the adjacent mainland. The closest port is Dampier, about 120 kilometres to the east. This expedition will visit two groups of islands approximately 100 km off the Pilbara coast of Western Australia.

Boodie, Middle and Pascoe Islands are nature reserves managed by the Department of Environment and Conservation (DEC) and lie just south of Barrow Island. Boodie Island (170 ha.) is named after the burrowing bettong, or boodie (*Bettonga lesueur*) that inhabits the island. Middle Island (350 ha.) supports one of the last remaining populations of the golden bandicoot (*Isoodon auratus*). The black rat *Rattus rattus* was introduced to these islands in the 1890s from the pearling industry and between 1985 and 1992 the then Department of Conservation and Land Management (CALM, now DEC) undertook successful rat eradication programs on these islands, and the south end of Barrow Island.

The Montebellos are an archipelago of about 180 islands, islets and rocks varying in size from Hermite Island (1022 ha) and Trimouille Island (522 ha) to rocks of a few square metres. Most of the western islands are composed of limestone with low coastal cliffs and occasional pale orange-brown alluvial sand plains and white sand beaches. The northern islands (North West, Trimouille, South East) and the southernmost substantial island (Ah Chong) have extensive white sand plains and low dunes and beaches between limestone headlands. There are some areas of mangrove, mainly *Avicennia marina* with some *Rhizophora stylosa*, especially on Hermite Island. A fringing coral reef lies to the west and the waters adjacent to the islands have many reefs, shoals and sandbanks.

There was no Aboriginal occupation of the islands at the time of European exploration however studies suggest that the islands were occupied between 30 000 and 7 000 years before present (Veth et al 2009). The first European visitors were Thomas Bright and the survivors of the *Tryal*, wrecked on Tryal Rocks in May 1622. French navigator Nicholas Baudin named the outer islands in 1801. They were named to commemorate the battle of Montebello, where the French general Lannes (later the Duke of Montebello) defeated the Austrians in 1800. Phillip Parker King visited in HMS *Mermaid* in 1818 and J. Lort Stokes in HMS *Beagle* in 1840. At this time hydrographic surveys were carried out, and some natural history observations made. Thomas Haynes lived on the islands for some years from 1884, experimenting with pearl oyster cultivation, and in his spare time gathered samples of the flora and fauna, which were sent to the British Museum. In 1912, P.D. Montague carried out a biological survey, under the auspices of the Royal Society of London. His collections are in the British Museum. The next visitor who published natural history observations was Keith Sheard, who made a brief visit in August 1950.

In 1952 and 1956, the islands were used by the British as a site for testing atomic weapons (Cooper and Hartley 1979; Australian Ionising Radiation Safety Council (AIRSC) 1983; Cathcart 1994). Three nuclear devices were exploded. The first, in October 1952, was placed below the waterline in a corvette, HMS *Plym*, anchored off Main Beach, Trimouille Island, and resulted in considerable long term contamination of the northern two-thirds of Trimouille. The second and third weapons were exploded on 30 m towers, one at Point Gladstone, at the northern tip of Trimouille Island, and the other near

Burgundy Bay on Alpha Island. The Alpha Island nuclear weapon, stated at the time to be 60 kilotons (Kt), was the largest tested anywhere in Australia (AIRSC 1983, Western Radiation Services 1993). However, the actual yield was 98 Kt. Since the test yield broke an assurance made personally by Prime Minister Anthony Eden of the United Kingdom to the then Prime Minister of Australia, Robert Menzies that the yield would not exceed 2.5 times that of the 1952 test (thus about 62 Kt), the true yield was concealed until 1984. During the tests the islands were occupied and many kilometres of temporary roads and other facilities were constructed. Structures and considerable amounts of rubbish from this period remain on the islands.

Until July 1992, the islands were officially a Prohibited Area under Commonwealth legislation. However, this did not stop numerous visits, including some biological survey work, from being undertaken. It merely prevented anyone suing the Commonwealth for damages if they had been injured or become ill as a result of the nuclear weapons program.

Frank Hill, who was part of the support party for the first nuclear weapon test, published natural history notes made in 1952. Dominic Serventy and Jock Marshall visited in 1958 to re-examine the natural history following the nuclear explosions. Harry Butler made some observations in 1966 when an exploratory oil well was drilled on Trimouille Island. Andrew Burbidge reported on biological survey work in 1970 and 1971, conducted by the then Department of Fisheries and Fauna, the 1971 trip being in association with Harry Butler and West Australian Petroleum. Since then, there have been several visits by CALM (now DEC) staff and others, but little of this information is readily available. Morris (1991) summarized the values of the area and outlined management proposals, as required by the Commonwealth Government before the return to State control.

The islands were returned to Western Australian control and declared a Conservation Park in 1992. They are vested in the National Parks and Nature Conservation Authority (NPNCA) and managed by DEC.

It was known at this time that the spectacled hare-wallaby *(Lagorchestes conspicillatus),* the golden bandicoot *(Isoodon auratus),* the black and white fairy wren (*Malurus leucopteris edouardi)* and the Spinifex bird (*Eremiornis carteri*) were locally extinct and that black rats and feral cats were established on the Montebello Islands. The water rat *(Hydromys chrysogaster)* may also be locally extinct on the Montebello Islands.

PROJECT BACKGROUND

Over 2000 islands occur off the WA coast and many of these are important to nature conservation as refuges for threatened mammals, breeding sites for marine turtles and seabirds, and are generally free of the other disturbances such as inappropriate fire and clearing that has threatened our biodiversity on the mainland. Unfortunately several invasive species have been introduced to some of our important island nature reserves and over the last 25 years DEC and its predecessors have been undertaking eradication programs on these. This project will visit sites of two of the most important black rat and feral cat island eradication programs undertaken.

The black rat (*Rattus rattus*) was eradicated from Boodie and Pascoe Islands in 1985 and from Middle Island in 1990-92. There was evidence that the black rat was suppressing the boodie and golden bandicoot populations on Boodie and Middle

Islands respectively. However the eradication of rats on Boodie Island unfortunately also resulted in the eradication of the few remaining boodies on the island. Once it was confirmed that rats had been eradicated, boodies were successfully reintroduced to Boodie Island in 1993. Part of our work here will be to monitor the abundance of boodies on Boodie Island, as well as continuing to check for signs of black rats or other introduced species. Similarly, golden bandicoots will be monitored on Middle Island. Searches of all these islands will also be made for the native water rat.

The Montebello Islands have been the focus of the Montebello Renewal program as part of the Western Shield program, DEC's leading nature conservation program safeguarding Western Australia's native animals. Launched in 1996, it is now the biggest wildlife conservation program ever undertaken in Australia. Western Shield is working to bring at least 13 native fauna species back from the brink of extinction by controlling introduced predators.

The objectives of the Montebello Renewal program were to eradicate black rats and feral cats from the Montebello Islands Conservation Park and to reintroduce locally extinct animals and introduce mammals that are threatened on the mainland by exotic carnivores. In 1994, initial biogeographic surveys were carried out which confirmed that black rats were on almost every island of the archipelago and that feral cats were restricted to Hermite Island, although they had been reported on Trimouille and Bluebell Islands previously.

Phase 1 of the project, rat eradication, commenced in 1996. It was decided to eradicate rats initially as they most likely provided a good food source for feral cats and thus a higher uptake of baits when the time came to bait specifically for cats. Searches in 1997 revealed that while the rat baiting program was successful in significantly reducing the rat population, it did not eradicate them completely. Islands upon which rat sign was detected were rebaited. One of the main difficulties in eradicating black rats was that they had the ability to swim between islands. Later searches in 1998 and 1999 indicted that native species were increasing in numbers across the archipelago but that rat tracks were increasing in density on a few islands including Hermite Island. The smaller islands were rebaited by hand and Hermite Island was aerially baited. Islands nearby to Hermite Island were also baited in case the rats swam to these islands.

In 2001, searches revealed rat tracks on Islands previously considered rat free, which indicated the ability of rats to swim. All islands north of Ah Chong were subsequently aerially baited and searches in 2002 and 2003 did not reveal any rat activity on any island. It was declared that black rats had been eradicated from the Montebello Islands in December 2003. However, further monitoring on an annual basis is being carried out to ensure that the islands remain rat free.

Feral cat control was considerably more effective. An initial baiting trial was carried out on Hermite Island in 1997 using 1080 baits and by trapping. This was followed up by a comprehensive baiting program in 1999 over a six week period in which cat eradication was achieved. The Montebellos were declared feral cat free in August 1999. Searches in 2001, 2002 and 2003 have confirmed this eradication.

The reintroductions of native animal species commenced in 1998 when thirty mala or rufous hare-wallaby (*Lagorchestes hirsutus)* were released on Trimouille Island from

central Australia in 1999 and 2000. 59 djoongari (Shark Bay mice – *Pseudomys fieldi*) were translocated to North West Island from a captive colony at Perth Zoo. Monitoring in 2002 and 2003 indicate that these populations were increasing in number and range, with djoongari being abundant and widespread. There are now plans to reintroduce golden bandicoots and spectacled hare-wallabies to Hermite Island in 2010.

THE PROJECT

On this *LANDSCOPE* Expedition, *Sanctuaries of the Sea, Wildlife of the Montebello Islands*, volunteers will be involved in a variety of activities in relation to marine and terrestrial animals, birds, land snails and introduced predators.

Specifically the expedition will;

- undertake trapping for mala, boodie, golden bandicoots, mala and Shark bay mice
- assist in fauna parasite and disease screening studies
- search for evidence of black rats, feral cats and the native water rat
- collect landsnails from a range of large and small islands, to understand the evolution of these animals via genetic and morphological techniques
- collect flowering plants from all the islands to add to the WA Herbarium collection
- make bird lists and counts of seabirds

On day one of the expedition we will travel overnight to Boodie and Middle Islands which lie off the southern tip of Barrow Island approximately 80 nautical miles west of Dampier. For the next two days, the expedition will monitor the fauna, collect land snails and plant specimens and search for introduced species. On day three the expedition will head north along the western side of Barrow Island to the Montebello Islands.

The expedition will spend the rest of the time visiting the major islands of the Montebello's including Middle, Trimouille, North West, Hermite and Alpha Islands conducting the above field work. Other minor islands will be visited to collect landsnails plants, searching for water rats and for sightseeing.

There will also be the opportunity to visit the relics of British nuclear testing from the 1950's including ground zero and historic pearling ruins from the late 19th century. There may also be the opportunity to snorkel amongst the coral reefs surrounding the islands.

VOLUNTEER ASSIGNMENTS

The Department very much appreciates your work on its behalf and wishes each volunteer a very enjoyable and rewarding trip.

Conservation Volunteers: Being a volunteer enables people to find out at first hand what the Department is doing. You will be part of a force of 3400 people involved in a wide range of activities that include tree planting, trail building, interpretation and assisting with scientific projects. If you wish to be involved with future DEC Volunteer projects, please contact DEC's Community Involvement Coordinator, Margaret Buckland, on (08) 9334 0251, on your return. The Department relies very much on its volunteer work force. In 2007/2008 volunteers supplied 424,500 hours of

effort. Volunteer assistance with remote area work, such as this expedition plans to carry out, is especially helpful.

Field Tasks

Volunteers will have the opportunity to assist with all aspects of fauna and flora survey work. This will include live trapping, animal handling, plant collecting and identifying and recording flora and fauna.

Activities will also assist with:

- compilation of data at the end of the day—write up notes and the trip diary
- collecting living and dead land snails, and recording data on collection locations
- clean and label snail specimens for long term storage and data-basing in Perth
- plotting of locations of specimens collected (using a GPS)
- identification of specimens
- parasite collections
- compilation of bird lists
- photography (participants may wish to contribute digital images to *LANDSCOPE* magazine)

On Board Tasks

Volunteers will also assist with post field tasks on board the charter vessel such as;

- summarise trapping sheets
- preparation of parasite specimens
- compilation of data at the end of the day
- write up notes and the trip diary
- you may also be required to assist with on board tasks as instructed by the crew of the charter vessel

FIELD TRAINING

As well as orientation there will be daily briefings on research procedures and objectives, procedures and safety. There will also be informal lectures, talks, daily reviews of progress and sharing of expeditioners' discoveries.

The identification of wildlife in the field is a skilled business; it requires patience, a good eye, and aids such as field guides, binoculars and hand lenses. Expeditioners will be trained in the use of keys and guides, as well as other equipment. Members should all have a good grasp of the basics by the end of our expedition. Team leaders will be happy to discuss any aspect of our work with expedition members, and are looking forward to a shared learning experience.

In addition to identifying animals, expeditioners will be shown how to set and maintain traplines efficiently, how to handle animals without harming or stressing them, and how to search for those species which are difficult or impossible to trap. This may include some spotlight and head-torch searches at night. Plant collection and identification techniques will also be demonstrated

APPLICATION OF RESULTS

The data collected will be made available to the DEC Pilbara Region and Science Divisions to assist in the ongoing management of the islands visited and in the proposed fauna translocations to the Montebello Islands.

The project is involved with providing answers to the more practical aspects of conservation in remote areas. This *LANDSCOPE* Expedition is one way of solving these practical problems with participants providing valuable assistance, both physically and financially.

The results of the research carried out on this voyage will be reported in scientific journals and reports. This expedition will add to the available information on bird, mammal, reptile, landsnail and plant species on these island nature reserves. Bird sightings and other natural history observations will assist in providing answers on distribution and abundance of species.

Information gathered on this expedition will be useful material for use in the preparation and updating of management plans for the area.

EXPEDITION LEADERS

Keith Morris is a Senior Principal Research Scientist based at the Wildlife Research Centre, Woodvale, where he is responsible for the management of fauna research activities in the Science Division. He has expertise with conservation of threatened fauna, introduced predator and rat control, marine turtles and forest fauna management. Keith was one of the leaders for the previous *LANDSCOPE* Expedition to the Montebellos in 2000 and was involved in translocations of the Shark Bay mice to North West Island, and boodies to Boodie Island.

Dr Peter Kendrick has been the Regional Ecologist in Karratha since 1989. He received his doctorate in evolutionary genetics and community ecology from the Zoology Department, The University of Western Australia. His special interests are in the biological survey of reptiles and mammals, and in arid zone and island land molluscs. He has worked extensively throughout the Pilbara, including the Great Sandy and Little Sandy deserts. Peter has spent time on the Montebellos and nearby island groups, undertaking biological survey, control of pest animals and plants, and general island management and industry liaison.

Brent Johnson is a Principal Technical Officer within DEC's Fauna Conservation Program based at the Wildlife Research Centre, Woodvale in Perth. He has undertaken a broad range of wildlife research projects throughout Western Australia and has considerable experience with forest ecology, threatened species research, disturbance ecology and species translocations. Brent has participated in many aspects of DEC's Western Shield fauna recovery program and species recovery plans, undertaking feral predator monitoring, native fauna surveys, fauna monitoring and translocation of threatened species. He was also a team leader in the eradication program for Black Rats on the Montebellos and has monitored native fauna on Middle Island near Barrow Island.

Bill Muir is a Senior Technical Officer, Science Division, at DEC's Woodvale Research Centre. He has worked for over 14 years with the biological survey group. Bill has conducted extensive research into bats, and maintains some interest in this area. He is also a skilled botanical collector, identifier and photographer. Originally from the Lake Muir farming district, Bill worked with the former Forestry Department and was involved in regional surveys in the Wheatbelt and Carnarvon Basin

The Expedition will also be joined by Professor Mike Johnson, The University of Western Australia, a leading taxonomist and land snail expert. Dr Andrew Smith, Murdoch University, and Ms Judy Dunlop DEC will undertake sampling of parasites on all the fauna trapped.

EXPEDITION DIARY AND REUNION

A copy of the expedition diary will be provided soon after the conclusion of the expedition.

A reunion for all 2009 participants will be held in December in Perth. As this will be the final *LANDSCOPE* Expeditions reunion, it will also be a celebration and farewell after 17 years of *LANDSCOPE* Expeditions. This gathering will provide the opportunity for you to catch up with old friends.

FIELD LOGISTICS

RENDEZVOUS

Expedition participants will make their own way to and from Dampier. We will rendezvous at 1700 hours on Monday 5th October 2009 at **Hampton Sailing Club**, The Esplanade, Dampier, when we will load luggage onto our charter vessel, Flying Fish V. We will then walk to a local restaurant, where we will enjoy a pre-expedition dinner.

ITINERARY

Day 1	**5 Oct**	**Monday**	Rendezvous at Hampton Sailing Club, Dampier, at 1700 hours. Load luggage on board Flying Fish V. Expedition Dinner at nearby restaurant. Depart that evening and travel to Boodie Island overnight.
Day 2	**6 Oct**	**Tuesday**	Boodie, Middle and Pascoe Islands: Set traps for boodies and golden bandicoot. Search for land snails on Boodie and Pascoe Islands, water rats opportunistically and collect flowering plants. Search for signs of black rats. Quarantine procedures to prevent the spread of weeds will be in place for access to Boodie and Middle Islands
Day 3	**7 Oct**	**Wednesday**	Boodie, Middle and Pascoe Islands: Check traps on Boodie and Middle Islands. Undertake searches as above, reset traps.
Day 4	**8 Oct**	**Thursday**	Boodie – Montebello Islands: Check and lift traps on Boodie and Middle Islands, travel to Montebellos via the west coast of Barrow Island. Set traps on North West and Trimouille Islands.. Examine relics from British atomic testing, search for black rat tracks. Visit minor islands to search for landsnails and observe seabirds.
Day 5	**9 Oct**	**Friday**	Montebello Islands. Check traps on North-West and Trimouille Islands. Move to Stephenson's Passage and explore Hermite Island, search for black rat and water rat tracks. Visit minor islands to search for land snails and observe seabirds.
Day 6	**10 Oct**	**Saturday**	Montebello Islands. Check traps on North-West and Trimouille Islands. Explore Alpha Island, search for black rat tracks. Visit minor islands to search for landsnails and observe seabirds.
Day 7	**11 Oct**	**Sunday**	Montebello Islands. Check traps on North West and Trimouille Islands. Inspect historic pearling ruins.
Day 8	**12 Oct**	**Monday**	Montebellos – Dampier: Check and lift traps on North-west and Trimouille islands. Depart

Montebello Islands for Dampier via Mermaid Straight. Transfer to Karratha for your return journey. End of Expedition.

This itinerary is provisional and may be varied at the discretion of the expedition leaders.

DAILY SCHEDULE

The daily schedule will be affected by weather conditions and any changes considered necessary by the leaders. Expeditioners will be organised into teams, and where ever possible teams will be assigned a different task and leader each day. The aim is for all expeditioners to gain experience in each of the activities undertaken, and to learn from each of the leaders.. The daily routine will demand a reasonably early start each morning (0530-0600) with breakfast taken after traps have been checked. Traps will need to be checked before the heat of the sun threatens the animals, and bird watching is best early in the morning. "Show and tell' will be a regular feature of the days activities, usually during refreshments before dinner.

Fauna surveying. Three types of traps will be used to catch native fauna – Elliott, Sheffield cage traps and Thomas soft traps. Traps are set in the mid-late afternoon, and are then checked each day at first light. Any captured animals are identified, weighed, measured, and returned to their point of capture. Some mammals may be returned to the vessel for collection of parasites and then released later in the afternoon. It is not anticipated that any native mammals will be taken as specimens. If any introduced species are trapped they will be euthanased humanely and kept as a specimen. This pattern will repeat each morning that we have traps in place, so we plan to rotate this task among the members of the group. Likewise, searching for animals such as land snails or signs of water rats requires patience and persistence. Bird watching will be an ongoing activity, both at sea and ashore.

After getting through our survey commitments, expedition members can take the opportunity to explore, take photographs, fish, swim, or just relax. There will probably be an opportunity for a rest break in the middle of the day.

TEAM DEVELOPMENT

Team members will have the opportunity to get to know each other and the expedition leaders once we rendezvous in Dampier on the afternoon of 5th October. We will initially be working closely together, until the group is confident with the skills required for working more independently. However, once basic skills are gained, the expedition will split up into smaller groups, each with a leader. There will be time for members to concentrate upon whatever aspect of the survey they may wish to (for example, bird watching), as well as working in small groups on other tasks. A rotation of members will be developed so that participants have an opportunity to work with each of the group leaders. Once on board, the team will have to work closely together to ensure that the laboratory and living spaces operate cleanly and efficiently.

ACCOMMODATION

Accommodation for the entire expedition will be aboard the Flying Fish V, a 23 metre charter vessel. There are 20 bunks below deck and six pipe bunks on deck. There are two toilets and showers on board. For more information on your charter vessel please see pages 20 and 21.

Volunteers should have two items of luggage – **your *LANDSCOPE* Expeditions duffel bag and a daypack. All bedding is provided by the charter vessel but you need to bring your own towel as these are not provided on board**. Bag labels are provided, however, as all the bags look the same, you may wish to mark your bag with a coloured ribbon, or something else that helps you spot your bag quickly. You may also wish to include a large, sturdy plastic garbage bag with ties to protect your bag in transit

FOOD AND DRINKS

All meals whilst on expedition will be covered by your contribution. **Some drinks are included but you will need to provide your own alcoholic beverages and mixers**. In Dampier, the pre expedition dinner will be held at The Hampton Sailing Club. On board the *Flying Fish V*, meals will be provided by the charter operator. Participants and organisers may be required to assist with preparation on a rotational basis. If you have any special dietary requirements you should contact *LANDSCOPE* Expeditions on (08) 9334 0401 or rohan.swan@dec.wa.gov.au as soon as possible to see of they can be accommodated.

After we leave Dampier there will be no opportunity for you to restock your personal supplies, so we recommend you bring all you need with you at the start of the trip. If you like to have "something extra" to enjoy with your evening meal, we recommend that you bring a **small supply** (as space on the boat is limited) with you. You may also wish to bring a small supply of lollies, snacks or "trail mix" to your liking.

PHYSICAL CONDITION

A reasonable level of fitness and agility is required for daily transfers from boat to shore, servicing traps and conducting other field tasks. However, there will be a range of activities to suit differing levels of fitness among volunteers. As most of the tasks to be carried out involve walking, you will maximise your enjoyment of the expedition by ensuring a reasonable level of fitness prior to the expedition.

ENVIRONMENTAL CONDITIONS.

Terrain

The terrain is not rugged and most walking will be in sandy areas. Caution should be exercised when walking or climbing in rocky areas.

Climate

The islands have a tropical arid climate. Maximum temperatures are likely to be 28-33 degrees, minimum temperatures 12-18 degrees, but possibly cooler if a breeze is

blowing. Rainfall is unlikely at this time of the year, but a waterproof jacket is advisable for island crossings.

SAFETY AND HEALTH

Your safety, health and comfort are of paramount importance.

Sunburn: Is possibly the greatest medical problem that arises. You must guard against it. Loose-fitting, long-sleeved shirts, full-brimmed hats, sunglasses, sunscreen lotion, and lip-block are all essential.

Dehydration: Is a significant issue in the high temperatures generally experienced, even during the evenings. It is vital to always ensure you drink plenty of water. You must keep water bottles (minimum of 2 litres) with you in your daypack. **This is essential**.

Safety Mates and Safety Tags: To improve volunteer safety in the field, expeditioners will be assigned a 'safety mate' for the duration of the expedition. At all times, you should know where your 'safety mate' is. If you cannot locate your mate and are concerned as to their whereabouts, please advise a leader. This system is designed to improve safety in the field and at sea. Leaders will explain the 'safety mates' and 'safety tag' protocol on Day 1.

Swimming and Snorkelling: Any swimming and snorkelling activities will be at the discretion of the expedition staff and charter boat crew. We advise that there are inherent risks associated with swimming and snorkelling that are beyond the control of expedition leaders and charter boat crew. Whilst all care will be taken, if you choose to participate in snorkelling and swimming activities, you do so entirely at your own risk.

Snakes: While there are thought to be no dangerously venomous terrestrial snakes on the Montebello islands, there are other snakes on the islands and the highly venomous mulga snake occurs on Barrow Island. There are also sea snakes that inhabit these waters. Although generally considered to be docile, they must be taken into consideration while swimming and snorkelling. All snakes sighted in the wild should be considered dangerous and left alone. For safety reasons, volunteers are not to handle snakes.

Clothing and footwear: Walking will be an essential part of the expedition and it is therefore imperative your footwear is comfortable. For island walking you will need proper walking boots that give ankle protection. Gaiters are also useful in keeping the sand out. Reef boots (divers' ankle length neoprene booties) are useful for wading ashore and exploring the reefs and shallows. Please ensure that you pack enough socks for one pair to be 'quarantined' when accessing Boodie Island.

Insect pests: Sandflies can occur in coastal regions—repellents and creams are advised if you are particularly susceptible to insect bites. Your doctor can prescribe any necessary antihistamines. *Please familiarise yourself with the enclosed brochures from the Health Department of Western Australia.*

Medications: Check that you have any required prescriptions filled beforehand. If you think you may need antihistamines for possible allergic reactions, see your doctor and obtain appropriate medication. You will also need to be prepared for the possibility of being sea sick and will need to bring appropriate remedies.

Personal hygiene: Peter G's liquid soap is a good soap to use in hard water. Medicated soaps such as gamophen, or sandalwood, which is natural to the bush, are also good choices. Baby wipes can be used for cleaning hands when ashore, and disposed of when back on board.

Wilderness survival: Please familiarise yourself with the enclosed Wilderness Survival Card and carry it in your day pack. Carry your water bottle and a whistle when ashore.

First Aid Kit: The *Flying Fish V* carries an extensive first aid kit. Minor cuts and scratches should be attended to promptly in the warm salt-water environment of the islands to avoid the onset of infection. Please ask one of the crew.

Avian Influenza: Wild birds in Australia pose a negligible avian influenza risk to humans at the present time, however, all birds, particularly water fowl (ducks, geese, swans) are potential carriers of the disease. As there may be some contact with water fowl on expeditions, volunteers are advised that they are not permitted to handle birds, especially those who appear sick or injured. For further information please refer to the following website on Avian Influenza.

http://www.health.gov.au/internet/main/publishing.nsf/Content/health-avian_influenza-index.htm

H1N1 Influenza 2009 (Human Swine Influenza): There is currently a worldwide pandemic of the H1N1 Influenza 2009 (Human Swine Influenza). At this stage H1N1 influenza 09 is causing a wide spectrum of illness around the world. While some deaths have occurred, and some people have needed treatment in hospital, most people have had a mild illness and recovered after a few days at home. The illness can be serious in vulnerable people and has occasionally been unexpectedly severe in otherwise young and healthy people.

Please take the time to read the information provided by the Department of Health and Ageing and ensure that you continue to follow good hand and respiratory hygiene practices whilst on expedition. LANDSCOPE Expeditions will provide facilities to ensure that good hand and respiratory hygiene are maintained

http://www.healthemergency.gov.au/internet/healthemergency/publishing.nsf/Content/home-1

FIELD COMMUNICATIONS

The charter vessel is equipped with a range of marine radios, satellite phones and computer communications equipment. Mobile phones do not work from the Montebello Islands.

LANDSCOPE Expeditions (08) 9334 0401 has facilities to contact DEC's office in Karratha and the charter vessel, but only in an emergency.

CRISIS / EMERGENCY MANAGEMENT

The expedition, in consultation with the charter operator and the Royal Flying Doctor Service (RFDS) have developed a comprehensive crisis management plan in the case that a medical or other emergency should arise.

ADVANCE PREPARATION

FIELD SUPPLIES

Once we board the *Flying Fish V*, it is not possible restock supplies or purchase anything you have forgotten. **Check each item carefully**. Don't forget to bring your camera. Binoculars and field guides will also be handy. You may wish to include a large, sturdy plastic garbage bag with ties to protect your bag in transit. Bed linen is provided on board *Flying Fish V*. You will need to bring a towel as these are not supplied by the charter vessel.

CHECK LIST

- ❑ Sturdy, comfortable, worn-in walking boots with firm soles and ankle support.
- ❑ Thick walking socks – ensure sufficient to allow for one pair to be 'quarantined' when accessing Boodie Island.
- ❑ Reef boots.
- ❑ Footwear for the boat (Loafers or sandals).
- ❑ Underwear.
- ❑ Long trousers, loose and tough.
- ❑ Shorts.
- ❑ T-shirts.
- ❑ Cool, long-sleeved and loose-fitting shirts.
- ❑ Casual clothes for travelling.
- ❑ Wet weather gear, spray jacket or raincoat.
- ❑ Jumper/polar-fleece, warm jacket.
- ❑ Woollen beanie or balaclava to wear at night.
- ❑ Thermal underwear or tracksuit if you feel the cold.
- ❑ Volunteer hat and sunglasses.
- ❑ Two x 1 litre, or 2 litre leak-proof water bottle.
- ❑ Bathers and fishing gear.
- ❑ Handkerchiefs or tissues.
- ❑ Toiletries.
- ❑ Beach towel.
- ❑ Insect repellent and sunscreen.
- ❑ Personal first aid including two pressure bandages (plus motion sickness remedy, eg, Kwells, acupressure wrist-bands).
- ❑ Prescription medicine and spectacles.
- ❑ Small, light daypack to carry camera, water bottle, snacks, etc.
- ❑ Head torch + spare batteries (Petzl with halogen globe recommended – optional).
- ❑ Small robust torch plus batteries, and spare globe.
- ❑ Camera and spare batteries and recharger.
- ❑ Binoculars.
- ❑ Notebook and pen.
- ❑ Chux wipes, or Wet Ones.
- ❑ Pocket knife.
- ❑ Lots of enthusiasm and smiles.

LANDSCOPE Expeditions supply a canvas bag and luggage tags for your gear, a DEC Volunteer's full-brimmed hat, a stubby holder, and a thermal mug.

YOUR CHARTER VESSEL

You will be accommodated aboard *Flying Fish V*.

Specifications: The *Flying Fish V* is a 23 metre West Coaster powered by a V12 Man diesel, with a cruising speed of 15-16 knots. She is surveyed for 20 passengers up to 200 nautical miles offshore.

Tenders: Shore access is by dinghy (1 x 14 foot aluminium dinghy, and 1 x 12 foot cathedral hull dinghy).

Facilities: *Flying Fish V* is equipped with modern navigation and communications equipment including satellite navigation systems, various nautical radios and satellite phone communications. There is also audio visual equipment that can be used for presentations and entertainment. She has a fully equipped galley and meal area that can also be used to conduct post field tasks. There is a large covered open deck area to the rear of the vessel.

Accommodation: There are 20 bunks below decks and 6 pipe berths on deck. There are 2 showers/toilets accessed from afterdeck.

Food and drink: Once aboard the *Flying Fish V*, you will be provided with all meals and drinks (except alcoholic beverages and mixers. You will need to provide your own alcoholic beverages and mixers. The expedition will provide some cask wine for evening meals). Tea and coffee will be available when the waters are calm. There are freezers, a coolroom and esky's on board.

Emergency procedure: The vessel is equipped with all required safety equipment including life jackets and life rafts and the vessel carries an extensive first aid kit. The crew will conduct a briefing and familiarisation when everyone is on board on day one of the expedition, and will advise the location of life jackets and life rafts, and outline emergency procedures.

Fishing: Fishing gear supplied includes Alvey deck winches, boat rods, overhead geared reels for trolling, hooks sinkers and baits however, you are welcome to bring your own rods and tackle. We suggest you bring your own lures for trolling as the vessel's stocks are limited. You keep the fish you catch as per fisheries regulations. There is plenty of room in the iceboxes for your fish, but bring some labelled bags.

Leaving the boat: Your safety is our biggest responsibility. A system of "Safety Mates" and "Safety Tags" will be explained and adhered to. Please observe the following guidelines:

1 Do not enter the water or swim until the skipper or one of the crew gives you the "all clear". They will generally give you a quick briefing as to what to expect in that area.
2 You will be checked in when you return to the boat, and counted before the boat leaves an area. **Do not return to the water after you have been counted as being on board.**

General: The crew of the *Flying Fish V* will discuss rubbish disposal, access to food and drink and tea-making facilities, and where you should stow wet gear, towels, bathers, and fishing gear. Please assist the crew by following their instructions precisely.

MAPS

The following map would be useful.

- StreetSmart Touring Map of the **Pilbara** (1998) produced by LANDGATE, Perth, Western Australia.
- **Montebello** 1957 and **Barrow Island** 1956 1:100 000 Topographic map sheets
- Australian Hydrographic Service Chart **AUS61 Montebello Islands** 1:25 000 Nautical Chart

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Burbidge AA, Blyth JD, Fuller PJ, Kendrick PG, Stanley FJ, Smith LA (2000). *The terrestrial vertebrate fauna of the Montebello Islands, Western Australia.* CALMScience 3, 95-107.

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Strahan, R (ed.). 1995. *The Mammals of Australia.* Australian Museum / Reed Books.

Thackway, R. and Cresswell, I. D. (Ed's). 1995. *An interim biogeographic regionalisation for Australia*: Australian Nature Conservation Agency, Canberra.

Triggs, B. 1997. *Tracks, Scats and other Traces.* A field guide to Australian Mammals. Oxford University Press, UK

Tyler, M. J., Smith, L. A. and Johnstone, R. E. 1984. *Frogs of Western Australia.* Western Australian Museum, Perth.

Veth, P., Aplin, K., Wallis, L.A., Manne, T., Pulsford, T., White, E. & Chappell, A. 2009. *Montebello Islands Archaeology: Late Quarternary Foragers on an Arid Coastline.* Archaeopress, Oxford, UK.

Wilson, S. K. and Knowles, D. G. 1988. *Australia's Reptiles. A photographic reference to the terrestrial reptiles of Australia.* Collins Australia, Sydney.

The following *LANDSCOPE* articles in chronological order are relevant to the Montebello Islands.

Morris, K., Christensen, L. & Start, T. 'Beyond the Bomb: Montebellos in 1988'. *LANDSCOPE,* winter 1988.

Burbidge, A. 'Montebello Renewal'. *LANDSCOPE*, summer 1996.

Algar, D. & Burbidge , A. 'Isle of Cats: The Scourging of Hermite Island'. *LANDSCOPE*, autumn 2000.

Hill, A. & Thomson-Dans, C. 'Montebello and Barrow Islands Marine Conservation Reserves'. *LANDSCOPE*, winter 2004.

**The expedition will carry some reference books. Please bring your own field guides.*

WEB SITES

www.naturebase.wa.gov.au
DEC website

http://www.dec.wa.gov.au/hotproperty/property/marine-parks-and-reserves/montebello-islands-marine-park.html
DEC information on the Montebello Islands Marine Park

NOTES

APPENDICES

LANDSCOPE Expeditions 2009

Lend your body to research...

LANDSCOPE Expeditions are non-profit, self-supported study and research projects. Since its inception in 1992, the program has been offered by the Department of Environment and Conservation's (DEC's) *LANDSCOPE* magazine, a quarterly publication devoted to wildlife, conservation and environmental issues in Western Australia. The expeditions are offered in association with UWA Extension, a department of The University of Western Australia (UWA).

DEC is responsible for the management and sustainable use of WA's more than 27 million hectares of national parks, conservation parks, marine parks, State forests and timber reserves, nature reserves and marine nature reserves. It is also responsible for conserving the State's rich diversity of plants and animals.

UWA Extension has been operating as a public outreach arm of UWA since 1913. It is a Centre for Continuing Education and promotes community awareness in a variety of ways, including educational travel.

DEC scientists and regional staff identify the research projects and lead the expeditions, which DEC and UWA administer. Private businesses and local communities are contracted to provide logistical support.

LANDSCOPE Expeditions answer the need for research to protect the environment and respond to the demand for first class interpretation by scientists and specialists. They provide paying volunteers with an opportunity to work alongside scientists and promote wider cooperation in addressing conservation and land management challenges in WA. Anyone can be involved subject to fitness and provided they are over 13 years of age.

The expeditions give you the opportunity to visit and gain an understanding of remote places and natural ecosystems and take part in important wildlife recovery programs. You can have the satisfaction of knowing you have contributed to our knowledge of threatened environments and endangered species. Unique photo opportunities and close encounters with unusual animals are a bonus.

Participants are not the only ones who benefit. The community also profits from the enriched lives of its members and from the benefits that flow on from research findings and outcomes. Future generations benefit from the natural and cultural resources that volunteers help to identify and conserve. And, on a global scale, *LANDSCOPE* Expeditions help to perpetuate cultural and biological diversity.

Expeditioners collecting scat samples at Binbinjano Rockhole on the Canning Stock Route. Photo – Alison McGilvray/DEC

DEC VOLUNTEERS

When you sign up for a *LANDSCOPE* Expedition you are automatically registered as a volunteer. You will be given a volunteer's hat and will receive copies of *Environment and Conservation News*, DEC's monthly newsletter. You are also entitled to take part in a range of other volunteer activities. Being a volunteer gives you the opportunity to develop a greater awareness and understanding of nature conservation and to play an active role in managing the conservation estate. Volunteer activities are available in the areas of information, research, management, maintenance and campground hosting.

APPENDIX 1

LANDSCOPE **Expeditions** 2009

Distant places, close encounters... of the scientific kind

Western Australia covers almost a third of the Australian continent, stretching from the tropical Kimberley to temperate areas west of Albany. The coastline alone is nearly 13,000 kilometres long. Of Australia's 80 recognised natural biogeographic regions, 26 occur in WA – more than in any other state. These biogeographic regions are defined principally by landform, soils and vegetation types. They range from the monsoon forests (rainforests) and savannas of the northern Kimberley through the diverse desert regions and the mulgas and mallees of arid inland WA to the tall karri forests of the Warren Region in the south-west. Coastlines cover a similar diversity of environments from the extensive coral reefs, mudflats and mangroves of the tropical Kimberley through the shallow sandy embayments of the west coast to the granite promontories and islands in the ocean off Albany and Esperance to the south.

These extensive land and seascapes provide a magnificent natural setting for a vast array of plant and animal species. It is in this huge natural laboratory, that scientists can pursue their research interests. However, such a diverse and extensive State also poses a formidable hurdle for scientists in determining the first among many questions that are essential to effective research and conservation – what occurs where? A major emphasis of the scientific research undertaken by *LANDSCOPE* Expeditions is directed toward answering this intriguing and pivotal question.

In the sparsely populated western third of the continent, the distribution of most plant and animal species is very poorly known and many *LANDSCOPE* Expeditions focus on trying to improve scientists' understanding of species' distributional patterns. Detailed records and prudent collections are made of many species, using the most scientifically acceptable methods and techniques, so that biologists from many institutions can carry out more detailed studies. Such documentation and collection helps define the distribution of many botanical and zoological species and facilitates research by State herbaria and museums on the level of variation within species. Studies of specimens and records of species from a wide geographic area are often the precursors to the description of species new to science.

WA's conservation reserve system aims to be comprehensive, adequate and representative. However, many land surface types and their associated wildlife are not represented in reserves, or are very poorly represented. This pattern was documented in the 1995 'Interim Biogeographic Regionalisation for Australia (IBRA) Report', which demonstrated that many of Australia's major bioregions are poorly served by the existing conservation reserve system. While some land systems may have been well represented within reserves, others remain completely unrepresented. Bioregions provide a framework for identifying gaps in the reserve system. Conservation reserves should protect representative samples of each bioregion. *LANDSCOPE* Expeditions help identify which areas should be included to protect and enhance the State's biodiversity.

LANDSCOPE Expeditions encourage the public to travel to distant places for close encounters of the scientific kind. You are a vital partner. Join us and be part of scientific team – record observations, collect, prepare and identify specimens. Many conservation goals are difficult to achieve by scientists working alone – your support can make the difference.

Expeditioners collecting plant samples at Lake Disappointment.
Photo – Graeme Liddelow/DEC

You can make a difference

Collecting insects at night using a light trap.
Photo – Graeme Liddelow/DEC

When you travel with *LANDSCOPE* Expeditions, you help in a variety of ways:

FUNDING

You and your financial contribution make the research possible. This alone is a significant factor in making the expedition a success.

SCIENTIFIC DISCOVERY

You can help by collecting key information. Although some interpretations will be made in the field, much of the synthesis takes place back in the laboratory, where final identifications and analyses are made and results prepared for publication. You will discover that fieldwork can be repetitive and time consuming as it has to be done in a systematic way. Outcomes are not always obvious at first – but there's always the chance of that surprise discovery.

Extra pairs of hands and eyes are of great benefit in helping to achieve goals, as fieldwork is very intensive. Leaders will maximise time spent on fieldwork but will provide instruction in techniques as time permits.

You may be asked to collect plant specimens and make animal sightings to increase our knowledge of the distribution of species. However, with plants, only representative specimens will be kept. Do not be disappointed if some are discarded as redundancy is often part of the scientific process. With bird observations, it is the collective experience that confirms the sighting and produces advances in our knowledge.

YOU DON'T NEED TO BE A SCIENTIST

Anyone can help – be assured that your assistance will make a contribution to nature conservation in WA. Remember scientists and leaders have spent many years developing their level of expertise – they welcome your questions and are there to guide you.

Your point of view or personal expertise may help in unexpected ways. Please feel free to share your ideas.

Expect to return home with a broader understanding of the natural world, the role of scientific methods, the value of nature conservation and the rewards of knowing you have contributed to pioneering studies in remote areas. *LANDSCOPE* Expeditions aims to whet your appetite for nature, give you a taste of scientific discovery, and provide an experience that may not otherwise be a part of your life.

IT'S NOT ALL SCIENCE

Many elements combine to make an expedition successful, not just the scientific activities. An affinity for team work, a flexible approach and a willingness to help in whatever way you can, help to create the best results for nature conservation.

Plant species list for the Montebello Islands provided by the WA Herbarium, 19/6/2009

Abutilon cunninghamii Benth.
Abutilon indicum (L.) Sweet
Acacia ampliceps Maslin
Acacia bivenosa DC.
Acacia coriacea DC. subsp. coriacea
Acacia gregorii F.Muell.
Acanthocarpus verticillatus A.S.George
Acanthophora spicifera (Vahl) Borgesen
Actinotrichia fragilis (Forssk.) Boergesen
Aerva javanica (Burm.f.) Schult.
Amansia rhodantha (Harv.) J.Agardh
Anadyomene plicata
Asparagopsis taxiformis (Delile) Trevis.
Atriplex isatidea Moq.
Boergesenia forbesii (Harv.) Feldmann
Boerhavia sp.
Boodlea composita (Harv.) F.Brand
Bornetella oligospora Solms
Botryocladia leptopoda (J.Agardh) Kylin
Botryocladia skottsbergii (Borgesen) Levring
Bruguiera exaristata Ding Hou
Buellia pruinosa Müll. Arg.
Canavalia rosea (Sw.) DC.
Capparis spinosa L.
Caulerpa corynephora
Caulerpa cupressoides var. cupressoides
Caulerpa cupressoides var. elegans
Caulerpa cupressoides Weber Bosse var. lycopodium Weber Bosse
Caulerpa fergusonii Murray
Caulerpa lentillifera J.Agardh
Caulerpa racemosa var. racemosa
Caulerpa racemosa (Forssk.) J.Agardh
Caulerpa racemosa (Turner) Weber Bosse var. lamourouxii (Turner) Weber Bosse
Caulerpa serrulata (Forssk.) J.Agardh
Caulerpa sertularioides (S.G.Gmel.) M.Howe
Caulerpa taxifolia (Vahl) C. Agardh
Caulerpa verticillata J.Agardh
Ceramium sp.
Champia stipitata Huisman
Chondria armata (Kütz.) Okamura
Cliftonaea pectinata (Harv.) Harv.
Codium ? repens
Codium sp.
Coelarthrum cliftonii (Harv.) Kylin
Coelothrix irregularis (Harv.) Borgesen
Collema ? coccophorum
Colpomenia sinuosa (Roth) Derbes & Solier
Commicarpus australis Meikle
Corchorus walcottii F.Muell.
Corynomorpha prismatica (J.Agardh) J.Agardh
Cynanchum floribundum R.Br.
Cystoseira trinodis (Forssk.) C.Agardh
Dichotomaria marginata (J.Ellis & Sol.) Lam.
Dichotomaria obtusata (J.Ellis & Sol.) Lam.
Dictyopteris serrata (Aresch.) Hoyt
Dictyosphaeria cavernosa (Forsskal) Borgesen
Digenea simplex (Wulfen) C.Agardh
Endosiphonia spinuligera
Euphorbia myrtoides Boiss.
Euphorbia tannensis (A.Cunn.) Hassall subsp. eremophila (A.Cunn.) Hassall
Exophyllum wentii Weber Bosse
Flaveria australasica Hook.
Frankenia ambita Ostenf.
Galaxaura rugosa (Ellis & Solander) J.V.Lamour.
Genus sp.
Gibsmithia hawaiiensis Doty
Gracilaria arcuata
Gracilaria eucheumatoides Harv.
Griffithsia sp.
Halimeda macroloba Decne.
Halimeda sp.
Halimeda velasquezii Taylor
Halophila decipiens Ostenf.
Halophila ovalis (R.Br.) Hook.f.
Halymenia maculata
Heterosiphonia crassipes (Harv.) Falkenb.
Hydropuntia eucheumatoides
Hypoglossum sp.
Ipomoea pes-caprae (L.) R.Br.
Kallymenia sp.
Launaea sarmentosa (Willd.) Kuntze
Laurencia brongniartii J.Agardh
Laurencia sp.
Lawrencia viridigrisea Lander
Liagora ceranoides J.V.Lamour.
Martensia sp.
Myoporum montanum R.Br.
Neomeris van-bosseae M.Howe
Neurymenia fraxinifolia (Turner) J.Agardh
Olearia dampieri (DC.) Lander subsp. dampieri ms
Padina sp.
Panicum decompositum R.Br.
Penicillus nodulosus (J.V.Lamour.) Blainv.
Peyssonnelia sp.
Phyllanthus sp. Coastal North West (J.Z. Weber 4919) PN
Pluchea sp. B Kimberley Flora (K.F. Kenneally 9526A) PN
Polysiphonia sp.

Portieria hornemannii (Lyngb.) P.C.Silva
Pterocaulon sphaeranthoides (DC.) F.Muell.
Pterocladia sp.
Ptilotus exaltatus Nees
Ptilotus villosiflorus F.Muell.
Rhagodia preissii (Moq.) Paul G.Wilson subsp. obovata (Moq.) Paul G.Wilson
Rhynchosia minima (L.) DC.
Sargassum decurrens (Turner) C.Agardh
Sargassum sp.
Scaevola crassifolia Labill.
Scaevola cunninghamii DC.
Scaevola spinescens R.Br.
Schizothrix mexicana Gomont
Scinaia tsinglanensis Tseng
Sclerolaena uniflora R.Br.
Scleropodium tourettii
Sebdenia flabellata (J.Agardh) P.G.Parkinson
Sesuvium portulacastrum (L.) L.
Solieria robusta (Grev.) Kylin
Sorghum plumosum (R.Br.) P.Beauv.
Spolochnus sp.
Spongocladia vaucheriaeformis Aresch.
Spyridia filamentosa (Wulfen) Harv.
Streptoglossa decurrens (DC.) Dunlop
Swainsona calcicola Joy Thomps.
Tecticornia indica (Benth.) K.A.Sheph. & Paul G.Wilson subsp. leiostachya (Benth.) K.A.Sheph. & Paul G.Wilson
Tephrosia remotiflora Benth.
Tolypiocladia calodictyon (Kütz.) P.C.Silva
Trichodesma zeylanicum (Burm.f.) R.Br.
Turbinaria sp.
Udotea glaucescens J.Agardh
Ulva lactuca L.
Ulva sp.
Ventricaria ventricosa (J.Agardh) J.L.Olsen & J.A.West

Bird List for the Montebello Islands provided by Birds Australia

Brown Quail
Bar-shouldered Dove
Wilson's Storm-Petrel
Wedge-tailed Shearwater
Brown Booby
Pied Cormorant
Eastern Reef Egret
Eastern Osprey
Black-shouldered Kite
White-bellied Sea-Eagle
Brahminy Kite
Spotted Harrier
Nankeen Kestrel
Beach Stone-curlew
Australian Pied Oystercatcher
Sooty Oystercatcher
Pacific Golden Plover
Grey Plover
Red-capped Plover
Lesser Sand Plover
Greater Sand Plover
Bar-tailed Godwit
Whimbrel
Common Sandpiper
Grey-tailed Tattler
Common Greenshank
Ruddy Turnstone
Sanderling
Red-necked Stint
Common Noddy
Bridled Tern
Sooty Tern
Fairy Tern
Caspian Tern
White-winged Black Tern
Roseate Tern
Lesser Crested Tern
Crested Tern
Silver Gull
Horsfield's Bronze-Cuckoo
Sacred Kingfisher
Singing Honeyeater
Brown Honeyeater
White-breasted Woodswallow
Spinifexbird
Yellow White-eye
Welcome Swallow
Zebra Finch
Australasian Pipit

Montebello Islands Archaeology: Late Quaternary Foragers on an Arid Coastline

Peter Veth1, Ken Aplin 2, Lynley A. Wallis3, Tiina Manne4,
Tim Pulsford5, Elizabeth White6 and Alan Chappell7

1. Australian Institute of Aboriginal and Torres Strait Islander Studies, Canberra, ACT
2. Australian National Wildlife Collection, C.S.I.R.O. Canberra, ACT
3. Department of Archaeology, Flinders University, Adelaide, SA
4. Department of Anthropology, University of Arizona, Tucson, Arizona
5. Environmental Protection Agency, Bundaberg, QLD
6. Jo McDonald Cultural Heritage Management Pty Ltd, Sydney, NSW
7. Advanced Analytical Centre, James Cook University, Townsville, QLD

Abstract

The Montebello Islands are a cluster of small, low relief land masses, comprised of ancient limestone, with skeletal soils, sparse vegetation and shifting sand bodies. They lie some 80 km from the coastline, representing far flung 'high points' on the once extensive arid coastal plains of north-west Australia. Barrow Island lies between the mainland and the islands. More famous as the first nuclear testing site used by the British in the 1950s and the location of the first known shipwreck off the Australian coast, (the *Tryal* in 1622), the Montebello Islands represent a unique configuration of terrestrial and marine ecosystems, with islands either connected or separated by mangrove flats, sand spits, shallow channels and limestone pavements and coral formations. The high biodiversity of the marine zone (as opposed to the now depauperate terrestrial fauna of the islands) has been recognised by its listing as a marine park.

This paper reports on archaeological analysis carried out on assemblages recovered from two stratified cave sites on Campbell Island in the Montebello group in northwest Australia. These sites provide unique insights into human responses to the drowning of the extensive arid plains of north-west Australia following the Last Glacial Maximum. Rich faunal assemblages have been recovered which date to the period 30 000 – 7 000 BP as the local environmental context changed in response to the post-glacial marine transgression.

Field surveys and excavations were carried out over two field seasons between 1992-1994 and involved a team of archaeologists, field assistants and support crew. Of particular note were field contributions made by Emeritus Professor Jim Allen, Ms Jill Allen and Drs Joe Dortch, Sue O'Connor and Bruce Veitch. Analyses of the surprisingly rich marine and terrestrial faunas (both anthropogenic and natural), sediments and artefacts recovered from the excavations have continued for approximately 10 years and included a range of postgraduate students and specialists (as cited below). Of special note with respect to advice on the faunas we wish to acknowledge Dr Alex Baynes (WA Museum), Dr Peter Kendrick (CALM), Professor Mary Steiner (University of Arizona), Dr Shirley Slack-Smith (WA Museum), Dr John Scanlon and Dr David Bellwood (James Cook University).

The archaeological record shows that occupation of the Montebello caves between approximately 30 000 and 10 000 BP was sparse and episodic in nature. This is similar to the pattern from similarly-aged stratified sites at North West Cape (e.g. Morse 1999). All of the hard rock stone artefacts which have been recovered from the Montebello Islands during this period must have been transported from supply zones on the mainland. After approximately 10 000 BP, discard of all categories of cultural materials increases with a significant marine component (for the first time) and this peaks during the period 7 800–7 000 BP as the sea approached its current position. When other dated sequences from North West Cape, and nearby Dampier Archipelago and Pilbara coastline are considered (cf. Przywolnik 2005), it is clear that systematic exploitation of marine resources has had an extremely lengthy and near-continuous history on this arid coastal plain.

The mammalian fauna in the Montebello sites are highly diverse and significantly richer than those currently recorded today on nearby Barrow Island. The diversity of medium-sized mammals is also higher than in the contemporaneous Cape Range faunas, primarily owing to the presence of a number of sand plain species assumed to have inhabited the now-submerged coastal plains. It appears that the coastal plain went through a phase of positive water balance, allowing herbaceous plant growth and, of special note, a short-lived south-

westerly range expansion of the northern nail-tail wallaby, *Onychogalea unguifera*, a species today found in the Kimberley region of Western Australia.

Littoral resources are believed to have become proximal (i.e. daily walking distance) to the sites by approximately 10 000 BP. A marked increase in the exploitation of marine resources is registered at Noala Cave by approximately 10 000 BP, when shell starts to accumulate in relative abundance. The dense midden of Hayne's Cave, dated to between approximately 7 800–7 000 BP, accumulates at precisely the time when the coast is estimated to be adjacent to the sites. The final phase of occupation of Hayne's Cave is characterised by the loss of most terrestrial fauna coupled with the continued use of marine resources. Species from all marine habitats appear to have been exploited including mature reef flats, rocky foreshore substrates, intertidal mudflats and, importantly, mangrove communities. There are mangrove shellfish, crab and saltwater crocodile recorded from approximately 12 000–7 000 BP. There is little reason to believe that the littoral environment was depauperate either during a transgressive phase or during the period when sea level stabilised at the current high stand.

The final phase of drowning and isolation of the sites from the mainland by circa 7 000 BP is marked by human abandonment, which continued through to the historic period.

The survey and excavation data from the Montebello Islands also allows us to reflect on the unique characteristics of foragers on an arid coastline. The terrestrial faunas of this once extensive coastal plain were more abundant than previously thought. Combined with the accessibility of rich sub-tropical marine species (high in protein and fat) the coastal/sub-coastal zone would have been attractive to hunter-gatherers during the terminal Pleistocene/early Holocene. The usual attributes associated with desert hunter-gatherers (the 'desert adaptation' after Gould 1977) characterised by high residential mobility may well have been transformed in this apparently productive coastal setting.