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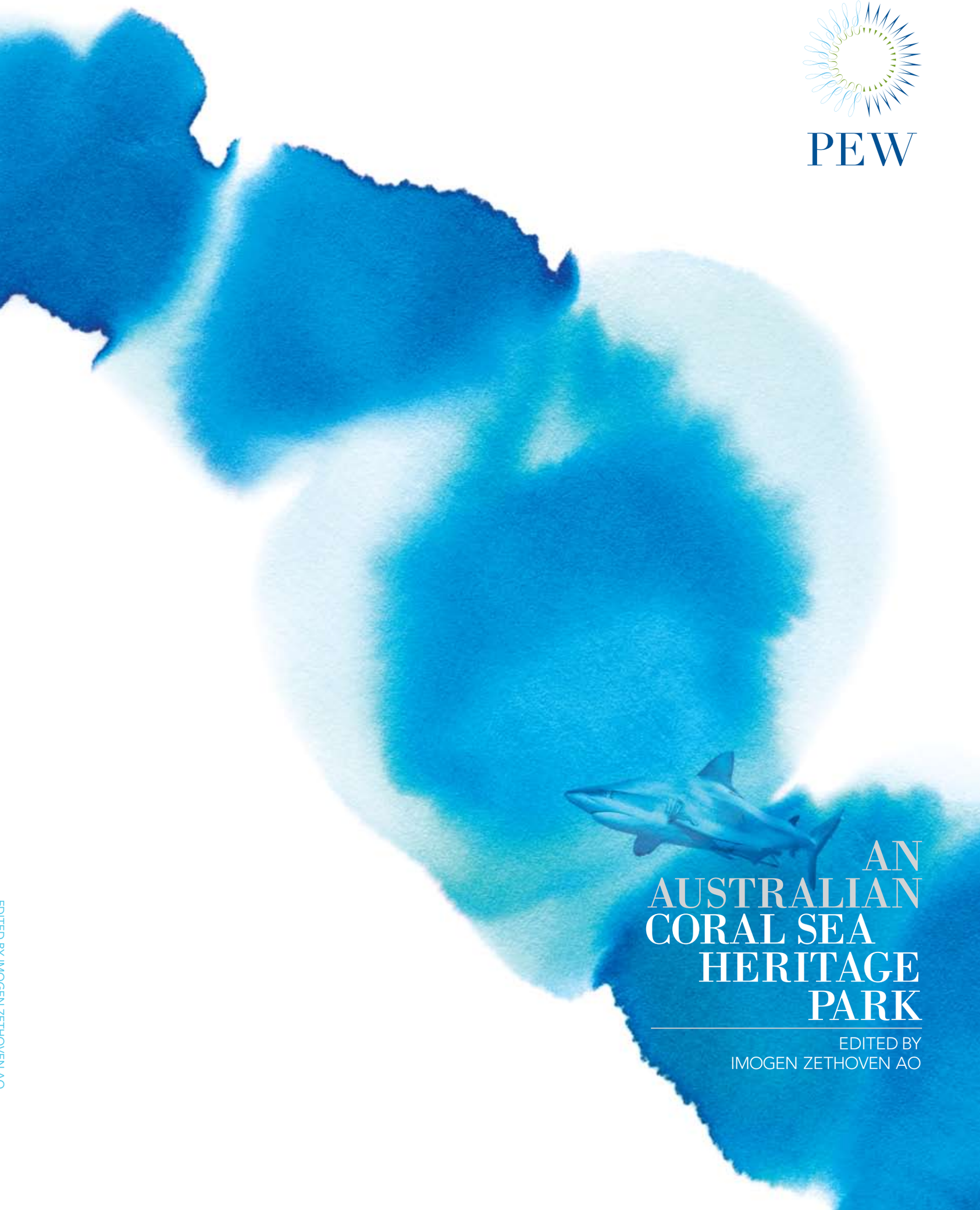

AN AUSTRALIAN CORAL SEA HERITAGE PARK

EDITED BY
IMOGEN ZETHOVEN AO

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The Pew Charitable Trusts is driven by the power of knowledge to solve today's most challenging problems. Pew applies a rigorous, analytical approach to improve public policy, inform the public and stimulate civic life. We partner with a diverse range of donors, public and private organizations and concerned citizens who share our commitment to fact-based solutions and goal-driven investments to improve society.

An independent nonprofit, the Trusts is the sole beneficiary of seven individual charitable funds established between 1948 and 1979 by two sons and two daughters of Sun Oil Company founder Joseph N. Pew and his wife, Mary Anderson Pew.

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Grey reef shark,
©Jurgen Freund

The Pew Environment Group is the conservation arm of the US-based Pew Charitable Trusts. Encouraged by Pew's successful advocacy for the Northwestern Hawaiian Islands, the Pew Environment Group in partnership with the Oak Foundation, the Sandler Family Supporting Foundation and the Robertson Foundation launched Ocean Legacy in 2007. Its goal is to secure designation of a small number of very large, world-class, no-take marine reserves over the next 3–5 years that will provide ecosystem-scale benefits and help conserve our global marine heritage.

PEW

Australian Marine Conservation Society

AUSTRALIAN CONSERVATION FOUNDATION

FOREWORD

BY
DAVID SHACKLETON, AO
Vice Admiral (Retired)
Former Chief of Navy

CHRISTOPHER RITCHIE, AO
Vice Admiral (Retired)
Former Chief of Navy

Australia has a unique relationship with the sea. Australians live on the only inhabited island continent on earth. Our oceans and coastline are of great importance to our identity, prosperity, lifestyle and security.

The sea is a significant resource; it is the nation's major highway for trade, a magnet for recreation and tourism, and the last line of Australia's defence and border protection. In the Second World War, Australia's fortunes were influenced greatly by the outcome of the Battle of the Coral Sea, the first major allied victory in the war of the Pacific, and an event that marked a realignment of Australia's international relationships.

As former Chiefs of the Royal Australian Navy, we spent our entire professional lives thinking about the role of the sea in Australia's future. There was a time, not long ago, when only naval officers, oceanographers, marine biologists and those with commercial interests gave much thought to the role of the sea in the life of the nation. Thankfully, there is now an awakening that the sea, like our rivers, flora and fauna, is critical to our collective future as responsible citizens.

Ecologists, environmentalists and ordinary citizens have come to understand that there is a lot more to the sea than science, commerce and national defence. The relationship between the sea and the land is a central element of Australia's future.

The Coral Sea holds a special place as part of Australia's oceanic boundary. It lies adjacent and seaward of the Great Barrier Reef, and has a significant continuous impact on the health of the Reef and the Central Western Pacific oceanic systems. Its ecology, oceanic reefs, rich marine life and diversity of habitats make it a priceless treasure for Australians and those whose shores it reaches. Importantly, scientific study tells us that the Coral Sea is one of perhaps as few as five ocean areas throughout the world that, because of a coincidence of conditions, acts as a haven for large fish species. In turn, these havens have a significant impact on the size of fish stocks in adjacent sea areas.

We are concerned that marine life in the Coral Sea is in danger.

Large ocean fish such as bigeye and yellowfin tuna are being rapidly depleted in the Pacific. Catch per unit effort for these species in Australia's East Coast Tuna and Billfish fishery, which operates partly in the Coral Sea, has also shown a clear downward trend. Fish stocks are not sustainable without time for the overall marine ecosystem to regenerate, an effort that typically takes many years without them being fished.

Fishing will not stop until there is some legal compulsion for it to do so. Australia's government has the authority to create that legal compulsion.

We suggest that Australia's stewardship of the Coral Sea needs to improve. Given the rapid decline of large oceanic fish as described in this submission, the onset of climate change and innumerable other threats to our oceans, it is time for strong leadership and action.

Evidence from around the world and in Australia demonstrates that no-take parks not only increase abundance of fish populations, they also improve catches of fish in adjacent fishing areas.

For this combination of reasons, we strongly believe that those charged with securing the future for Australians should agree to this proposal to form a very large highly protected, no-take reserve: to be known as the *Australian Coral Sea Heritage Park*.

A no-take reserve does not deny the ocean to others, but it does prohibit all forms of fishing.

The *Australian Coral Sea Heritage Park* would be the largest of its kind in the world, and a clear demonstration of Australia's commitment and leadership in nurturing its whole environment; not just part of it.

This proposal by the Pew Environment Group[1], in collaboration with the Oak Foundation, the Sandler Family Supporting Foundation and the Robertson Foundation, is a prime example of evidence-based policy analysis and formulation, advancing a tried-and-tested idea that has deep roots in conservation history. It goes back to the world's first marine park, the Key West National Wildlife Refuge in Florida, USA, created 100 years ago in 1908 by President Theodore Roosevelt, and Australia's first Commonwealth-created marine reserve, the Great Barrier Reef Marine Park established under legislation in 1975. The Pew proposal also includes sound and effective strategies to achieve an *Australian Coral Sea Heritage Park* at the earliest possible date.

This is a national challenge for which only the Federal Government is equipped to take the lead.

We strongly commend this submission to you[2].

[1] The Pew Environment Group is the conservation arm of the Pew Charitable Trusts: www.pewtrusts.org

[2] We are not receiving any benefit, monetary or otherwise, for our role in supporting this proposal.

Dwarf minke whale

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We are grateful to the following agencies for contributing information, advice, photos or maps to this submission: the Australian Fisheries Management Authority; the Australian Hydrographic Service; the Australian Institute of Marine Science; the Australian National Maritime Museum; the Australian War Memorial; the Great Barrier Reef Marine Park Authority; the Queensland Department of Primary Industries & Fisheries; and the Sea Power Centre – Australia.[1] We are also grateful to Dr Phil Burgess, chair of the Climate Change Review Group at Telstra, where he is Group Managing Director of Public Policy and Communications, for reviewing and commenting on the manuscript; Robyn Harper for assistance with photo compilation; and Helen Odlin for proofreading.

[1] The information and views expressed in this submission do not necessarily reflect those of the Federal or Queensland Governments or any of the agencies mentioned above.

NOTES ON CONTRIBUTORS

Quentin Hanich is a Senior Fellow at the Australian National Centre for Ocean Resources which he joined in early 2005. Mr Hanich coordinates much of the Centre's provision of advice on international fisheries and oceans governance for Australian and regional agencies, particularly in regard to the negotiation and implementation of international fisheries and marine conservation treaties. Mr Hanich has advised delegations to various fisheries and marine environment treaty meetings and has worked throughout the Asia/Pacific region. Mr Hanich lectures and writes on: oceans governance; international fisheries; Antarctic and marine conservation; international environment and fisheries fora; and strategy development. Mr Hanich has degrees in Antarctic Studies (Hons) and Arts. He is also undertaking a PhD analysing fisheries governance and institutional arrangements in the Pacific Islands region.

Professor **Ove Hoegh-Guldberg** is the Director, Centre for Marine Studies, University of Queensland. Ove Hoegh-Guldberg has held academic positions at UCLA, Stanford University, the University of Sydney and the University of Queensland and is currently a member of the Australian Climate Group, the Royal Society (London) Marine Advisory Network and is a Reviewing Editor at *Science* magazine. He also heads a large research laboratory (over 25 researchers and students) at the University of Queensland that is focused on the impacts of global warming and ocean acidification on marine ecosystems, now and into the future. He completed his BSc. Honours at the University of Sydney and PhD at UCLA in 1989, and was recognised in 1999 with the Eureka Prize for Research into the physiological mechanisms of coral bleaching.

Professor **Terry Hughes** is an Australian Research Council (ARC) Federation Fellow (2002–2007, 2007–2012) and Director of the ARC Centre of Excellence for Coral Reef Studies (since 2005). Professor Hughes was elected a Fellow of the Australian Academy of Science in 2001, and was a member of the Expert Advisory Committee for *Australian National Research Priorities* in 2002. He is a Fellow and Board Member of the *Beijer International Institute for Ecological Economics at the* Royal Swedish Academy of Science, Stockholm, and a member of the Board of Directors of the *Resilience Alliance*. He has been awarded numerous prizes and awards, including the Centenary Medal of Australia, the Silver Jubilee Award for Excellence of the Australian Marine Science Association in 2004, the 2007 Sherman Eureka Prize for Environmental Research, and the 2008 quadrennial Darwin Medal of the International Society for Reef Studies.

According to ISI Science Citation Index, Professor Hughes is ranked number one globally for citations to individual researchers in coral reef science. He has published over 80 influential papers, including 18 in *Science and Nature*. In the past two to three years, his research has increasingly evolved in a new direction, moving from an ecological focus to a broader evaluation of the linkages between coral reef ecosystems, the goods and services they provide to people, and the welfare of human societies. The ARC Centre he directs has a membership of over 200 researchers, including PhD students from 36 countries.

Paul Hundley is Senior Curator of the USA Gallery at the Australian National Maritime Museum. This Gallery was created by an official gift from the United States to Australia in 1988 commemorating the Bicentennial of European settlement. He has held this position since 1993. Prior to this he was the State Underwater Archaeologist for the state of Maryland, 1989–1993. He was also Curator of Maritime History at the West Australian Maritime Museum, 1980–1989. Mr Hundley received his Masters degree in Nautical Archaeology from Texas A&M University in 1980.

Helene Marsh is Professor of Environmental Science and Dean Graduate Research Studies at James Cook University. She leads a cross-disciplinary research group that aims to establish the science base for the management of marine wildlife in the tropical Australasian region. Marsh leads the species conservation program of the Marine and Tropical Research Facility that studies the status of stocks of sensitive marine wildlife (dugongs, dolphins and whales, turtles and seabirds) to provide early warnings of declines and scientific advice aimed at improving conservation strategies and outcomes. Marsh has been commissioned to provide scientific advice on dugong conservation to the United Nations Environmental Program and 10 range states. She has provided advice to the Great Barrier Reef Marine Park Authority for 25 years through her membership of numerous advisory committees including the Scientific Advisory Committee and the Social Economic and Cultural Advisory Committee that were established for the program that re-zoned the Great Barrier Reef Marine Park in 2003. Her research has been internationally recognised by the award of a Pew Fellowship in Marine Conservation in 1998 and a Distinguished Service Award by the Society of Conservation Biology in 2007.

Ben Milligan is a Researcher at the Australian National Centre for Ocean Resources and Security (ANCORS) specialising in international law. Prior to joining ANCORS, Ben was a member of the in-house legal team of Hutchison Telecommunications (Australia) Ltd.

John Pandolfi is Professor at the Centre for Marine Studies and the Department of Earth Sciences, University of Queensland and a chief investigator of the Australian Research Council's Centre of Excellence in Coral Reef Studies. He has published more than 70 articles in peer-reviewed journals and received numerous research grants and scholarships from the Smithsonian Institution, the National Science Foundation (USA), the Australian Research Council, and NOAA. Pandolfi is the one of the world's leading experts on coral reef palaeoecology. He has focussed on coral reef ecosystems to shed light on a number of fundamental ecological questions where long-term data are essential. Pandolfi has provided frequent Congressional briefings in Washington D.C. on coral reef management and policy and has been invited to serve on numerous international working groups, including ones convened to evaluate the effects of humans and global change on coral reefs (Scientific Committee on Ocean Research; Panel on Climate Change and Coral Reefs, JCU), the integrated management and conservation of Brazilian reefs, and the ecosystem function and biodiversity of coral reefs (UNESCO).

Hugh Possingham, FAA, completed Applied Mathematics Honours at The University of Adelaide in 1984. After attaining a Rhodes Scholarship in 1984, Hugh completed his D.Phil at Oxford University in 1987. Postdoctoral research periods followed at Stanford University and at the Australian National University (as a QEIII Fellow). In 1991 he took a Lectureship, later Senior Lectureship, in Applied Mathematics at The University of Adelaide. In 1995 he was appointed Foundation Chair and Professor of the Department of Environmental Science at the Roseworthy Campus of The University of Adelaide. In July 2000 Hugh took up a joint Professorship between the Departments of Zoology & Entomology, and Mathematics at The University of Queensland. In February 2001, The Ecology Centre was established with Hugh as Director. From 2003–2006 Hugh was an ARC Professorial Research Fellow. Professor Possingham is currently an ARC Federation fellow (2006–2011) and Director of a Commonwealth Environment Research Facility – Applied Environmental Decision Analysis.

Hugh has been awarded: the POL Eureka Prize for Environmental Research (for collaborative work with Dr David Lindenmayer) – 1999; the inaugural Fenner Medal for Plant and Animal Sciences from the Australian Academy of Sciences – 2000; and the Australian Mathematical Society Medal – 2001. In 2005 he was elected to the Australian Academy of Science.

Vice Admiral (Rtd) **Chris Ritchie** AO joined the Royal Australian Navy as a 16 year-old Cadet Midshipman in January 1965 and retired as the Chief of Navy more than 40 years later in July 2005. In the course of his career, he qualified as a Principal Warfare Officer and commanded three ships including HMAS Brisbane during the Gulf War of 1991. He held appointments at flag rank as Maritime Commander, Head of Capability Systems, Deputy Chief of Navy and Commander Australian Theatre. He became the Chief of Navy in July 2002.

Since leaving the Navy, Vice Admiral Ritchie has maintained an interest and involvement in Defence issues and has promoted a greater awareness of Australian maritime history and the need for a robust Australian defence industry. He has served on reviews and committees, both for Government and not-for-profit organisations. He is currently Chair of the Australian Defence College Advisory Board, a director of ASC Pty Ltd and Maritime Australia Limited and patron of the Naval Warfare Officer's Association and the Australasian Hydrographic Society. He is a Fellow of the Australian Institute of Company Directors and a Visiting Fellow at the Australian Centre for Ocean Resources and Security at the University of Wollongong.

Vice Admiral (Rtd) **David Shackleton** AO joined the Navy in 1966 and commanded the Royal Australian Navy from July 1999 to July 2002 in what was a very interesting period in the history of the Navy.

During his Navy career of 36 years, David had Vietnam service as well as extensive sea experience, including foreign exchange with the Royal Navy and command of the frigate HMAS Derwent and the destroyer HMAS Brisbane. He has had senior level responsibilities for the development of Navy and Defence policy, all Australian Defence Force operational capability requirements, project management and procurement of complex command and control and intelligence information systems, as well as the education and training of officers in advanced staff development programs.

Since leaving the Navy he has formed his own consulting business which focuses on complex strategic leadership issues. He is a non-executive Director of Stratos Wireless (Australia), Chairman of the Australian National Centre for Ocean Resources and Security at the University of Wollongong and member of the South Australian Defence SA Advisory Board. He assists a number of not-for-profit organisations. David has earned an Executive MBA from Monash University and completed several advanced Australian and international leadership and management programs. He is a Fellow of the Australian Institute of Company Directors, a Fellow of the Australian Institute of Management, and a Visiting Fellow at University of NSW University College Business School (Australian Defence Force Academy).

G. Robin South is Adjunct Professor in the School of Earth and Environmental Sciences at James Cook University and Senior Advisor to the Reef and Rainforest Research Centre. He currently coordinates the International Ocean Institute's global training program *OceanLearn*, and is the IOI's Advisor for Australia and the Western Pacific. He was previously Professor and Head of the Department of Biology at Memorial University, Canada; Director of the Huntsman Marine Science Centre in St. Andrews, New Brunswick, Canada; and from 1990–2002 was the founding Professor of Marine Studies at the University of the South Pacific based in Suva, Fiji. As a technical advisor to the Council of Regional Organisations for the Pacific (CROP) Marine Sector Working Group, he was one of the architects of the Pacific Islands Regional Ocean Policy, and as leader of the Global International Waters Assessment for the Pacific Islands he led a regional assessment of important national and trans-boundary issues impacting the Pacific Islands region.

Dr **David Stephens** is a former naval officer, a graduate of the University of New South Wales (PhD) and the Australian National University (MA), and currently Director of Strategic and Historical Studies within the Sea Power Centre - Australia. He has contributed articles and essays to many publications and his work has been translated into several languages. His most recent books include the third volume in the Australian Centenary History of Defence: The Royal Australian Navy (2001); (co-ed) The Face of Naval Battle: the human experience of modern war at sea (2003); *The Royal Australian Navy in World War II* (2nd ed. 2004); (co-ed) *The Navy and the Nation* (2005), *A Critical Vulnerability: the impact of the submarine threat on Australia's maritime defence* 1915-54 (2005); *Australia's Navy in the Gulf* (2006); (co-ed) *Sea Power Ashore and in the Air* (2007); *and Strength Through Diversity: The Combined Naval Role in Operation STABILISE* (2007).

Martin Tsamenyi is Professor of Law and Director of the Australian National Centre for Ocean Resources and Security (ANCORS) at the University of Wollongong, Australia. Professor Tsamenyi has had several years of academic and practical experience in ocean law and policy. His areas of specialisation include fisheries law; fisheries monitoring, control and surveillance; shipping law; marine environmental law and ocean policy. Professor Tsamenyi has written extensively on these subjects and has undertaken consultancy and advisory work for several governments and international organisations.

Dr **Trevor Ward** peer-reviewed the chapter on Natural History and Heritage. Dr Ward is a Perth-based consulting marine ecologist specialising in performance assessment systems for marine ecosystems and biodiversity. Dr Ward holds adjunct teaching and research appointments at the University of the Sunshine Coast (Maroochydore, Queensland) and the University of Western Australia (Perth, Western Australia). His recent research and consulting project experience includes marine planning systems, fishing impacts, environmental impacts and marine invasive species. He has extensive experience in planning for marine protected areas, and their role as fisheries management and biodiversity conservation tools. Dr Ward provides strategic policy and technical advice to government agencies, fisheries managers, conservation groups and local communities worldwide on sustainable management of marine ecosystems and fisheries. He has published more than 140 scientific journal papers, book chapters and research reports in marine ecology and environmental management, and was jointly awarded the CSIRO Chairman's Medal in 1996 for excellence in marine science. In 2007, Dr Ward authored an unpublished study for the Pew Environment Group and The Nature Conservancy, entitled *Wild Australia Program: Conservation of Australia's Marine Ecosystems.*

Dr **Clive Wilkinson** recognised coral reef scientist responsible for coordinating the Global Coral Reef Monitoring Network in more than 80 countries, which is supported by United Nations agencies, and various governments including those of USA, Australia, France and the UK. The GCRMN publishes the 'Status of Coral Reefs of the World' reports every two years. From 1990, he was the Chief Technical Advisor for a natural resource assessment and research capacity building program in five ASEAN countries for five years. He was an active field scientist on the ecology of the Great Barrier Reef as a senior research scientist for 26 years at the Australian Institute of Marine Science. His original training was in microbiology and ecology from the University of Queensland where he obtained a PhD in Marine Ecology. He is interested in international affairs and was formerly a Vice President of the Australian Institute for International Affairs. He is currently an International Research Associate at the Reef and Rainforest Research Centre in Townsville and Cairns: email: clive.wilkinson@rrrc.org.au.

Imogen Zethoven AO is leading the Pew Environment Group's work to establish an *Australian Coral Sea Heritage Park*. Imogen has worked for many not-for-profit groups as an environmental advocate. She led WWF's global climate campaign, PowerSwitch!, which focused on the EU's Emissions Trading Scheme and the organisation's Great Barrier Reef campaign which resulted in the world's largest network of highly protected areas. In recognition of this achievement, Imogen received the Fred M. Packard International Parks Merit Award at the World Conservation Congress in 2004, shared with the Hon. Virginia Chadwick, former Chair of the Great Barrier Reef Marine Park Authority. Imogen has worked as a policy advisor in Canberra and has authored several reports including *Clear… or Present Danger* about the decline of water quality in the Great Barrier Reef. In 2006, Ms Zethoven was made an Officer of the Order of Australia for service to conservation and the environment.

AN AUSTRALIAN CORAL SEA HERITAGE PARK

INTRODUCTION

BY
IMOGEN ZETHOVEN AO

The world's oceans are in trouble. Both their shallow waters and mysterious depths are being increasingly emptied of life. The decline in abundance of fish and other creatures is accelerating. Yet our global efforts to protect the marine environment still lag far behind our achievements on land. Less than one percent of the world's oceans are highly protected.

We can be proud of Australia's record of marine conservation. In 1975, Australia created the world's largest multiple use ocean reserve: the Great Barrier Reef Marine Park. Thirty years later, we created the world's largest network of highly protected areas, fully protecting one-third of the Great Barrier Reef Marine Park in no-take zones (slightly over 115,000 km^2). In 2007, Australia designated the South-east Commonwealth Marine Reserve Network that protected almost 106,000 km^2 from commercial fishing.

However, further effort is needed to protect Australia's and the world's oceans. Australia has an obligation to make a focused and determined effort because of our large and recently expanded maritime waters and because we have the capacity to do so. A worldwide effort becomes even more critical in the face of climate change and the negative effects it will have on the marine environment.

In recent years, marine conservation achievements by other countries have surpassed us.

On 15 June 2006, President George W. Bush announced the designation of the world's largest highly protected marine park, known as the Papahānaumokuākea Marine National Monument in the Northwestern Hawaiian Islands. The entirely no-take park covers 356,893 km^2. It is nearly 12,500 km^2 larger than the Great Barrier Reef Marine Park. When announcing the proposal, President Bush said: *"Our duty is to use the land and seas wisely, or sometimes not use them at all."*

In 2006, the Republic of Kiribati declared the Phoenix Islands archipelago and waters surrounding them as a marine park, officially named the Phoenix Islands Protected Area. It includes a "managed area" that covers 184,700 km^2 where commercial fishing is prohibited. This year the Kiribati Government announced its intention to increase the size of the park to 410,500 km^2; however, this extension depends on the success of a fundraising mechanism which may take some time to deliver.

THE CORAL SEA, FULLY PROTECTED, WOULD BE A SAFE HAVEN FOR GLOBALLY THREATENED SPECIES

AN AUSTRALIAN CORAL SEA HERITAGE PARK

Australia now has an unparalleled opportunity to regain and enhance its status as global marine leader. The Coral Sea is an iconic area, nationally and internationally. Its natural and cultural heritage value to the nation and to the world is substantial.

The area contains habitats as diverse as coral reefs, remote islands, sandy cays, underwater mountains, abyssal plains and deep-sea canyons. Its spectacular wildlife includes top predators such as sharks, tuna, marlin and swordfish as well as threatened sea turtles, whales, seabirds and a huge range of corals and reef fish. The Coral Sea, fully protected, would be a safe haven for globally threatened species and fish that are rapidly declining around the world such as tuna and sharks. Its location next to the Great Barrier Reef World Heritage Area and Marine Park creates an unparalleled opportunity to protect a very large area of the world's tropical marine environment.

The Coral Sea is also noteworthy for having cultural values.

The Coral Sea was the arena for a naval engagement that turned the tide of World War II in the Pacific. The Battle of the Coral Sea involved both US and Australian naval ships and was the world's first battle at sea where the result was determined by carrier-based aircraft. It was the first time during WWII that the Imperial Japanese Navy failed to win a naval battle, impeding their seaward advance to Port Moresby. The Battle of the Coral Sea was soon followed by the Battle of Midway, marking a decisive win by the United States. The Japanese, realising they had lost their naval superiority, turned their focus to a land-based strategy. This set the scene for the Japanese land invasion of Papua New Guinea and the epic Australian struggle which began at Kokoda.

The Coral Sea's cultural heritage also includes a civic element. It was Captain Matthew Flinders who first coined the name, 'Coral Sea' for the region.The area's underwater mountains rising to shallow coral reefs, combined with often stormy weather, resulted in many shipwrecks and human tragedies. One remarkable story is the shipwreck of two vessels in 1803, one of them carrying Matthew Flinders, on what became known as Wreck Reef. Flinders and thirteen others rowed more than 1,000 km back to Sydney to return with three rescue ships. Eighty sailors were saved six weeks later.

The Coral Sea's natural, military and civic heritage values deserve a high level of permanent recognition and protection.

With this in mind, it is heartening that the Minister for the Environment, Water, Heritage and the Arts, the Hon. Peter Garrett MP, was quoted in *The Age* (17 September 2007) saying: *"serious attention needs to be given to consider better protecting its environmental values"*.

On 5 May 2008, the Hon. Warren Snowden, Minister for Defence Science and Personnel, delivered a message from Prime Minister Rudd at the 66th Commemorative Service of the Battle of the Coral Sea[1]:

"On this 66th Anniversary of the Battle of the Coral Sea, we honour those Australian and American service personnel whose courage, sacrifice and cooperation made victory possible. Their valour and resilience shall not be forgotten."

It is also encouraging that the Minister for Energy and Resources and Minister for Tourism, the Hon. Martin Ferguson MP, noted on ABC TV's Insiders (27 April 2008)[2]:

"We saw on Friday new Anzac opportunities in places such as the western battlefields in France. I actually talked to the PNG Government, or think about Milne Bay, or think about Guadalcanal in the Solomon Islands, think about the Kokoda Track. Develop a proper tourism strategy and for our young Australians who want to give respect to those who fought for Australia and guaranteed our future, you do not necessarily have to go to Europe, you can also go the islands around us and help economic opportunities and also a sense of peace and stability for economic development."

Left: Indo-Pacific blue marlin
Roger Fenwick, Toora, Victoria

THE PROPOSAL

Early last year, the Global Ocean Legacy, a project managed by the Pew Environment Group, identified Australia's Coral Sea as one of a handful of places remaining in the world where a very large highly protected oceanic park could be created, protected, monitored and enforced.

Pew, in partnership with other groups and individuals, proposes a large highly protected park between the Great Barrier Reef Marine Park and outer edge of Australia's Exclusive Economic Zone. The park would encompass Boot Reef in the north and Cato Island in the south.

The proposed park includes two existing Commonwealth National Nature Reserves: Coringa-Herald and Lihou Reefs. Together, these reserves cover 17,290 km^2 of islets, cays and seabed. Both are managed to maintain ecological processes and systems and to protect the habitats and biodiversity of the reserves from the pressures associated with human use[3].

We propose that these existing parks be incorporated into a much larger park using the Commonwealth reserve provisions of the *Environment Protection and Biodiversity Conservation Act 1999*. This is the simplest and most logical mechanism for creating a large highly protected park in the Coral Sea.

It would make sense to delegate the ongoing management of an *Australian Coral Sea Heritage Park* to the Great Barrier Reef Marine Park Authority, with financial resources to enable effective monitoring, surveillance and enforcement by the Australian Customs Service and the Royal Australian Navy.

[1] Attachment 1 is the full message by the Hon. Kevin Rudd, Prime Minister, to the 66th Commemorative Service for the Battle of the Coral Sea.
[2] http://www.abc.net.au/insiders/content/2007/s2228263.htm
[3] http://www.environment.gov.au/coasts/mpa/publications/coral-sea.html

CURRENT COMMERCIAL USES

The Coral Sea dive tourism industry is comprised of six tourism operations. The primary destination is Osprey Reef, which the industry considers the "jewel in the crown". The influential *Forbes* magazine in August 2007 declared the Coral Sea among the top 10 global diving destinations.

Two Commonwealth-managed commercial fisheries operate in the Coral Sea: the Eastern Tuna and Billfish Fishery (ETBF), a longline fishery which extends from the tip of Cape York Peninsula, down the east coast of Australia, to the Victoria–South Australian border; and the Coral Sea Fishery, a small mixed fishery which extends from the tip of Cape York to the tip of Fraser Island. Both fisheries operate in the area between the Great Barrier Reef Marine Park and Australia's EEZ.

Although the ETBF has 159 concessions, most fishing effort takes place south of the proposed area of interest. In addition, a large area (Area E) within the Coral Sea is restricted to 11 concessions, all of which are also allowed to fish throughout the ETBF zone.

Net financial returns by the ETBF have been positive in only three of the last eleven surveyed years. The three most recent periods have all been negative. The 18 permit holders in the Coral Sea Fishery generate only a small amount of revenue.

Very limited recreational charter fishing occurs in the Coral Sea.

A small structural adjustment package would be required to buy out all effort in the Coral Sea Fishery. A limited licence buyout package may be needed in the ETBF for operators who have historically depended on fishing in the Coral Sea for the majority of their income. It is unclear at this stage whether charter operators in the Coral Sea would fall into this category.

Geoscience Australia has no oil and gas program in the Coral Sea and as a consequence there has never been oil and gas exploration in the region.

PUBLIC SUPPORT

Last year the Pew Environment Group commissioned Newspoll to undertake a survey of public opinion about the creation of a large highly protected park in the Coral Sea. The survey was limited to the Cairns and Townsville regions and occurred 19–20 September 2007. Sixty-six percent of people supported the proposal without a public education campaign. It is likely that support will be much higher nationally and locally after an education campaign[4]. Australian environment groups strongly support a high level of protection for the Coral Sea[5].

CURRENT AND PAST INDIGENOUS INTERESTS

Currently, there is no documented record of Aboriginal land or sea use of the Coral Sea. The few islands are too far off the coast to be accessible. As of May 2008, there have been no native title applications over thearea. However, this does not discount that in the past, traditional connections to the Coral Sea country may have existed, and that story lines or traditional cultural links to the region may still exist.

THIS SUBMISSION

This submission brings together a wide range of nationally-recognised experts across different disciplines.

We are honoured that the two most recent Chiefs of the Navy, Vice Admiral (Rtd) David Shackleton AO and Vice Admiral (Rtd) Chris Ritchie AO have endorsed this proposal and written its Foreword.

Australia's leading tropical marine scientists have presented the scientific case for a large highly protected park in the Coral Sea.

Dr Clive Wilkinson and Dr Robin South have written a chapter that documents the natural history and heritage of the Coral Sea.

The Director of Strategic and Historical Studies at the Navy's Sea Power Centre, Dr David Stephens, has written a chapter about the Battle of the Coral Sea and why we should remember and honour it.

The Curator of the USA Gallery at the Australian National Maritime Museum, Paul Hundley, has written a chapter about the civic maritime history and heritage of the area.

The Director of the Australian National Centre for Ocean Resources and Security, Professor Martin Tsamenyi, is the primary author of a chapter about the management implications of a large highly protected park in the Coral Sea.

The Director of Pew's Coral Sea campaign, Ms Imogen Zethoven AO, has written the chapter on current extractive uses in the Coral Sea, with input from QDIPF, AFMA, AIMS and GRBMPA.

AN OCEAN LEGACY FOR FUTURE GENERATIONS

Environmental concern has never been higher in Australia. Australians are becoming more conscious of our consumption patterns and their impact on the environment, including an increased desire to buy sustainably caught seafood. But the decision to protect our cherished marine environment lies with government. In the case of the Coral Sea, it lies clearly in the hands of the Federal Government.

An *Australian Coral Sea Heritage Park* would make an incomparable contribution to Australian and international marine conservation. It would honour our military and civic history. It would be the largest highly protected marine park in the world in its own right, and its western boundary would join with the eastern boundary of the most beloved tourism destination in the world, the Great Barrier Reef World Heritage Area, to form a grand park across the seas. There could be no better ocean legacy for future generations.

[4] A copy of the Newspoll survey is available upon request. Email Imogen Zethoven at izethoven@pewtrusts.org.

[5] Attachment 2 is a joint letter from Australian environment groups to the Federal Environment Minister, dated 15 April 2008, calling for a large no-take park in the Coral Sea.

THE SCIENTIFIC CASE FOR A LARGE NO-TAKE PARK

URGENT NEED FOR IMPROVED PROTECTION OF THE CORAL SEA

BY
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Australia's leading tropical marine scientists strongly support the proposal to transform the Coral Sea into the world's largest no-take area, to protect its immense environmental and heritage values from the escalating threats of overfishing and climate change.

- The world's marine ecosystems have been degraded by overfishing, pollution and man-made global warming. Eleven percent of terrestrial habitats have been designated as parks to conserve their biodiversity and the ecosystem services they provide to people. In contrast, less than 0.1% of the world's oceans are fully protected.
- The Coral Sea provides critical habitats for many species, including critically endangered Hawksbill and endangered Green turtles, 25 species of whales and dolphins; and 27 species of seabird. At least 13 species of seabird breed on Coral Sea islands, including regionally important populations of the red-footed Booby, least frigate bird and greater frigate bird. The Coral Sea is one of the few places remaining on Earth where large pelagic fishes (tuna, billfish and sharks) have not yet been severely depleted.
- Fishing effort in the Coral Sea has grown rapidly in the past 20 years, and the catch per unit effort of yellowfin and bigeye tuna has already begun to decline. The unsustainable bycatch of turtles, sharks and birds in pelagic fisheries, and the rapid decline of large sharks from illegal finning are major concerns worldwide that warrant immediate intervention to prevent further long-term damage. Fishing activities in the Coral Sea contribute to significant declines of sharks, turtles and seabirds on the adjoining Great Barrier Reef. A single large no-take zone is the best approach for protecting these pelagic and migratory species because they cannot be protected inside small reserves.
- The rich coral fauna of the Coral Sea have already been damaged by coral bleaching, which is set to increase in frequency and scale due to global warming. Reefs in the Coral Sea are small and relatively isolated from each other, making them more reliant on large-scale dispersal of larvae than the highly interconnected Great Barrier Reef. A single large no-take area (encompassing Australia's Coral Sea jurisdiction) would ensure that the scale of management appropriately matches the biological scale of important ecosystem processes such as dispersal and migration.
- The Coral Sea is one of only a handful of places in the world where a very large oceanic no-take park could be created, monitored and supported by the overwhelming majority of citizens in a single national jurisdiction.
- The Coral Sea has acted as a vital reservoir for reef biodiversity during past periods of rapid change in climate and sea level. It is relatively free from the influence of land-based pollution that affects inshore and mid-shelf coral reefs in the Great Barrier Reef, and has much lower levels of fishing. The creation of the Coral Sea no-take area will ensure that this region remains globally significant for the protection of tropical marine biota.
- A very large no-take park immediately adjacent to the GBRMP and its network of highly protected areas would be by far the world's largest protected ocean ecosystem. It would:
  - Enhance Australia's reputation as a world leader in the stewardship of marine biodiversity;
  - Make an unparalleled contribution to global marine conservation by setting a new benchmark for large-scale protection;
  - Enhance the World Heritage values of the Great Barrier Reef by reducing human impacts in the adjoining Coral Sea; and
  - Foster the growth of sustainable tourism industries.

Right: **Grey reef shark**
©Jurgen Freund

THE CORAL SEA IS ONE OF THE FEW PLACES REMAINING ON EARTH WHERE LARGE PELAGIC FISHES (TUNA, BILLFISH AND SHARKS) HAVE NOT YET BEEN SEVERELY DEPLETED

THE NATURAL HISTORY AND HERITAGE OF THE CORAL SEA

INTRODUCTION

BY
DR CLIVE WILKINSON
AND DR ROBIN SOUTH

The natural heritage value of the Coral Sea is enormous for both Australia and the world. The region is one of the few remaining places in the world where there is high diversity of large fishes. "The ocean east of the Great Barrier Reef is among the best areas remaining…" (SeaWeb, 2005).

The Coral Sea of Australia warrants special conservation protection for the following natural heritage values[1]:

- The Coral Sea is one of the few places remaining on earth where populations of spectacular biodiversity have not been severely depleted, especially seabirds; sharks, including whale sharks; humpback, minke and killer whales; dolphins; turtles; billfish such as marlin and sailfish; tuna; and myriads of invertebrates, many of which are unknown to science;
- It is one of the world's last tropical oceanic regions with large, high biodiversity coral reef areas that are virtually pristine;
- The waters, reefs and islands of the Coral Sea act as significant nursery and breeding ground for seabirds, turtles, humpback whales, sharks, and other top predators. Destruction of these populations would damage the ecology of the southwest Pacific and Antarctic Oceans;
- The reefs lie on the edge of the Coral Triangle of Southeast Asia, the global centre of marine biodiversity, with currents passing through the Coral Sea to replenish the reefs of Australia and the Triangle;
- The coral reefs and seamounts of the Coral Sea provide the critical 'stepping stones' that connect species in the wider Pacific with those of the Great Barrier Reef and the waters of southeastern Australia;
- The area contains seamounts with exceptionally high biodiversity that have not been destroyed by destructive bottom trawlers; but the threats are pending;
- The Coral Sea is remote from land-based sources of pollution; it is not directly threatened by chemical pollution or sediment runoff; and
- The Coral Sea lies between two countries (Australia and France – New Caledonia) with high conservation ethics and strong capacity to patrol and enforce conservation regulations.

[1] Much of the background material in this chapter has been summarised from a report commissioned by the Department of Environment and Water Resources (now the Department of the Environment, Water, Heritage and Arts): *Ecosystems of the East Marine Region* (Brewer *et al.*, 2007).

THE CORAL SEA REGION

The whole Coral Sea (Figure 1) formed approximately 60 million years ago as a large rocky basin that broke off the edge Gondwanaland because of volcanic activity. The basin migrated north on the Australian tectonic plate and gradually moved into the tropics.

Around 20 million years ago, the Coral Sea and the Great Barrier Reef arrived sufficiently close to the Central Indo-Pacific global centre of marine biodiversity to start accumulating this rich assemblage of species. This process of accumulation was aided by downstream equatorial currents, which provided an uninterrupted migration path from the high biodiversity centres to the north to the northern and eastern Australian coastline and the Coral Sea. The Great Barrier Reef and the Coral Sea therefore share a similar biogeographic history.

The Coral Sea is a critical link between the western Pacific and the Great Barrier Reef and further on to the Coral Triangle of Southeast Asia. The South Equatorial Current (Figure 2) flows through the ecosystems of Fiji, the Solomon Islands, Papua New Guinea, Vanuatu and New Caledonia, and into the Coral Sea. As it meets the Australian continental shelf at about 14˚S, it splits into two streams: the weak north-flowing Hiri current that flows through the Torres Strait to the Coral Triangle of South East Asia; and the south flowing East Australian Current (EAC) which brings warm waters to southern coastal areas of eastern Australia.

The biodiversity of all these regions therefore represents a continuum between the remarkable biodiversity of the Coral Triangle, which now includes the Solomon Islands, and the wider Indo-Pacific region. The Coral Sea provides many of the necessary 'stepping stones' to enable genetic exchanges between species via ocean currents that transport spores, larvae and migratory animals.

For example, it is probable that genes and populations of fish species with long larval periods are replenished on the Great Barrier Reef from Coral Sea reefs. Similarly the larvae of corals, fishes and other species are carried along on the East Australia Current to replenish reefs and coastal areas in Southern Queensland, New South Wales and on to remote reef areas of the Tasman Sea (Lord Howe and Norfolk islands, and Elizabeth and Middleton reefs).

The EAC (and associated gyres and eddies) is the primary mechanism that delivers, distributes and disperses an abundance of pelagic and shelf-slope demersal organisms and their larvae towards the south.

A distinct nutricline (boundary between low nutrient surface waters and richer deeper waters) has been demonstrated at about 60–100 m depth, peaking in July (Lyne & Hayes, 2005); however, there are pockets of nutrient-rich water associated with upwellings around reefs and seamounts. For much of the year, there are strong southeast trade winds that drive surface waters into all areas, especially north of 20˚S. During the monsoon season (December–February) cyclones are regularly generated in the Coral Sea. In some years, there may be eight or more, a frequency that can cause considerable destruction to reefs.

The uniqueness of the Coral Sea lies in its healthy condition compared with the highly devastated reefs of many parts of the Coral Triangle; and the remarkable biodiversity gene pool, which is a combination of Pacific, Southeast Asian and possibly Indian Ocean animal and plant populations. Much of the biodiversity of the Coral Sea is poorly understood, but it should be conserved for its global significance.

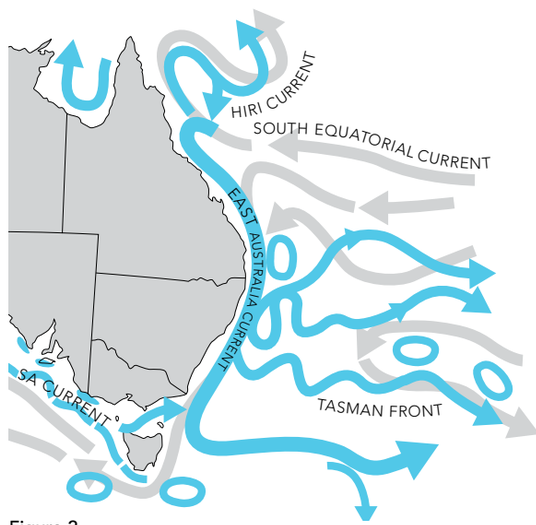


Figure 2
Schematic diagram of main eastern Australian currents, showing the major current patterns (modified from Lyne and Hayes 2005, in Brewer *et al.*, 2007).

THE CORAL SEA IS A CRITICAL LINK BETWEEN THE WESTERN PACIFIC AND THE GREAT BARRIER REEF AND FURTHER ON TO THE CORAL TRIANGLE OF SOUTHEAST ASIA

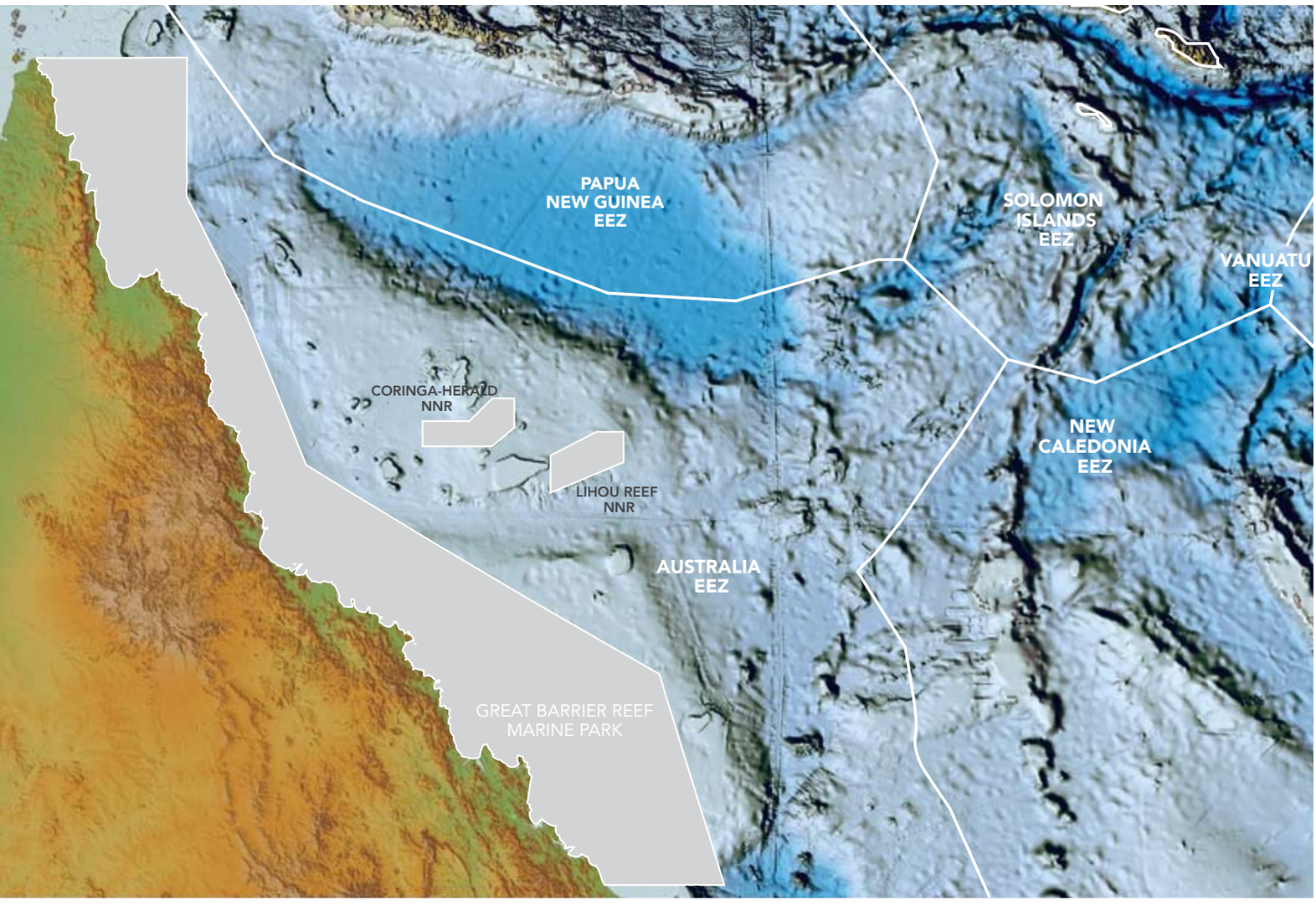
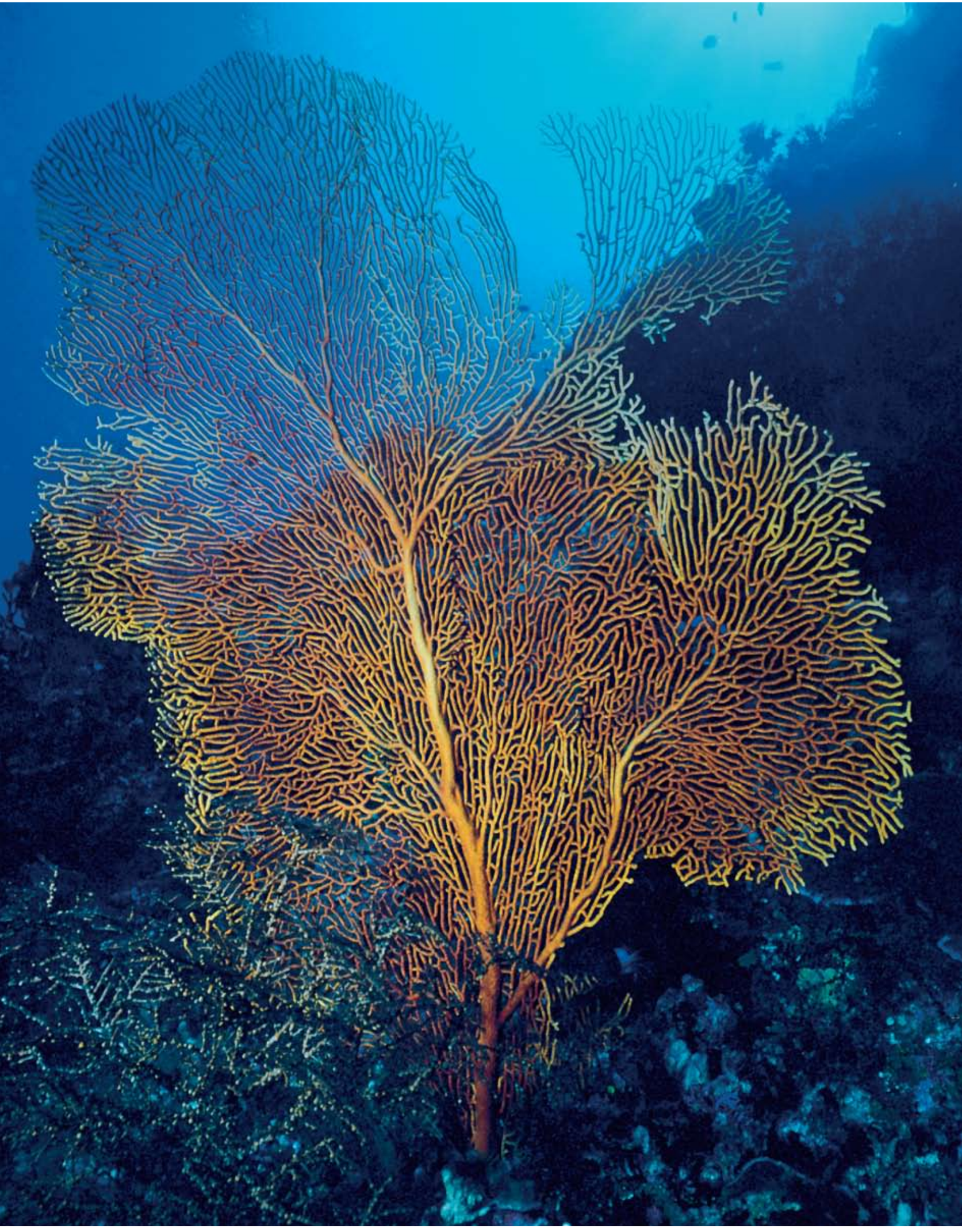


Figure 1: Map of the Coral Sea, with Exclusive Economic Zones (EEZ) by Daniel Beaver, 2008



AUSTRALIA'S CORAL SEA: MAJOR GEOPHYSICAL FEATURES

Within Australia's jurisdiction, the most significant features in the north of the Coral Sea are the Queensland Plateau and the Queensland and Townsville troughs. These are both over 2,000 m deep, but do not constitute hydrodynamic boundaries between the Queensland Plateau and the Great Barrier Reef (Brewer *et al.*, 2007). The eastern region of the Australian Coral Sea extends to the edge of the continental slope, and includes an abyssal plain with water depths exceeding 4,000 m. The Queensland Plateau constitutes much of the northern Coral Sea and these waters have very low nutrient concentrations, with water depths not exceeding 1,000 m, adjacent to the deeper Coral Sea Basin.

There are about 30 separate reefs and atolls in the Australian Coral Sea; 12 are wholly submerged or are dry only during low tide; and 18 have approximately 51 small islets and cays, some of which are vegetated. The largest atoll is Lihou Reef (lagoon is 100 by 30 km, and 2,500 sq km in area), which was declared a National Nature Reserve on 16 August 1982, enclosing an area of 8,440 sq km. Coringa-Herald National Nature Reserve (area 8,856 sq km) was declared at the same time. The land area in these Reserves is insignificant, as it is rarely more than 1 m elevation, with the highest point being 6 m above sea level on Cato Island.

There are many seamounts in the Australian Coral Sea, which form a continuum with seamounts further south in the Tasman Sea. The Northern Seamounts Field is an extension of the Tasmantid Seamount Chain, which includes the Southern Seamounts Field (outside the Coral Sea). The Australian Coral Sea seamounts lie in very deep water (2,500 m to 4,500 m) and are almost certainly similar to two other ranges of seamounts to the east that have been studied in more detail: the Lord Howe Rise or Tasmantid seamounts that run from New Zealand to New Caledonia; and the Kermadec Ridge seamounts that lie further east. These are all volcanic peaks, which arise from great depths and may reach close to the ocean surface. Those that were previously exposed or close to the surface were colonised by corals that grew upwards as the seamounts subsided, thereby forming the existing atolls.

AUSTRALIA'S CORAL SEA: MAJOR BIODIVERSITY FEATURES

Much of the biodiversity of the Coral Sea remains undiscovered, or undescribed.

There have been 628 species of fishes recorded from the Coral Sea, with more than 400 occurring in each of the two reserves. This former number is almost certainly conservative. Gerry Allen and Walter Starck observed more than 576 species of fishes from a handful of cays in the Coral Sea (www.underwater.com.au). These scientists described their breathtaking experiences diving in the crystal clear waters of the Coral Sea; unparalleled anywhere else in the world. It is anticipated that many more species remain to be found.

About 850 species of invertebrates were recorded from the Tasmantid Seamounts of southeast Australia, and it is likely that the unstudied seamounts of the Coral Sea will reveal a similarly rich biodiversity (Samadi *et al.*, 2006). The Seabed Biodiversity surveys on the Great Barrier Reef by the Australian Institute of Marine Science (AIMS) involved 1,340 video, sled, dredge and acoustic samples, at 448 sites with trawls and acoustics (www.aims.gov.au). The large number of new fauna and flora records has delayed complete analysis of the surveys, but it is anticipated that the biodiversity of the adjacent shallow parts of the Coral Sea (<100 m depth) will be comparable. The deep abyssal areas of the Coral Sea are completely unknown, and a rich pool of biodiversity certainly awaits discovery.

Left: Large sea fan

THE EXTENSIVE SEAMOUNT SYSTEMS OF THE CORAL SEA ARE ICONIC FEATURES THAT ARE CERTAIN TO BE HOTSPOTS OF ANIMAL BIODIVERSITY

EXTINCT BIRDS AND JURASSIC SHRIMPS

Many wonders of undiscovered biodiversity remain to be discovered in the vastness of the Coral Sea. Beck's petrels (Pseudobulweria becki), which have not been seen for more than 80 years, flew out of extinction and were photographed in the Bismarck Archipelago, Papua New Guinea in 2007 by Hadoram Shirihai, an Israeli ornithologist[1]*. There is a high probability that these birds also frequent the Coral Sea. Geoff Hilton of the Royal Society for the Protection of Birds says "there are numerous atolls and islands in the region where Beck's petrel could be breeding … now we must use this discovery as a new spur to try and save the bird."*

In 2006, French Zoologist Bertrand Richer de Forges discovered a 'Jurassic' shrimp (Neoglyphea neocaledonica) believed extinct for more than 50 million years, alive and well on an underwater peak in the Coral Sea[2]*. It is likely that around 40% of the invertebrates inhabiting seamounts in the Coral Sea are new to science. This, and other discoveries, stimulated France to declare a large area to the south of Isle des Pins, New Caledonia as a trawler exclusion zone to protect the biodiversity on seamounts.*

[1] *ScienceDaily*, March 11th, 2008.
[2] *Census of Marine Life*, 2006.

CORAL REEFS AND ISLANDS

The reefs of the Coral Sea are rich in biodiversity, comparable to those in the Great Barrier Reef. There have been no assessments of the total number of coral species occurring in the Coral Sea. However, it is anticipated that the number will be between 350–400 coral species. Comparable areas of the Great Barrier Reef have up to 500 hard corals and 40–50 genera of soft corals and gorgonian species (Fabricius & De'ath, 2000). The number of hard corals on the reefs of New Caledonia is estimated to be 342 (Pichon, 2006). Rapid surveys on some of the reefs of the Coral Sea reveal quite high coral diversity; e.g. 180 species on Osprey Reef and 140 species on Coringa-Herald National Nature Reserve.

The Coral Sea reefs support unusual assemblages of reef fish and are relatively isolated from one another. This isolation will mean that there will be only occasional inputs of new larvae from distant reefs, whereas most recruitment of coral reef biota will be through self-seeding. Larvae from these reefs are probably retained in the lagoons or in the downstream eddy that forms behind coral reefs, and when mature, the larvae actively migrate back to the natal reef. This is probably the most important mechanism for reef recovery following disturbances.

Although these reefs are remote from land-based pollution and some of the warming effects found in reefs closer to the coast, they are equally vulnerable to the impacts of climate change such as coral bleaching, rising ocean acidification and the damaging impacts of cyclones. Lihou Reef is one example. The Lihou Reef National Nature Reserve was surveyed in 1984 and 2004. Coral cover was generally low (10%) in 2004, and coralline algae and turf algae dominated the benthic community. Most coral colonies were small because the reefs are subjected to strong oceanic swells. The reef probably suffered coral bleaching during 1998 and 2002, such that the two surveys, separated by 20 years, showed that coral cover has declined from 20% to 10%.

SEAMOUNTS

The seamounts generally occur in relatively stable, cool waters (around 4 to 10˚C) therefore the animal biodiversity probably resembles similar, high-biodiversity seamounts around southeastern Australia and New Zealand. However, very little information is known about the biodiversity of the Northern Seamounts within the Coral Sea, although a number of them have been targeted for fishing. The closest studies have been made of marine invertebrates of the Norfolk seamounts (Samadi *et al.*, 2006), and similar studies of biodiversity on New Caledonian seamounts (Richer de Forges *et al.*, 2000). The French Governments of New Caledonia and mainland France were so impressed with biodiversity richness on the New Caledonian seamounts that they were protected in a special no-trawling zone.

The extensive seamount systems of the Coral Sea are iconic features that are certain to be hotspots of animal biodiversity, with unknown levels of endemism. They will contain cold water reefs dominated by corals and other filter-feeder animals that benefit from a stable rocky bottom and the increased availability of particulate organic matter being concentrated by the upwellings. Such seamounts contain a rich biodiversity of sponges, corals, gorgonians, sea squirts and crinoids; these organisms can grow unusually large, and are frequently very long-lived, often exceeding several hundred years. For example, large quantities of jewel quality black corals (*Bathypathes platycaudus*) up to 5 m tall probably occur on these seamounts.

The few detailed surveys of seamounts have shown as much as 40% of the fauna may be undescribed, and up to 34% of the species may be endemic. However, trawl fishing on such seamounts first involves the removal of these cold water reefs to gain access to the fish populations. This exploitation is unsustainable as many of the commercially important species, such as the orange roughy, live for more than 100 years, do not breed until they are 30 years old, and rely on the complexity of these cold water reefs for their habitat.

Right: Yellowfin tuna

Above: **Humphead wrasse**
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Below: **Hawksbill turtle**
©Jurgen Freund

AUSTRALIA'S CORAL SEA: CHARISMATIC BIODIVERSITY

CONTINENTAL SLOPES AND ABYSSAL PLAINS

Little is known about the abyssal regions of the Coral Sea, but the biodiversity is likely to be directly comparable with findings of other deep sea ecosystems. Abyssal regions are crucial in understanding ocean and global carbon cycling and functioning as the ocean floor is the largest interface between the geosphere and the biosphere. These regions support high species diversity and contain a vast reservoir of undiscovered species that may contain new bioactive molecules. Probably 90% of species collected in a typical abyssal sample are new to science; for example more than 500 invertebrate and fish species have been described from hydrothermal vents and cold seeps since they were discovered after 1977. Moreover, deep-sea ecosystems have many endemic species; up to 70% of species in hydrothermal vents are endemic. The microbial and genetic diversity is virtually unknown. These ecosystems are also fragile and vulnerable to climate change, as well as to anthropogenic disturbance. The current hypothesis is that deep-sea ecosystems support more species than anywhere else on Earth (EuroDEEP; www.horta.uac.pt/intradop/noticias1/EuroDEEP/).

The Australian Coral Sea contains spectacular megafauna, including manta rays, turtles, nautilus, large predatory fish, more than 600 other species of fish and two dozen species of sea birds; these all warrant special protection.

LARGE PREDATORY FISH

The Coral Sea is one of the few remaining places in the world where large populations of pelagic predators (megafauna) have not been severely depleted (Worm *et al.*, 2005).

These populations alone would warrant conservation of the region, especially as many of them reproduce relatively slowly. The large populations of pelagic fish, including tuna, barracuda, trevally, sailfish and marlin often congregate around seamounts and isolated reefs, and are concentrated here because of currents and upwellings.

GLOBAL CRASH IN BIG FISH POPULATIONS

There has been a marked downward trend in the diversity of fish in the open ocean, the largest and least known part of the world. Boris Worm and Ransom Myers of Dalhousie University reported a clear link to overfishing over the past 50 years, after correcting for climate change, in Science (via Science Express; www.sciencexpress.org; July 2005). There is a surprising global pattern of open ocean hotspots; i.e. areas with predictable congregations of tuna, marlin, swordfish, and other ocean predators. These hotspots are off the east coasts of the USA, Australia, and Sri Lanka; south of Hawaii; and in the South-Eastern Pacific and provide new insight into the structure of life in the open ocean and should be a focus for conservation efforts. Overfishing has not only reduced the number of fish in the sea, but also the variety; the diversity of tuna, marlin, and swordfish in the oceans has declined by up to 50% in the last 50 years. The target for this information is the policymakers in the UN General Assembly and the CBD (Convention on Biological Diversity) to encourage them to take the difficult steps of establishing protected areas in the ocean in order to save global fisheries and high seas diversity.

SHARKS AND RAYS PLAY AN IMPORTANT ROLE AS TOP PREDATORS, THEREBY MAINTAINING THE ECOLOGICAL BALANCE ON CORAL REEFS

SHARKS AND RAYS

There are 125 species of sharks and rays in the Great Barrier Reef Marine Park, and the majority of these probably also occur in the Coral Sea. However, little is known about their distribution, biology or ecology. Sharks and rays play an important role as top predators, thereby maintaining the ecological balance on coral reefs. It is highly probable that many sharks migrate throughout the Coral Sea and enter Great Barrier Reef waters. They are important natural tourism attractions at dive sites in the Great Barrier Reef and Coral Sea (www.reefed.edu.au).

The main pressure on sharks in the Coral Sea is commercial fishing for the shark fin trade, either targeted or as incidental catch. In 1986/87,"non-target" shark catch in the entire Eastern Tuna and Billfish Fishery was 12 tonnes, rising to 336 tonnes in 2001/02. Latest data shows a non-target catch of 114 tonnes in 2005/06, with 18 tonnes caught north of 25°S. However, it is unknown whether the current fishing levels are sustainable, with strong fears that the slower breeding, long-lived species are in rapid decline. Some species, such as hammerhead and tiger sharks, travel great distances, meaning that these sharks may also be caught by fishers in other parts of Australia, and throughout the Indo-Pacific.

There is, however, strong evidence that shark populations in the Great Barrier Reef Marine Park are in rapid decline. There is an order of magnitude fewer sharks on fished reefs as compared to no-entry zones. This was assessed via management and population viability models of whitetip and grey reef sharks which showed steep declines in abundance of 7% and 17% per annum, respectively (Robbins *et al.*, 2006). Thus, best practice management on the Great Barrier Reef appears inadequate to protect reef sharks, indicating that even stronger measures may be required to protect the shark populations of the Coral Sea.

The life history characteristics of sharks are typified by slow growth, late maturity and low rates of reproduction, typical of apex predators. Non-destructive assessment techniques have been adopted by AIMS to assess species composition, distribution and abundance in tropical reef habitats. This has allowed sampling of deeper habitats beyond the reach of traditional methods and has been used to quantify the effects of fishing (both legal and IUU) on abundance patterns. Recently, the work has broadened to encompass mark-recapture studies of pelagic and reef sharks to quantify movement patterns, stock boundaries and sustainable yields (www.aims.gov.au).

The resident population of whitetip reef sharks, *Triaenodon obesus*, has been studied at North Horn on Osprey Reef since 1995. Osprey is an isolated seamount in the Coral Sea off the northern Great Barrier Reef, Australia, and individuals within the population have been identified, tagged and measured. A number of mature females have been tracked to determine their daily and seasonal movement patterns and home range, indicating that they mostly remain close to home base (www.sharkresearch.com).

The presence of healthy shark populations is also becoming increasingly important as a surrogate for the health of reef fish populations, because high populations indicate low levels of fishing pressure. Fishing preferentially targets large resident species such as grouper and snapper as well as sharks, then 'moves' down the trophic levels as the predators become locally depleted.

NEW TECHNOLOGY DESIGNED AND DEVELOPED IN TOWNSVILLE, WILL TAKE A HUGE BITE OUT OF THE RISKS OF SHARK RESEARCH

Townsville-based shark researcher and filmmaker Richard Fitzpatrick of Digital Dimensions has been attaching satellite tags to tiger sharks to track their movements in and around the north coast of Queensland. Fitzpatrick once relied on barbless hooks to pull a shark close to the boat, and then enter the water with the shark and tail rope it. The new technology involves a tail clamp that is deployed from a small boat and is quicker and far less stressful on both the shark and researchers. The tail clamp known as the 'Shark Claw' was designed by Fitzpatrick and built by Townsville engineer Gavin Maughan."Shark Claw will definitely redefine the type of shark research that can be achieved. It will also have implications for research on other large oceanic animals. I have already been approached by overseas researchers to help tag other species of large sharks," Fitzpatrick said. A very large female tiger shark was captured and tagged using the Shark Claw during a recent expedition to Raine Island in the Far Northern Section of the Great Barrier Reef on the eco-tourism vessel Undersea Explorer. Raine Island is the world's largest green turtle rookery and Fitzpatrick is conducting research into possible migration patterns of tiger sharks that may coincide with the summer nesting of green turtles.

Left: Manta ray
©Jurgen Freund

Next Page: Grey reef shark
©Jurgen Freund

THE MAIN PRESSURE ON SHARKS IN THE CORAL SEA IS COMMERCIAL FISHING FOR THE SHARK FIN TRADE

THE CORAL SEA IS A MAJOR FEEDING AND BREEDING LOCATION FOR SIX OF THE WORLD'S SEVEN SPECIES OF SEA TURTLES

SEA TURTLES

The Coral Sea is a major feeding and breeding location for six of the world's seven species of sea turtles. The cays and islets of the Coral Sea are an important area for nesting green turtles and probably other species as well. All turtle species are threatened and listed on the IUCN 'Red List' of endangered species (www.iucnredlist.org) and are also listed as 'threatened species' by Queensland's *Nature Conservation Act 1992* and the Commonwealth's *Environmental Protection and Biodiversity Conservation Act 1999* (Michelle Boyle pers. com.; www.jcu.edu). Thus it is essential to protect one of the world's last remaining, near-natural populations of turtles, especially the coral islands of the Coral Sea where they breed in large numbers. In addition, turtles are valuable species for the tourism industry and have strong spiritual and social significance for Australia's indigenous people.

The nesting populations of green turtles (*Chelonia mydas*) in the Coringa-Herald National Nature Reserve, especially on Northeast Herald and Southwest Herald, are particularly important for conservation because they are remote from fishing pressures and the nests are not threatened by any introduced predators. These nesting turtles will become increasingly important to those in the Great Barrier Reef, as the nesting populations on Raine Island have shown clear evidence of a decline over the past 20 years. There are marked fluctuations in the numbers of nesting turtles in the Coral Sea which is linked to variations in the El Niño-Southern Oscillation (ENSO), similar to nesting patterns on Raine and Heron Islands.

However, virtually nothing is known of the turtle populations on the other reefs and islands; for example hawksbill turtles, *Eretmochelys imbricata*, forage around the reef islands, but have not been observed nesting. Green turtles that nest in the Coral Sea can travel great distances; for example 14 turtles that nested in the Coringa-Herald National Nature Reserve have been found along the northern NSW and Queensland coasts and in the Torres Strait. Certainly some migrating turtles would be harvested in the Torres Strait/PNG region.

MARINE MAMMALS

It is unknown how many marine mammals occur in the Coral Sea, but the number of species is probably more than the 25 reported, because almost 60 are found in Australian waters and 22 have been reported from New Caledonian waters. For example, of the 17 species of delphinids (dolphins and killer whales) and 16 species of whales that are known from the Great Barrier Reef, many will occur in the Coral Sea (except coastal species such as the Australian snubfin dolphin, *Orcalle heinsohni*; Lawler *et al.*, 2007). Marine mammals are significant in east Australian waters in cultural, ecological and economic terms. They are protected under the *Environment Protection and Biodiversity Conservation Act 1999*, the *Great Barrier Reef Marine Park Act 1975*, and the *Queensland Nature Conservation Act 1992*.

Details on the biology of dolphins are sadly lacking, which impedes efforts at their conservation. Similarly little is known about some of the whales, such as migration routes, feeding preferences and rates, breeding locations, and major threats. The humpback whale (*Megaptera novaeangliae*), and the dwarf minke whale (*Balaenoptera acutorostrata*) are the only species that apparently occur in large numbers in north east Australian waters. Humpbacks migrate into tropical waters from May–October, where they calve, mate and fast (Lawler *et al., 2007*). Dwarf minke whales appear in the northern Great Barrier Reef and Coral Sea mainly in June–July and to a lesser extent in May and August, but where they spend the rest of the year is unknown (Arnold & Birtles, 1999). Both whales are the focus of a major whale watching industry along the Ribbon Reefs of the Great Barrier Reef and there is strong potential to develop similar operations from live-aboard boats in the Coral Sea. Similar endeavours in dolphin watching as a tourist industry will further increase their conservation value in the Coral Sea.

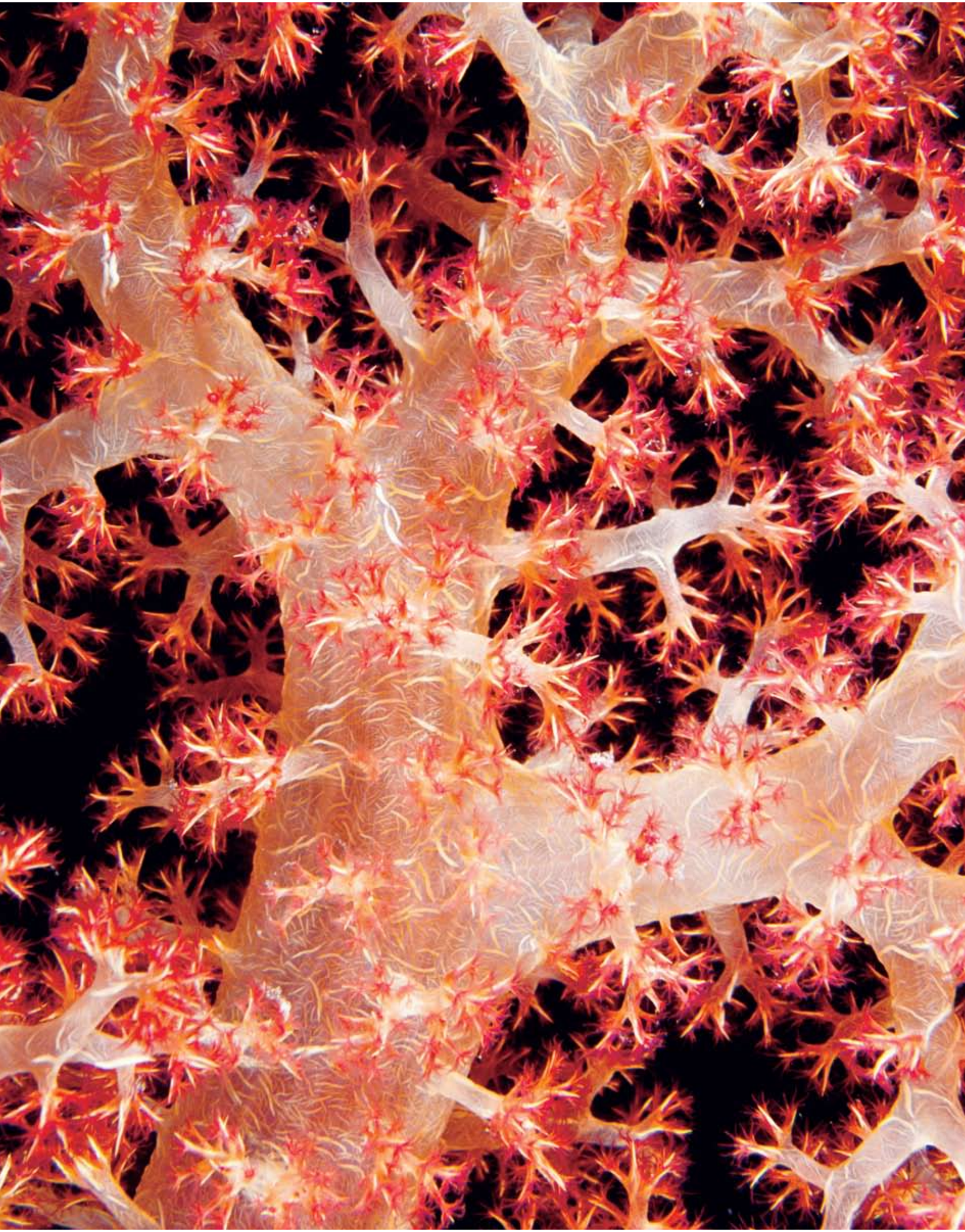
The major global threats to the whale and dolphin species concern incidental harvesting in nets, especially purse seine, drift and gill nets, incidental catches on longlines, accidental ship strikes, loss of food stocks from over-fishing, major shifts in the global climate that disrupt food supplies, and deliberate harvesting of some species in Antarctic waters (Miller, 2007). Conservation of winter breeding locations in the Coral Sea would be a significant step towards ensuring the conservation of these species. Lawler *et al.* (2007) state that we have a very poor understanding of the distribution or ecology of any of the whale species in Coral Sea waters; thus definitive statements on their status or predictions are not possible.

NAUTILUS

The spiral nautilus shell has a particularly rich history. The original species, the ammonites, dominated the seas as major predators (and then prey) for more than 300 million years, with some exceeding 2 m in diameter. The ammonites are now extinct, but there are currently eight living nautilus species which are close relatives to those from 500 million years ago, making them virtually the oldest living fossils. Recent research has identified a totally new dwarf species of nautilus on Osprey Reef in the northern Coral Sea. This new species, similar to *Nautilus pompilius*, has probably evolved after being isolated from those on nearby Coral Sea reefs and the Great Barrier Reef and certainly reflects the very isolated nature of Osprey (Ward, 2008). It is conceivable that new species remain to be found on other isolated reefs of the Coral Sea.

Right: **Dwarf minke whale**
©Jurgen Freund

Next Page: **Soft coral**
© MarkSpencer.com.au
Chambered nautilus in red whip coral
©Jurgen Freund



THE SMALL ISLETS AND CAYS OF THE CORAL SEA ARE IMPORTANT NESTING PLACES FOR AT LEAST 13 SPECIES OF SEABIRDS

SEABIRDS

There are 27 species of seabirds reported in the Coral Sea, with 17 of these being migratory species listed and protected under international agreements between Australia, China and Japan. The small islets and cays of the Coral Sea are important nesting places for at least 13 species of seabirds, with major populations nesting on Northeast Herald and Southwest Herald cays. Birds nesting in the Coral Sea include the red-footed, brown and masked boobies, the least and greater shearwater, sooty terns, the common and black noddy, and the least frigate bird and greater frigate bird. Recently, there was great excitement at the confirmed sighting of Beck's petrels breeding in waters adjacent to the Coral Sea. These were previously regarded as being extinct. Seabirds nesting on the Flinders Reefs are frequently observed feeding over reefs of the Great Barrier Reef, especially the frigate birds.

There is a special need to improve conservation of seabirds in the Coral Sea as recent, large-scale ENSO processes have been associated with marked decreases in tropical seabird breeding success. Such impacts were particularly obvious during the 1997/98 ENSO event. Data gathered between 1992 and 2004 show significant declines equivalent to greater than 6–7% per annum for populations of great and least frigatebirds (*Fregata minor, F. ariel*) and possibly black noddies (Hamann *et al.*, 2007); however, there are large year to year variations. A significant decline in these species appears to relate directly to population crashes during 1997/98, which was associated with major changes in current patterns and massive decreases in the populations of the fish prey of these seabirds. Numbers of each species remained relatively stable before and after this event; however, the frigatebird and noddy tern populations have not returned to their pre-1998 levels, despite a return to apparently more favourable conditions.

SHEARWATERS MAKE AMAZING FLIGHTS SEEKING FOOD

Satellite transmitters attached to shearwaters from the Capricorn-Bunker island group in the southern Great Barrier Reef showed that the birds travelled more than 2,000 km on a single, 'at-distance' 15-day foraging trip to visit multiple seamounts in the Coral Sea. (figure 3) Extensive upwellings of nutrients at these locations support very high levels of prey abundance, and the shearwaters were observed foraging along the edges of these upwelling zones. Dr Brad Congdon of James Cook University says: "The conservation significance of such key foraging refuges cannot be overstated. The shearwater colony in the southern Great Barrier Reef is the largest in the Pacific. The breeding success of these shearwaters, and probably many other seabird species, is likely to be totally dependent on the continued stability of upwellings at these Coral Sea sites. It is also likely that many shearwaters from the southern Great Barrier Reef also over-winter at these Coral Sea locations. How climate change will affect productivity at these locations is currently unknown."

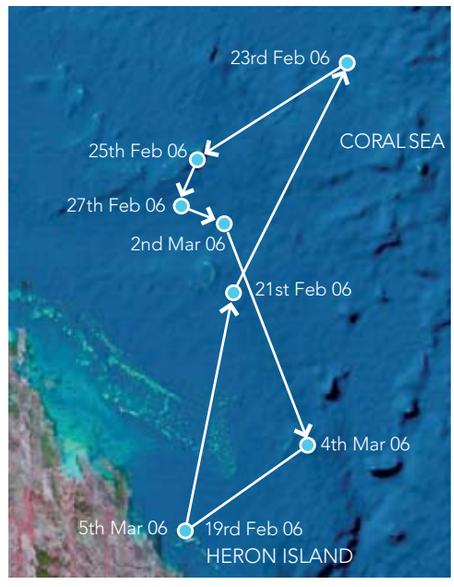
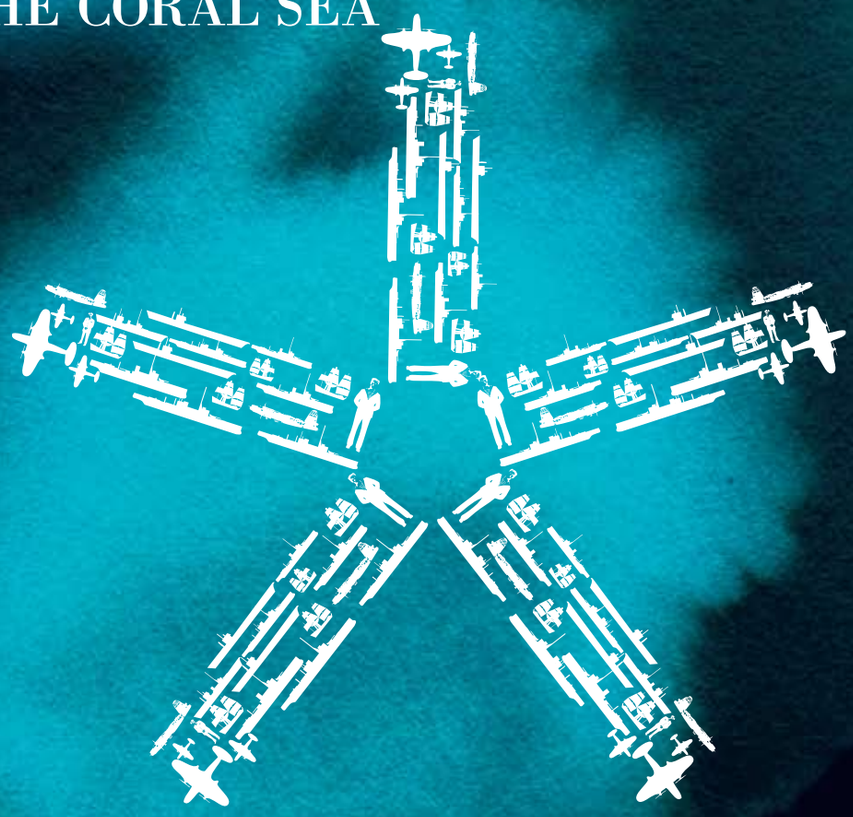


Figure 3
Breeding shearwaters from the Great Barrier Reef depend on upwelling from Coral Sea seamounts for food (from Congdon *et al.*, 2007)

Right: **Brown booby and chick**
© MarkSpencer.com.au

THE MILITARY HISTORY AND HERITAGE OF THE CORAL SEA



INTRODUCTION

BY
DR D.M. STEVENS[1]

Recognition of the strategic and economic importance of Australia's maritime approaches is not a recent phenomenon. As the early European settlers struggled to establish a presence that went beyond the basics of survival, it became very clear that prosperity and security both depended on unhindered access to the vast seas surrounding our continent. Appropriately named in 1803 by Captain Mathew Flinders, RN, the Coral Sea is one of the most beautiful and important of these bodies of water. By the latter half of the 19th century an extensive and patient program of surveying had opened up almost the entire east coast of Australia for navigation and commerce, with safe highways to the huge potential markets of India and China charted for the 'grateful mariner' through the 'mazes of the Coral Sea'[2]. Yet these same highways could also be used by those planning to threaten Australian trade and coastal cities, making maritime defence an early priority for the nascent Commonwealth.

Notwithstanding perennial fears of Asian invasion, it was the German East Asiatic Cruiser Squadron which most threatened Australia during the first days of World War I. German plans to damage and disrupt our shipping were thwarted, however, by Australia's recent acquisition of an effective ocean-going fleet. More specifically, in August 1914 the German commander, Vice-Admiral Maximilian Graf von Spee, was deterred by the presence of the Royal Australian Navy's (RAN) powerful battle cruiser HMAS *Australia*, which 'by itself, is an adversary so much stronger than our squadron that one would be bound to avoid it'[3]. Instead of cutting Australia off from the outside world, the German cruisers retired to South America, leaving Australia's maritime forces in control of the Coral Sea and able to occupy all enemy territories in the Western Pacific in a succession of virtually bloodless operations.

The outbreak of the War with Japan in December 1941 again brought the importance of Australia's northern approaches to the fore, with the land operations conducted to stop and eventually turn back the Japanese advance in New Guinea entirely dependent on the maintenance of the sea lines of communication through the Coral Sea. Although subject to exaggerated claims that it was the 'Battle that Saved Australia', the sea and air battle fought in the Coral Sea between 3 and 10 May 1942 (Figure 1) was nevertheless the most important single event connected with the shaping of this larger strategic campaign. Moreover, it has created a mystique which has influenced the relationship between Australia and the United States ever since.

[1] The views expressed herein are those of the author and do not necessarily reflect those of the Australian Government, the Department of Defence or the Royal Australian Navy.

[2] Tribute by T.H. Huxley on the surveying work of Captain Owen Stanley, RN. Cited in D. Stevens and J. Reeve (eds), *The Navy and the Nation: the influence of the Navy on modern Australia*, Sydney: Allen & Unwin, 2005, p. 110.

[3] Letter Admiral von Spee to his wife, 18 August 1914, cited in D. Stevens (ed) *The Royal Australian Navy*, Melbourne: Oxford University Press, 2001, p. 33.

BACKGROUND

By April 1942, a series of unbroken victories had allowed the Japanese to form a defensive perimeter stretching from the Kuriles southward through the Marshall Islands to New Britain then westwards to Java, Sumatra, the Andaman Islands and Burma. Within that perimeter Japanese authority was virtually unchallenged and every strategic position occupied. In Australia's area of specific interest the Japanese had already established outposts at Lae and Salamaua in northern New Guinea. For many Australians it was easy to believe that their turn could be next.

Yet, the Japanese leadership had soon rejected an outright invasion of Australia as being beyond their capabilities. Instead, impressed by the ease by which they had achieved their initial strategic goals, the Japanese began to consider means by which their perimeter could be strengthened and extended to gain an extra measure of security. The Commander-in-Chief of the Imperial Japanese Navy (IJN), Admiral Yamamoto, for example, was concerned that despite the crushing blow dealt to the United States Navy (USN) at Pearl Harbor, the IJN striking force had missed the American aircraft carriers. These ships were beginning to make their presence felt with a number of raids on Japanese bases in the central and south Pacific. Yamamoto hoped to complete the destruction of the US Pacific Fleet before it was able to rebuild its strength, and he began planning for a strike on the island of Midway to draw the US carriers into a decisive action.

Others in the Japanese military were keen to provide defence in depth for their major base at Rabaul, while simultaneously cutting the oceanic lines of communication between Australia and the west coast of the United States. Australia, after all, would pose the greatest threat to Japanese interests by acting as the principal Allied staging base for future offensives into the South West Pacific. In this context the Japanese acquisition of the Solomon Islands could be seen as an opportunity for expansion south to New Caledonia, the New Hebrides (now Vanuatu), Fiji and Samoa. The occupation of Port Moresby, meanwhile, would not only prevent its use by the Allies as an advanced outpost, but cut off the eastern sea approaches to the important military port at Darwin, provide the Japanese with a secure operating base on Australia's northern doorstep and allow them to establish air supremacy over north-eastern Australia.

As a first step the Japanese began detailed preparations for the capture of Port Moresby. Codenamed MO, the operation would take place in early May 1942 allowing forces to be reconstituted in time for the Midway operation planned for the following month. Assuming success in these two operations, the capture of the New Hebrides, New Caledonia, Fiji and Samoa would follow. The initial plan involved the seizure of the islands of Tulagi in the southern Solomons, and Deboyne off the east coast of New Guinea. Both these islands would provide bases for flying boats, allowing patrols into the Coral Sea in order to protect the flank of the Moresby invasion force as it entered from the north. Successively, the Tulagi invasion group would carry out a sudden attack on Nauru and Ocean Islands to secure the phosphorous resources located there.

Vice Admiral Shigeyoshi Inoue, Commander of the Fourth Fleet, based at Rabaul had overall command of MO. On 29 April he initiated the operation, his forces divided into several major groups including two landing forces, one for Tulagi and another for Port Moresby, each with its own support force; a separate Main Body Support Force containing the light carrier *Shoho*; and a Carrier Striking Force under Vice Admiral Takao Takagi formed around the fleet carriers *Shokaku and Zuikaku*.

Figure 1: Battle of the Coral Sea: 5-11 May 1942

Source of map: Gill, 1985, courtesy of the Australian War Memorial. Australian Exclusive Economic Zone boundary superimposed by the Australian Hydrographic Service.

Left: USS *Lexington* flight deck damage scene, during Battle of the Coral Sea, Naval Historical Center, Washington D.C.

THE BATTLE

Prior to the fall of the Philippines the USN's signals intelligence unit at Corregidor Island had been transferred to Melbourne where it became a joint USN/RAN unit known as Fleet Radio Unit Melbourne. Intelligence gathered by this organisation was to play an important role in subsequent events, for in the latter half of April the Combined Operational Intelligence Centre was able to issue an assessment that a Japanese operation to occupy Port Moresby was imminent. Forewarned, the Allies launched their own counter moves, increasing reconnaissance flights and concentrating much of their available striking forces in the Coral Sea.

Admiral Chester Nimitz, Commander-in-Chief of the US Pacific Fleet, ordered his two available aircraft carrier groups, Task Force 17 (Rear Admiral Frank Jack Fletcher) built around USS *Yorktown* and Task Force 11 (Rear Admiral Aubrey Fitch) centred on USS *Lexington* into the Coral Sea. On 1 May they rendezvoused off Espiritu Santo in the New Hebrides, and with Admiral Fletcher in overall tactical command began to refuel from their attendant oilers. Sailing from Sydney on the same day was Task Force 44 (Rear Admiral J.G. Crace, RN), consisting of the heavy cruiser HMAS *Australia* (II) and the light cruiser HMAS *Hobart*, under orders to join with the carriers on 4 May. Meanwhile the cruiser USS *Chicago* and destroyer USS *Perkins*, also part of Task Force 44, came up from Noumea.

The *Yorktown* group completed fuelling first and on 2 May Fletcher detached and steamed northwest to take up a position 550 miles south of Guadalcanal. As the Americans attempted to pre-position to intercept the Japanese, Admiral Takagi's Carrier Striking Force was sailing from Truk, and by 3 May both *Shokaku* and *Zuikaku* were north east of Rabaul. Already, however, the movement south of the Tulagi Invasion Group had been reported by D.G. Kennedy, an Australian coast watcher on Santa Isabel Island. On hearing of the Japanese occupation of Tulagi, Fletcher proceeded north at high speed allowing him to launch an air strike on the morning of 4 May and catch the Japanese by surprise. *Yorktown* launched three strikes in all, destroying a number of small warships at a cost of three of her own aircraft. More significant for the evolving battle, the Japanese lost several long range flying boats, severely reducing their reconnaissance capability in the north east Coral Sea.

Having spent 5 May refuelling, on 6 May the entire Allied force was amalgamated as Task Force 17. Admiral Crace, with the cruisers *Australia*, *Hobart* and *Chicago* and destroyers *Perkins* and USS *Walke*, commanded the Support Group, which was now designated Task Group 17.3. Fletcher then headed for the Louisiade Archipelago to intercept the Japanese forces he expected to pass through there en route to Port Moresby. Meanwhile Tagaki's Carrier Striking Force had moved rapidly down the eastern flank of the Solomons covering what they anticipated to be the US carrier's line of retreat and, having rounded the southern tip, entered the Coral Sea behind Task Force 17. Yet the weather was poor and the inexperience of searching air crews made reconnaissance doubly difficult. At one stage the opposing forces were only 70 miles apart, but all through 6 May the fleets remained in ignorance of each other's whereabouts.

Meanwhile, the Japanese Port Moresby invasion force was moving south and by the evening of 6 May was just north of the Louisiades. Its covering force, the *Shoho* and her accompanying cruisers, had refuelled after covering the Tulagi landing and then moved south westwards towards the Jomard Passage. They were sighted and unsuccessfully attacked by US Army Air Force B-17 bombers based in Australia, but enough information had been accumulated to make the Japanese intentions apparent. Fletcher steamed westwards through the night in preparation for launching search flights at dawn. The fleet tanker USS *Neosho* and her escorting destroyer USS *Sims* were left to steam southwards to a new refuelling position.

On the morning of 7 May Fletcher turned Task Force 17 to the north. At 0700 he reinforced Task Group 17.3 with the destroyer USS *Farragut* and detached the Support Group to the northwest to block any Japanese forces intending to pass through the Jomard Passage into the Coral Sea. This was an extremely risky decision and perhaps the most important in the entire battle. Not only had Fletcher weakened his own air defences but he had also exposed Crace's ships to the possibility of air attack without hope of friendly fighter protection. Crace proceeded at high speed and, having arrived off the Jomard Passage at about 1400 on 7 May, ordered his ships to take up a diamond-shaped anti-aircraft formation.

Right: Abandonment of USS *Lexington*, during Battle of the Coral Sea, Naval Historical Center, Washington D.C

Above: Torpedo bombers attacking HMAS *Australia*,
Australian War Memorial,
Negative # P02497_048_1
Below: USS *Neosho* refuels USS *Yorktown*
in heavy seas, May 1942,
Naval Historical Center, Washington D.C

JAPANESE AIRCRAFT SUBJECTED [HMAS] *AUSTRALIA* TO AN ACCURATE LEVEL-BOMBING ATTACK WHICH WAS ONLY AVOIDED BY SKILFUL SHIP HANDLING

Japanese reconnaissance aircraft soon sighted the Support Group and just after 1500 a dozen Japanese land-based torpedo bombers began their attack. Crace altered course so that his ships were heading directly towards the oncoming aircraft and each ship then began evasive manoeuvres. Heavy and accurate fire downed at least one enemy bomber and encouraged the others to release their torpedoes early. Some casualties in the Allied ships were caused by strafing, but no torpedoes struck home and the Japanese lost at least five aircraft. Immediately following this first wave another 19 Japanese aircraft subjected *Australia* to an accurate level-bombing attack which was only avoided by skilful ship handling. A few minutes later, three US Army Air Force high level bombers from Australia failed to recognise that the ships below were friendly and began their own attack, fortunately with no result.

On their return to Rabaul, the overly optimistic Japanese airmen reported that they had sunk an Allied battleship and damaged a second battleship and a cruiser. As a result of this inaccurate assessment Rabaul launched no further strikes against Crace. Of more significance, however, Admiral Inoue had ordered the Port Moresby invasion force to reverse course while the situation with regard to the 'battleship' sightings and other reconnaissance reports was clarified. This was to mark the furthest penetration south by the invasion force.

Crace in the interim maintained his patrol, uncertain of what was happening elsewhere as he had received no situation reports from Fletcher. Only intercepts of Australian reconnaissance reports and US aircraft radios provided some indication of developments. *Hobart*, short of fuel, was detached to Brisbane on the evening of 8 May as was *Walke* which had engine defects.

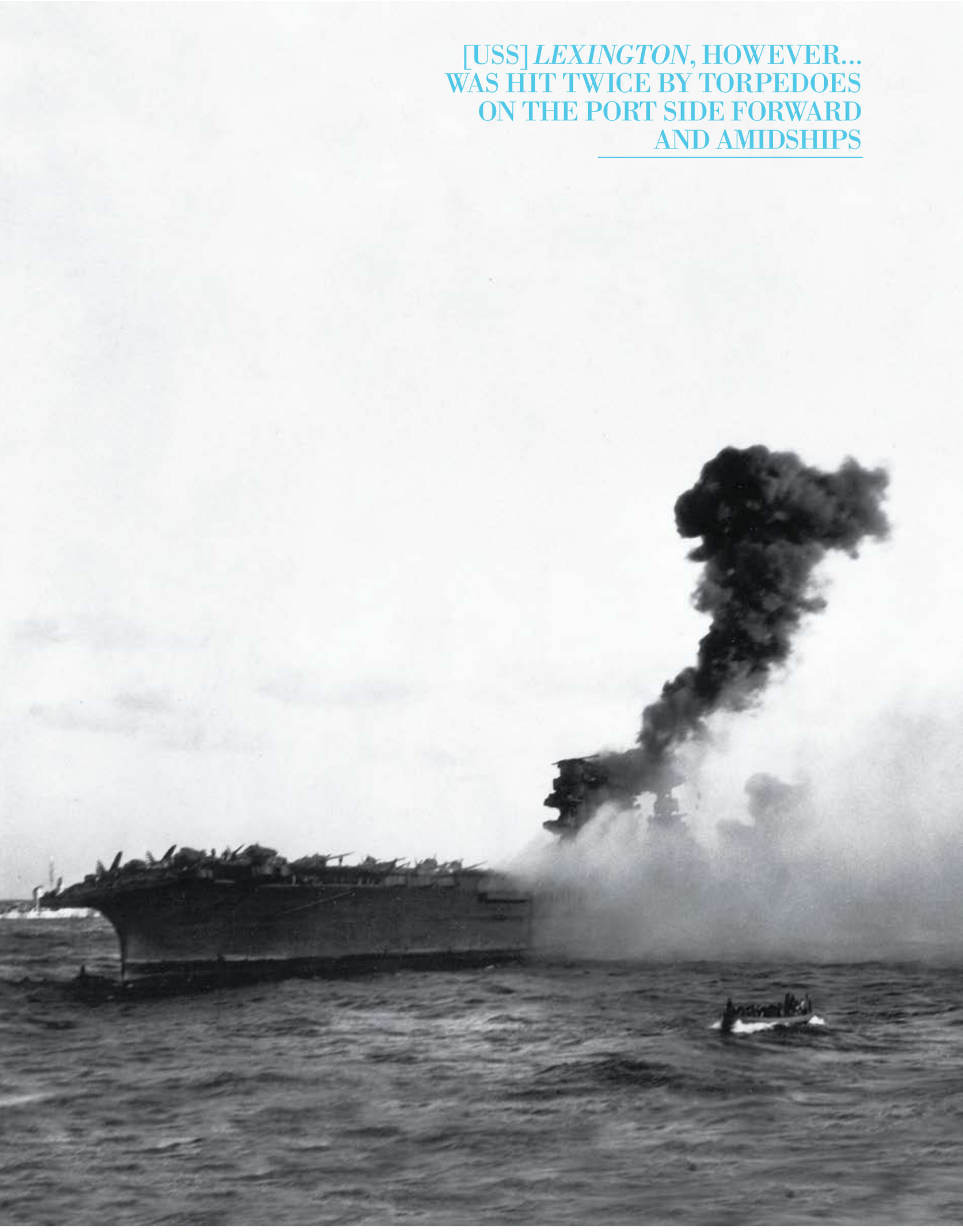
Meanwhile, both the Japanese and US carrier forces had launched searches at dawn on 7 May. At 0815 American scouts sighted a force reported as two carriers and four cruisers 225 miles to the northwest. At 0926 *Lexington* launched her first strike, followed 20 minutes later by one from *Yorktown* adding up to some 90 aircraft. Although the search aircraft had actually discovered and mistakenly identified the small Japanese cruiser/destroyer force bound for Deboyne Island, Fletcher decided to let the strike continue. Then at 1022 he received a message that Allied land-based aircraft had spotted *Shoho* and her escorts a few miles north of Misima Island. The outbound strike was re-directed and attacked the carrier at 1100, just as she was turning into the wind to launch her own aircraft. The small carrier stood no chance. Hit by at least 20 bombs and torpedoes *Shoho* sank at 1135 with the loss of 638 of her crew[4]. By 1335 the Americans had recovered their aircraft, but rather than launch another strike against *Shoho*'s remaining escorts Fletcher elected to await more precise news of the other enemy carriers.

Farther to the east the searches launched by the Japanese Carrier Striking Force were successful in sighting the *Neosho* and *Sims* at about 0830. They were mistakenly reported as a carrier and light cruiser and Takagi launched his own 78 plane strike. The two American ships were attacked by dive bombers at noon with *Sims* sunk and *Neosho* heavily damaged. (On 11 May she was sunk by USS *Henley*)[5]. With the strike beyond the range of recall, Tagaki at last received accurate intelligence on the position of the two American carriers, now some 280 miles to the northwest. To his chagrin he was unable to launch another strike until late that afternoon. Because the aircraft would be returning in the dark, Tagaki selected his most experienced aircrew, and at 1630 launched 12 dive bombers and 15 torpedo bombers in three groups.

[4] *Shoho* sank in 10°29′ S, 152°55′ E, within Papua New Guinea's Exclusive Economic Zone. This and subsequent positions are taken from S.E. Morison, *Coral Sea, Midway and Submarine Actions May 1942-August 1942, History of United States Naval Operations in World War II*, Vol. IV, Little Brown and Company, 1949.

[5] The engagement took place in 16°09′ S, 158°03′E within Australia's Exclusive Economic Zone.

[USS] *LEXINGTON*, HOWEVER... WAS HIT TWICE BY TORPEDOES ON THE PORT SIDE FORWARD AND AMIDSHIPS



Not only did this strike miss seeing Task Force 17 in squally weather but on their return flight the Japanese aircraft were intercepted by US fighters and badly mauled. Further heavy losses resulted from their inability to find their own carriers in the dark. Only six of the Japanese aircraft returned safely.

That night the two carrier forces drew away from each other. Both commanders contemplated sending their surface ships out to attack the opposing carrier force, but both rejected the idea because they expected attacks the next morning and needed the ships to provide additional anti-aircraft firepower. The Americans moved south to find better weather while the Japanese steamed north. With the odds almost even the Battle of the Coral Sea was about to reach its most crucial stage.

At 0600 on 8 May the Japanese, who had again turned southwards, launched searches to cover a 200 mile arc from southwest to southeast. At 0625 the US carriers launched their own search. Some two hours later the two carrier forces were detected at almost the same time. Strikes were launched immediately but the heavy cloud, which had dogged the entire operation, prevented any sightings of the opposing air groups as they headed for their targets on reciprocal courses. *Yorktown*'s aircraft made the first attack at 1057, concentrating on *Shokaku* because *Zuikaku* had disappeared in a rain squall. *Shokaku* managed to avoid all the torpedoes fired at her, but was struck by several bombs which started fires and prevented her from launching and recovering aircraft. *Lexington*'s strike had difficulties locating the targets, scoring only one additional hit on *Shokaku* and causing little additional damage. In all, the Japanese carrier lost 150 men killed and wounded while the Americans lost 33 aircraft to all causes.

The Japanese strike group now delivered similar treatment to *Lexington* and *Yorktown*. The two carriers were steaming together in the centre of a circular formation with cruisers and destroyers forming inner and outer rings and fighter aircraft patrolling above. They faced 69 Japanese aircraft many of which flew so low that they had to rise to pass over the defensive rings to carry home their attacks. *Yorktown* successfully avoided all the torpedoes aimed at her, and though a single bomb hit killed 37 men and started fires, these were soon brought under control. *Lexington*, however, larger and less manoeuvrable, was hit twice by torpedoes on the port side forward and amidships. The Japanese dive bombers followed up, scoring at least two more hits and several near misses. The attack had taken less than 20 minutes, and although the damage at first appeared under control, *Lexington*'s aviation gasoline tanks were leaking. Just over an hour later a spark from a motor generator ignited the built-up fumes. The resulting series of violent internal explosions forced the carrier to be abandoned shortly after 1700 after which she was torpedoed and sunk by the destroyer USS *Phelps*[6]. *Lexington* lost 216 of her crew, while Japanese losses amounted to 30 aircraft in combat and another 13 to other causes.

Both carrier forces were now too battered to continue the fight. The *Zuikaku* low on fuel and with only 40 aircraft remaining, escorted the limping *Shokaku* back to Japan. Left without carrier aircraft to cover the Port Moresby invasion, Admiral Inoue had no choice but to cancel the execution of MO. Fletcher likewise had cause to husband his forces and withdraw. *Yorktown* recovered *Lexington*'s remaining aircraft and then the Task Force turned south and thence on towards Pearl Harbor. Still unaware of much of this detail, TG 17.3 remained on patrol until the early morning of 10 May by which time Crace had correctly assumed that his presence was no longer necessary. He therefore also turned southward, then proceeded back to Australia to refuel.

Left: Explosion amidships on USS *Lexington*, during Battle of the Coral Sea, Naval Historical Center, Washington D.C.

[6] *Lexington* was sunk in position 15° 12'S, 155° 27'E, putting her within Australia's Exclusive Economic Zone.

THE LONG-TERM SIGNIFICANCE

Both the Japanese and the Allies portrayed the Battle of the Coral Sea as a victory. In a sense both are correct. But while the Japanese may have managed to sink more ships than they lost, the Allies not only prevented the Japanese from achieving their objective, the occupation of Port Moresby, but also reduced the enemy forces available for the forthcoming Midway operations. Most importantly, *Shokaku* was too badly damaged to take part while *Zuikaku*'s losses in aircraft and skilled crews effectively prevented her participation. In contrast, extraordinary efforts by the Pearl Harbor dockyard ensured *Yorktown* was ready in time to take her place at Midway. Whatever the statistics, the Battle of the Coral Sea was an indispensable preliminary to final victory and of immeasurable morale value to the Allies at a time of great peril.

At the Battle of Midway the Japanese lost four aircraft carriers to the Americans' one, leaving no doubt as to the outcome and marking a new phase in the Pacific War. Thereafter the Japanese had lost the initiative at sea. They could no longer seriously consider a seaborne invasion of Port Moresby. They would have to accomplish its capture either by crossing the mountain ranges from the northern coast of New Guinea or stepping round the coast. The course of the future campaign for the island was thus resolved. For Australians, the result would be the epic and hard fought struggle on land which began at Kokoda and would eventually see the Japanese turned back and driven completely out of New Guinea.

WHY WE SHOULD REMEMBER IT

The Japanese may have never seriously contemplated the invasion of mainland Australia, but had they occupied Port Moresby there is no doubt that the course of the war would have been more difficult for the Allies. Had the Japanese then gone on to successfully complete Australia's isolation from the United States it is likely that our nation would have either been forced out of the war or simply rendered irrelevant.

The Battle of the Coral Sea, the first great naval action between aircraft carriers, and the first stemming of the Japanese tide, also remains important for a number of other reasons. Marking the nearest approach of hostile forces in strength to our coastline, at a deeper level it serves as an enduring symbol of the Australian–American relationship and brings to mind the joint comradeship in arms achieved during the war. Although Australia's overall contribution to the battle may not have been as spectacular as that of the American carriers, the work done by the coast watchers, intelligence staff, the cruisers and other support ships and personnel all contributed to the final result.

In particular, although Task Group 17.3 did not go into action against the Port Moresby invasion force, its presence, combined with bombing attacks from aircraft based in Australia, was vitally important in influencing the decision by the Japanese Commander-in-Chief to turn back his landing force on 7 May, thereby achieving the battle's strategic objective. In the words of the US Navy's historian, 'Crace's chase', as it became known, '…proved that ships of two nations could be made into an excellent tactical unit; while Task Group 17.3's escape '…without a single hit is a tribute to its training and to the high tactical competence of its commander'[7]. Such assessments were vital to establishing the foundation of mutual trust and confidence which has since allowed the building of the effective and long-standing security partnership enjoyed between the United States and Australia.

[7] Morison, p. 39.

Right: Rescuing USS *Lexington* survivors, during Battle of the Coral Sea, Naval Historical Center, Washington D.C.

AT A DEEPER LEVEL IT SERVES AS AN ENDURING SYMBOL OF THE AUSTRALIAN–AMERICAN RELATIONSHIP AND BRINGS TO MIND THE JOINT COMRADESHIP IN ARMS ACHIEVED DURING THE WAR

THE CIVIC MARITIME HISTORY AND HERITAGE OF THE CORAL SEA

CHARTING THE CORAL SEA

BY
PAUL HUNDLEY

The Coral Sea islands are a group of small uninhabited tropical islands and reefs in the Coral Sea, northeast of Queensland, Australia. The Coral Sea Islands Territory, covering approximately 780,000 sq km[1], was created in 1969 by the *Coral Sea Islands Act*. Prior to this Act, the area was part of Queensland, having been annexed in 1872.

The islands, cays and reefs of the Great Barrier Reef are not part of the territory, belonging to Queensland instead. The outer edge of the Great Barrier Reef is the boundary between Queensland and the Coral Sea Islands Territory. There is no documented record of Aboriginal land use as the islands are too far off the coast to be accessible.

Captain James Cook is generally credited with bringing to the world's attention the European discovery and exploration of the east coast of Australia. In 1773, the results of his voyage around the world between 1768 and 1771 were published (Magra, 1771). At the core of this three-volume work was Cook's description of his charting of the expansive network of off-shore reefs. His description was of 'a wall of Coral Rock rising all most perpendicular out of the unfathomable Ocean.' It was Cook who first put a name to this great expanse of reef, calling it 'The Labyrinth'.

It was the explorations of Cook and the dissemination of that knowledge that led directly to the European colonisation of Australia. The establishment of a permanent English population led to more detailed surveys of the Australian coastline, as well as the off-shore reefs and islands by William Blight and Matthew Flinders.

Flinders explored the Coral Sea islands and Great Barrier Reef on more than one occasion. It was in fact Flinders who first used the descriptive phrase – Coral Sea – in his journal, belatedly published in 1814. During August – October 1802 he was following in the path of James Cook's *Endeavour* aboard his vessel *Investigator*. Sailing amongst the reefs was risky and caused unwelcomed delays. He hoped to find a navigable channel through the reef to the open Coral Sea, and was finally able to do so after numerous attempts. The passage through the reef from inner coastal water to the open sea now bears the name Flinders' Passage.

In August 1803, while returning to England from Australia through the Coral Sea, he was shipwrecked when the *Porpoise* and another ship travelling with it, the *Cato*, hit a reef. This reef he appropriately named Wreck Reef. All but three of the sailors survived, but the crews of the two ships were stranded on the small reef. To save the crews, Flinders and thirteen others rowed more than 1,000 km back to Sydney in the ship's cutter, which was given the name *Hope*. On arrival in Sydney, with Governor King's assistance, they organised three ships, led by Flinders in the *Cumberland*, to carry out the rescue. This took place successfully six weeks later, and the 80 sailors who had remained behind were saved.

From 1815 onward hydrographic surveys were undertaken by Royal Navy officers including Lt. Charles Jeffreys (1815–17) and Phillip Parker King (1818–22). By 1825 the Admiralty had published a series of coastal charts. From 1860 through to 1880 the various colonies funded ongoing surveys. The Royal Navy presence continued on a cost-sharing basis from 1880 through to 1926 with at least two ships engaged in surveying. Australia's hydrographic service was formed in 1920 as a part of the Royal Australian Navy. Its responsibilities and methods are traceable back to those of the Royal Navy and those navigators and hydrographers mentioned above.

[1] http://www.ga.gov.au/education/facts/dimensions/externalterr/coral.htm

FLINDERS EXPLORED THE CORAL SEA ISLANDS AND GREAT BARRIER REEF ON MORE THAN ONE OCCASION. IT WAS IN FACT FLINDERS WHO FIRST USED THE DESCRIPTIVE PHRASE – CORAL SEA

Above: Hand coloured engraving, 1814
Below: Flinder's chart of Australia, 1814
Both reproduced courtesy of the Australian National Maritime Museum

Right: Red-tailed Tropicbird and chick
© MarkSpencer.com.au

SHIPPING ROUTES

Historically the Coral Sea was traversed by Australian vessels carrying exports to countries around the world. As well, vessels from every continent would cross this water body on their way to Australian ports to discharge their cargoes. Looking at the *Merchant Shipper's and Ocean Traveller's Atlas* of 1899 one can see the diversity of routes and ports (Johnston, 1899).

SHIPPING ROUTES OF AUSTRALASIA

The 1895 edition of *Ocean Passages for the World* sets out the shipping routes for the east coast of Australia (Jackson, 1895). For full-powered vessels and auxiliary steam ships the recommended route is 'Direct as possible, and taking the Inner route, inside the Barrier reefs, along the north-east coast.' For sailing ships the advice is 'On the coast to the southward of Sandy cape, a vessel making southing should keep about 15 or 18 miles from the shore in the strength of the current; but in making northing a vessel should keep about 60 miles from the shore until nearing her port.'

Ocean Passages also notes, 'Large sailing vessels, however, seldom navigate the Inner route, but take the passage called the Outer route, between the Great Barrier reefs and the Chesterfield reefs and islands as far north as Mellish reef, and thence proceed to Torres strait by Raine island or Bligh entrance, or by either of the various openings in the Great Barrier reefs to the northward of cape Melville, but the passage through the Great Barrier reefs, from the Coral sea into Torres strait, is frequently attended with danger, and sometimes the loss of the vessel.'

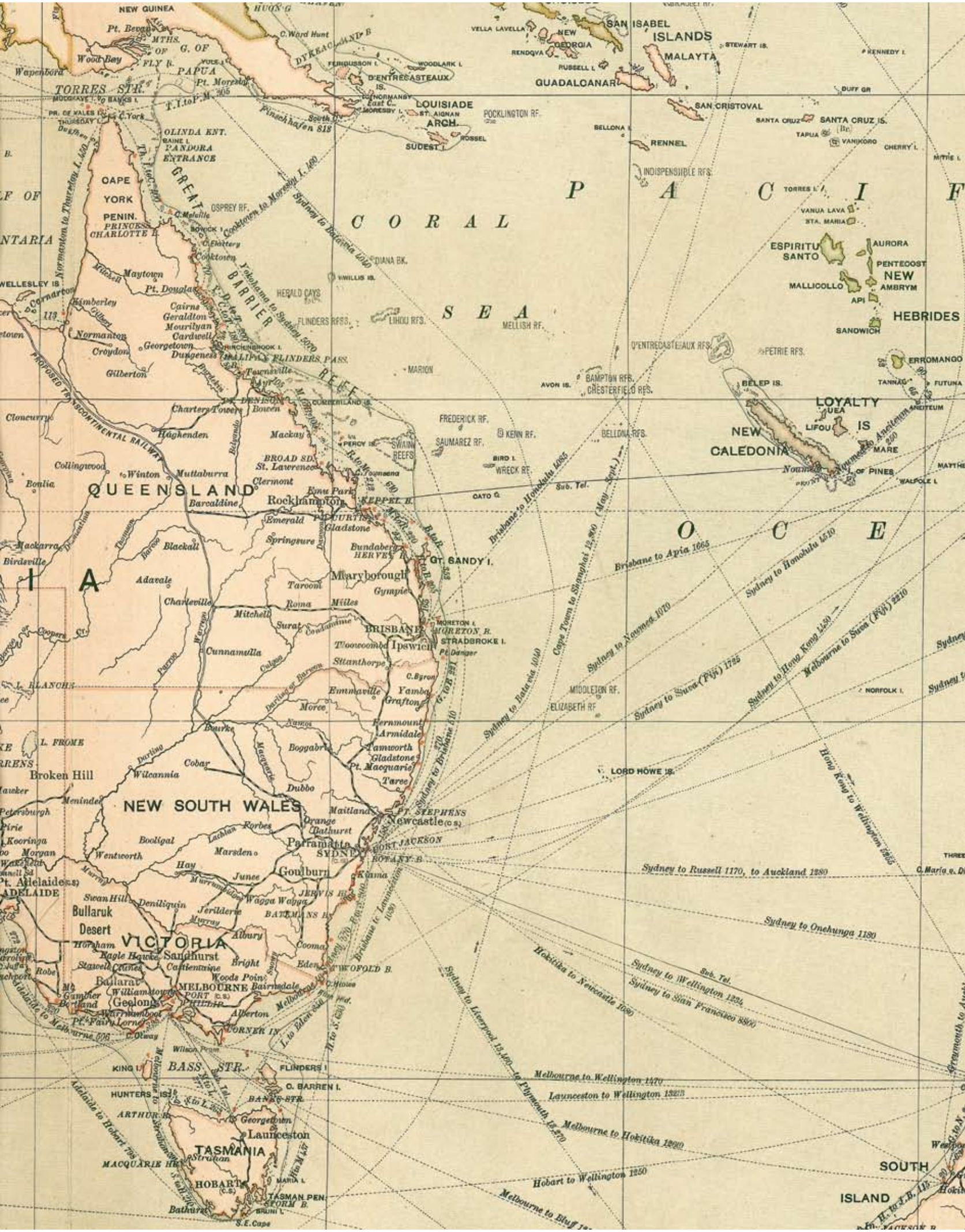
Currently there are five active shipping lanes running through the Great Barrier Reef and Coral Sea. From the time it was surveyed by Captain James Cook in 1770 and later by Captain William Bligh in 1792, the main route for coastal commercial shipping has been the Inner Route between the Great Barrier Reef and the Queensland coast. Stretching for 2,000 km, from the Tropic of Capricorn to Torres Strait, this route was used by early sailing and steam vessels involved in coastal trade between Queensland and the southern states. Due to the treacherous reef, the Inner Route was not used by large sailing vessels. Today even with modern navigational aids, compulsory pilotage is required to traverse some sections of the route.

The second shipping route is the Great North East Channel which runs between the Great Barrier Reef and the Papua New Guinea coast for 120 miles from Bramble Cay in the Coral Sea to Torres Strait. This is the same route that vessels in the 19th century used on their voyages from Sydney to Batavia (modern day Jakarta).

The other three are:

- Hydrographers Passage across the Great Barrier Reef in Central Queensland, linking the coal port of Hay Point with the Coral Sea.
- Palm Passage off Townsville leads through the Great Barrier Reef, linking the ports of Lucinda, Townsville and Abbott Point with the Coral Sea.
- The Grafton Passage off Cairns crosses the Great Barrier Reef linking the ports of Cape Flattery, Cairns and Mourilyan with the Coral Sea.

Right: Shipping routes of Australasia, Johnston, 1899, reproduced courtesy of the Australian National Maritime Museum


NEW GUINEA
HUON G.
Pt. Bevan
MTHS.
G. OF
FLY R.
Wood Bay
PAPUA
Wapenbord
Pt. Moresby
TORRES STR.
T.I. to P.M. 365
C. Ward Hunt
D'ENTRECASTEAUX IS.
FERGUSSON I.
WOODLARK I.
LOUISIADE ARCH.
ST. AIGNAN
ROSSEL
SUDEST I.
Pinschhafen 818
South C.
East C.
MORESBY I.
PR. OF WALES I.
THURSDAY I.
C. York
OLINDA ENT.
PANDORA ENTRANCE
VELLA LAVELLA
NEW GEORGIA
RENDOVA
RUSSELL I.
SAN ISABEL
ISLANDS
MALAYTA
STEWART IS.
KENNEDY I.
GUADALCANAR
SAN CRISTOVAL
DUFF GR.
POCKLINGTON RF.
BELLONA I.
RENNEL
SANTA CRUZ
SANTA CRUZ IS.
TAPUA
VANIKORO
CHERRY I.
MITRE I.
INDISPENSIBLE RFS.
P A C I F
TORRES I.
VANUA LAVA
STA. MARIA
ESPIRITU SANTO
AURORA
PENTECOST
NEW
AMBRYM
MALLICOLLO
API
HEBRIDES
SANDWICH
ERROMANGO
TANNA
FUTUNA
ANEITEUM
CAPE YORK PENIN.
PRINCESS CHARLOTTE B.
GREAT BARRIER REEF
C. Melville
OSPREY RF.
C. Flattery
Cooktown
Cooktown to Moresby I. 460
Sydney to Batavia 4040
CORAL SEA
DIANA BK.
WILLIS IS.
HERALD CAYS
FLINDERS RFS.
LIHOU RFS.
MELLISH RF.
D'ENTRECASTEAUX RFS.
PETRIE RFS.
MARION
AVON IS.
BAMPTON RFS.
CHESTERFIELD RFS.
BELEP IS.
LOYALTY IS
UEA
LIFOU
NEW CALEDONIA
MARE
Noumea
I. OF PINES
WALPOLE I.
MATTHEW
FREDERICK RF.
KENN RF.
BELLONA RFS.
SAUMAREZ RF.
SWAIN REEFS
BIRD I.
WRECK RF.
CATO G.
Sub. Tel.
Yokohama to Sydney 5070
Brisbane to Honolulu 4065
Cape Town to Shanghai 12,800 (May-Sept.)
Noumea to Aneiteum 250
NTARIA
WELLESLEY IS.
Normanton to Thursday I. 450
Maytown
Pt. Douglas
Kimberley
Cairns
Geraldton
Mourilyan
Cardwell
Georgetown
Normanton
Croydon
Dungeness
Gilbert
Gilberton
LIZARD I.
Townsville
Bowen
PT. DENISON
CUMBERLAND IS.
FLINDERS PASS.
PROPOSED TRANSCONTINENTAL RAILWAY
Cloncurry
Charters Towers
Hughenden
Mackay
PERCY IS.
Collingwood
Winton
Muttaburra
BROAD SD.
St. Lawrence
Clermont
Boulia
QUEENSLAND
Emu Park
Rockhampton
Barcaldine
KEPPEL B.
Emerald
PT. CURTIS
Gladstone
Springsure
Blackall
Bundaberg
HERVEY B.
GT. SANDY I.
Birdsville
Maryborough
Gympie
Adavale
Taroom
I A
Charleville
Roma
Miles
Mitchell
Surat
Condamine
BRISBANE
MORETON I.
MORETON B.
STRADBROKE I.
Toowoomba
Ipswich
Pt. Danger
Cunnamulla
Stanthorpe
C. Byron
Yamba
Grafton
Emmaville
L. BLANCHE
Moree
Fernmount
Armidale
Bourke
Boggabri
Tamworth
Gladstone
Pt. Macquarie
Taree
L. FROME
Broken Hill
Cobar
Wilcannia
Dubbo
Menindee
NEW SOUTH WALES
Maitland
PT. STEPHENS
Newcastle (C.S.)
Orange
Bathurst
Parramatta
SYDNEY
PORT JACKSON
BOTANY B.
Booligal
Forbes
Marsden
Wentworth
Hay
Junee
Goulburn
Kiama
Pt. Adelaide
ADELAIDE
Swan Hill
Deniliquin
Wagga Wagga
JERVIS B.
BATEMANS B.
Bullaruk Desert
Jerilderie
Albury
Cooma
Horsham
VICTORIA
Eagle Hawk
Sandhurst
Bright
Stawell
Castlemaine
Woods Point
TWOFOLD B.
Eden
Ballarat
Williamstown
MELBOURNE
PORT PHILLIP
Bairnsdale
C. Howe
Mt. Gambier
Portland
Geelong
Warrnambool
Pt. Fairy
Lorne
Alberton
CORNER IN.
C. Otway
Adelaide to Melbourne 506
Wilson Prom.
KING I.
BASS STR.
FLINDERS I.
C. BARREN I.
HUNTERS IS.
BANKS STR.
ARTHUR R.
Georgetown
Launceston
TASMANIA
Strahan
MACQUARIE HR.
HOBART (C.S.)
MARIA I.
TASMAN PEN.
STORM B.
BRUNI I.
Bathurst
S.E. Cape
Adelaide to Hobart 796
Melbourne to Launceston
M. to L.
L. to Eden 340
Melbourne to Sydney
Sydney to Brisbane 510
Brisbane to Launceston 1030
Brisbane to Apia 1665
Sydney to Honolulu 4510
Sydney to Noumea 1070
Sydney to Suva (Fiji) 1725
Sydney to Hong Kong 4450
Melbourne to Suva (Fiji) 2210
Sydney to Batavia 4040
MIDDLETON RF.
ELIZABETH RF.
NORFOLK I.
LORD HOWE IS.
Hong Kong to Wellington 5655
Sydney to Russell 1170, to Auckland 1280
C. Maria v. Diemen
THREE KINGS
Sydney to Onehunga 1180
Hokitika to Newcastle 1080
Sydney to Wellington 1234
Sydney to San Francisco 6800
Sydney to Liverpool 13,450, to Plymouth 13,370
Melbourne to Wellington 1470
Launceston to Wellington 1325
Melbourne to Hokitika 1280
Hobart to Wellington 1250
Melbourne to Bluff
O C E
SOUTH ISLAND
Westport
Hokitika
JACKSON B.

COMMERCIAL HISTORY OF THE CORAL SEA

The first and primary economic use of the Coral Sea islands was in guano mining for its phosphate content and use as a fertiliser. The date of the first mining operation is a topic of debate but it is thought to be as early as 1840. The height of operations occurred in the 1870s and 1880s. Infrastructure for the mining operations was set up on Lady Elliot, Chilcott and Bird Islands, as well as Wreck Reef. The absence of a permanent supply of fresh water, however, prevented long-term habitation.

The exposed nature of the Coral Sea Islands made this anything but a safe and reliable endeavour. A number of vessels came to grief. The *Lone Star* was wrecked at Bird Island in 1871 on a voyage to load guano for Hobart. The captain and three crew members sailed to Rockhampton in an open boat for assistance. The crew camped on a sand cay for several weeks and managed to salvage most gear and provisions from the wreck, assisted by guano workers from the island. The American-built vessel *Annie* was loading guano for Launceston when changing winds drove her onto Wreck Reef in 1882.

Secondary industries such as bêche-de-mer (sea cucumber) and pearl shell harvesting were also established in the Coral Sea. The vessel *Kate Kearney* was employed in bêche-de-mer and pearl fisheries during the 1870s.

The schooner *Active* was involved with bêche-de-mer. It was suspiciously wrecked in 1871 on a reef at Stephens Island in the Barnard Islands group. The captain had arrived at Somerset, Cape York, to insure his cargo after successfully fishing in Torres Strait, and then sailed for Sydney. It was generally thought that the ship was wrecked on purpose. It was possible to insure goods at some ports, like Somerset, without sighting the goods being insured. The captain made claim on the insurance and was paid out. Later, the owners of the Active made a return trip to the vicinity of Stephens Island and quickly returned with a full cargo of bêche-de-mer, already smoked.

The recruitment of South Sea Islanders for employment in Queensland cane fields was actively pursued in the 1860s and 1870s. The labour trade was commonly known as 'blackbirding' and the labourers as 'Kanakas'. Many vessels sailed out of Queensland coastal ports from Maryborough to Cairns. They would cross the Coral Sea en route to destinations from New Caledonia to Bougainville in the Solomon Islands. Little thought was given to the morality of the labour trade by the ship captains that plied the Coral Sea. The prosperity of the sugar industry in North Queensland ultimately became dependent upon the contract labour of the 62,000 Pacific Islanders who arrived as part of the circular recruiting process from 1863 to 1904.

The labour trade also suffered casualties in crossing the Coral Sea. The schooner *Noumea* was lost on Saumarez Reef in 1880 while on voyage from Santo Island to Mackay with a party of Kanakas. The schooner *Io* was engaged on a recruiting voyage when it wrecked on Wansfell/Marion Reefs in the Coral Sea in 1882. The survivors reached Mackay after six days. The report of the loss noted that no "returns" were on board and part of the crew consisted of Islanders.

Left: Liberty ship, *Francis Preston Blair* grounded on Saumarez Reef, Coral Sea
John Harding / fathom™

DIVING AND TOURISM

The Coral Sea reefs are reached by a 12 to 18 hour boat trip east from the coast of mainland Australia, well beyond the reach of any day boats. There are six live-aboard charter operators running dive trips to the Coral Sea. On longer trips the charters may spend additional time on the Great Barrier Reef. The appeal of diving on Coral Sea reefs is the clarity of water with an average visibility in excess of 30 feet. The reefs are also well known for their fish life, particularly sharks, as well as schooling barracuda, trevally and other pelagic fish.

Charter operators have divided the Coral Sea into the southern and the northern sectors. The Northern Coral Sea is accessed from Cairns and Port Douglas. Osprey Reef is the primary tourism destination and considered the tourism "jewel in the crown" of the Coral Sea. Shark, Bougainville, and Holmes Reefs are also visited if weather conditions are good. Each has individual characteristics that appeal to divers and dive operators. Osprey Reef is the most northerly Coral Sea reef, being 350 km away from Cairns. It contains a deep-water lagoon in the middle, which provides for safe anchorage. The vertical walls of the seamount rise up from more than 1,000 m to just below the surface. It is well known for its shark population and divers regularly feed the sharks at this location.

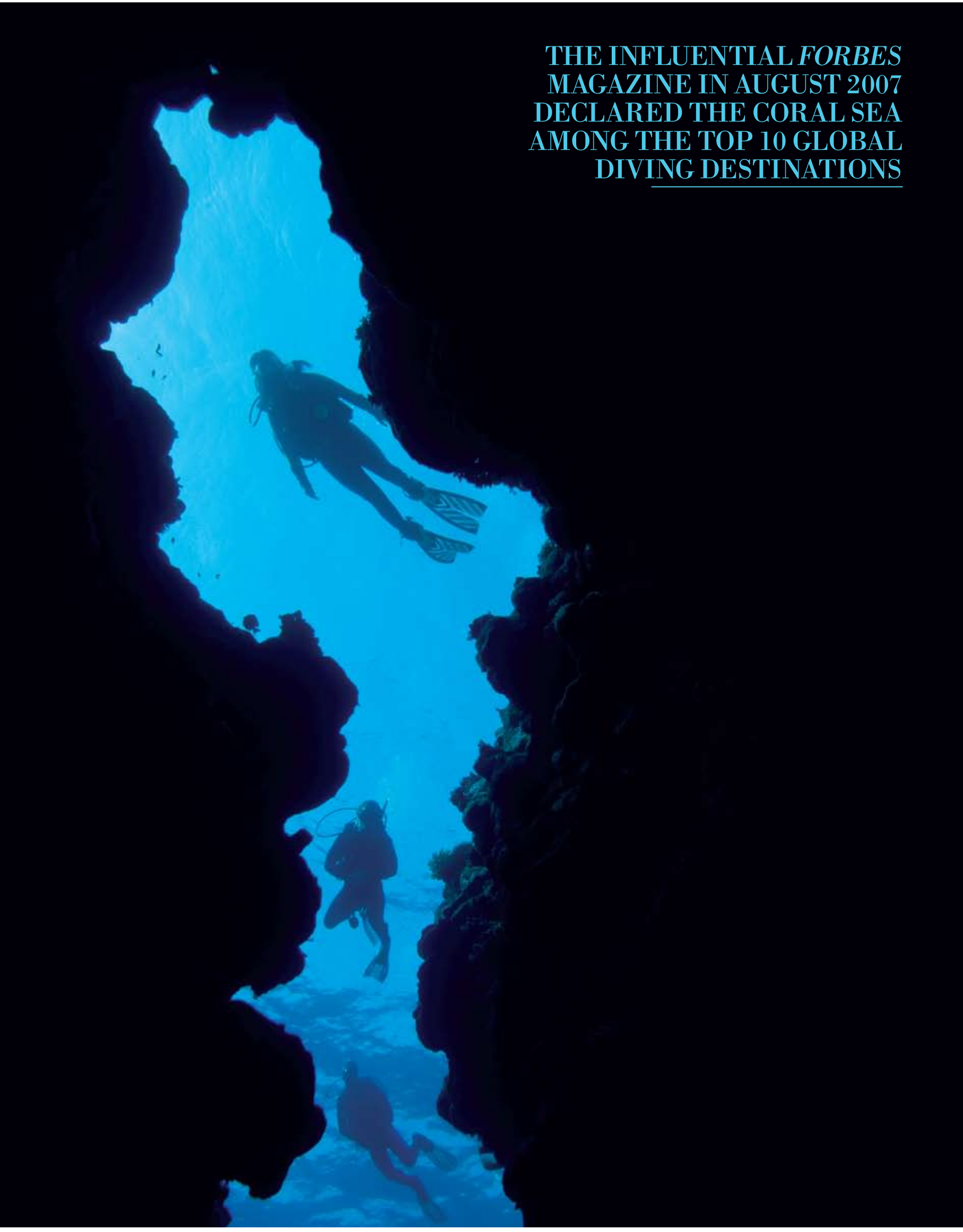
Holmes Reef is 240 km away from Cairns. This area has a large selection of possible dive sites.

Bougainville Reef is very different from Holmes Reef, and much smaller. It offers a variety of caves, tunnels, canyons, overhangs, some spectacular drop-offs and a shipwreck. Charter trips to Bougainville Reef are very weather dependent, as most of the anchorage sites are not well sheltered. Most dive sites are unprotected and it can become quite rough. For these reasons, there are only a few trips during the year operating out to Bougainville Reef.

The influential *Forbes* magazine in August 2007 declared the Coral Sea among the top 10 global diving destinations. This activity is now estimated to be worth more than $11 million per year in tourism.

In 2008, archaeologists from the Queensland Museum, collaborating with Undersea Explorer (one of the live-aboard charter operators), and a group of sport divers will undertake maritime archaeological surveys and shipwreck inspections in the Coral Sea. The archaeological program will focus on relocating charted shipwreck sites to conduct site inspections, physical surveys, and acquire GPS location fixes. Unidentified snags by fishing vessels may also be explored, along with reef diving. The charter will also visit the wreck site of HMS *Pandora*. During the expedition, archaeologists will offer the divers training sanctioned by the Australasian Institute of Maritime Archaeology and the British Nautical Archaeology Society in the methods and theory of maritime archaeology. This is a new initiative combining dive tourism, eco-tourism, and scientific research with mandated Queensland State responsibility to manage the shipwreck resources of the area.

Right: Divers outside a cave entrance
©Jurgen Freund



THE INFLUENTIAL *FORBES* MAGAZINE IN AUGUST 2007 DECLARED THE CORAL SEA AMONG THE TOP 10 GLOBAL DIVING DESTINATIONS

MARITIME ARCHAEOLOGY

As has been seen through the numerous references in the discussion of the maritime history of the Coral Sea, the potential for maritime archaeology to contribute to a better understanding of the history of the area in all aspects of maritime endeavour is tremendous. A search of the Australian National Shipwrecks database for known vessel losses within the coordinates of the Great Barrier Reef and Coral Sea Islands Territory returns 667 shipwrecks identified through the historical records (Attachment 3). When limiting the search to the Coral Sea there are 104 known shipwrecks. Of all these vessel losses, the actual remains of only eight have been located! These include:

- *Cato* wrecked in 1803 on Porpoise Cay (Wreck Reef)
- HMS *Porpoise* wrecked in 1803 on Porpoise Cay (Wreck Reef)
- Coringa Packet wrecked in 1845 on Coringa Islets (NE of Chilcott Island)
- *Thomas King* wrecked in 1852 on Cato Reef
- *Mahaica* wrecked in 1854 on Wreck Reef
- *Lone Star* wrecked in 1871 on Wreck Reef
- *Wolverine* wrecked in 1879 on Bird Island (Wreck Reef)
- *Francis Preston Blair* wrecked in 1945 on Saumarez Reef

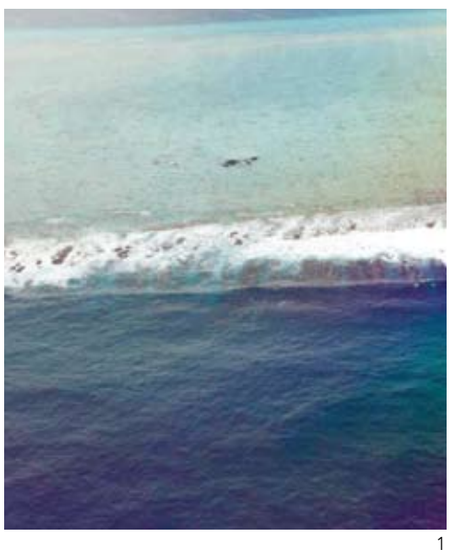
There is no way of knowing the actual number of vessel losses as most have just been reported as 'lost at sea'.

The shipwrecks of the Coral Sea present the greatest potential for future archaeological research. With the number of known wrecks, one can postulate that there are a far greater number of unknown wrecks that would span the whole history of human contact with the area. If ever the question of early Portuguese exploration[2] of the Australian east coast were to be definitively answered, it would be through the identification and dating of a Portuguese shipwreck.

The conditions that exist in the Coral Sea area are similar to other coral reefs and atolls in the Pacific Ocean. The reefs and islands rise rapidly from great depths which causes an almost perpetual breaking swell around the perimeter of atolls or the windward reef edge. This generates a very high energy surf zone which acts to physically break up any ship remains that lie in the area. It also introduces a high level of oxygen into the water which accelerates decomposition of timber hulls. Iron ships and the metal fastenings and fittings of timber vessels are able to survive in this environment, as do glass, ceramics and ballast stone. All of these elements can be used in the identification and dating of shipwreck sites.

Shipwreck remains can be preserved if they are relatively quickly covered over on the seabed or protected by the ships' ballast, as was the case in Western Australia with the *Batavia* which wrecked in 1629. During the archaeological investigation a section of the stern quarter of the port side of the ship was found under the ballast and coral sand. This provides the centre-piece for the Western Australian Maritime Museum.

1 High energy surf zone around coral atoll
2 Remains of ship's windlass
3 Copper sheathing covered with coral growth
4 Reconstruction of windlass patented 1852
5 Copper fastening, coal and sheathing



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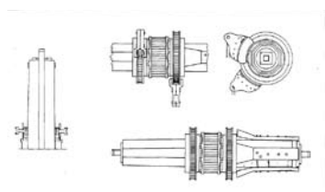

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All photographs by Paul Hundley, courtesy of the Australian National Maritime Museum.

6

CURRENT EXTRACTIVE USES OF THE CORAL SEA

CURRENT EXTRACTIVE USES OF THE CORAL SEA

BY IMOGEN ZETHOVEN AO

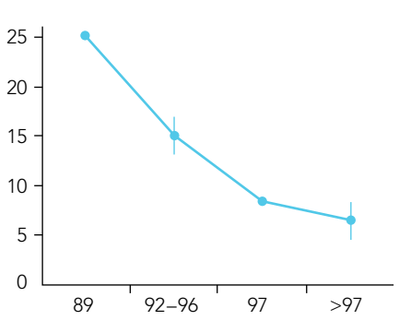
Two Commonwealth-managed commercial fisheries operate in the Coral Sea: the Eastern Tuna and Billfish Fishery (ETBF), a longline fishery which extends from the tip of Cape York Peninsula, down the east coast of Australia, to the Victoria–South Australian border; and the Coral Sea Fishery (CSF), a small mixed fishery which extends from the tip of Cape York to the tip of Fraser Island. Both fisheries operate in the area between the Great Barrier Reef Marine Park and Australia's EEZ[1]. Very limited recreational charter fishing occurs in the Coral Sea and is managed by the Queensland government. Geoscience Australia has no oil and gas program in the Coral Sea and as a consequence there has never been oil and gas exploration in the region.

Table 1: Net Return – Whole ETBF

Year	GVP (A$m) – in 2005 – 06 dollars
2002–03	-18.7
2003–04	-15.1
2004–05	- 8.3

Source: Bureau of Rural Sciences, 2007

Figure 1: Catch Per Unit Effort for Yellowfin Tuna – ETBF



Source: based on data from: Bureau of Rural Sciences, 2007

EASTERN TUNA AND BILLFISH FISHERY

The main target species in the fishery are tuna (yellowfin, bigeye and albacore) and broadbill swordfish. Striped marlin is targeted opportunistically. In 2005–06 longline fishers caught and landed 114 tonnes of sharks which are considered a non-target species in the fishery. Take is limited to 20 sharks per trip.

Overfishing of yellowfin and bigeye tuna is a major issue in the western and central Pacific. Their decline is also of concern along the east coast of Australia. Figure 1 shows a substantial reduction in catch per unit effort of yellowfin tuna, even in the few years the fishery has been operating.

Catch per unit effort for swordfish and bigeye peaked in 1997, and then declined rapidly. Since 2000, catch rates have been well below their peak, declining to a record low in 2006 (Bureau of Rural Sciences [BRS], 2007).

Recently the ETBF has shifted to the less commercially valuable albacore tuna. Historically in fisheries throughout the world, such shifts are indicators of unsustainable fishing effort. In the area north of 25°S, albacore tuna catch jumped from an average of 96 tonnes per annum in the seven years between 1998–99 and 2004–05 to 809 tonnes in 2006–06. Albacore tuna comprised almost half the catch in this northern area (Australian Fisheries Management Authority, 2007a).

A recent BRS report refers to data from the Australian Bureau of Agricultural and Resource Economics, that shows net financial returns by the ETBF have been positive in only three of the last eleven surveyed years (BRS, 2007). The three most recent periods have all been negative (Table 1). Relatively high diesel costs, low export prices and the strong Australian dollar have all contributed to a poor economic environment for the fishery. The gross value of production has fallen by 50% since the early years of this decade. The fishery is characterised by rapid expansions and contractions, linked to fluctuations in foreign exchange rates, discovery of new markets, and local fish abundance (BRS, 2007).

Gross value of production for the key target species in the fishery are shown by latitude in Table 2.

In 2005–06 *total* catch (not just the key target species identified in Table 2) was 6,291 tonnes. Of this amount, 1,777 occurred north of 25°S, representing just 28% of the fishery.

The ETBF is limited entry, with 159 concessions and approximately 70 active fishing vessels[2]. The majority of concessions are longline but there were 44 minor line as of March 2008[3] (BRS, 2007). Not all licenced fishers are permitted to fish anywhere in the fishery; however, once AFMA grants Statutory Fishing Rights (which is likely to occur late 2008/early 2009, after litigation is settled), they will be able to do so, with the exception of Area E. Only 11 concession holders are allowed to fish in Area E (Figure 2). These same 11 concession holders are also allowed to fish elsewhere in the fishery. Longlining is prohibited in the Great Barrier Reef Marine Park.

Yellowfin tuna, bigeye tuna and broadbill swordfish are air-freighted fresh-chilled to Japan and the US and sold on the domestic market. Albacore is exported for processing in canneries in Samoa, Thailand and Indonesia. Recently, processors have opened up a market in Spain for fresh albacore at $8 per kilo (BRS, 2007), providing a major stimulus to albacore fishing.

The bycatch of sharks, marlins, seabirds, and sea turtles is a major issue for longlining worldwide (BRS, 2007). The ETBF has made some effort in recent years to reduce bycatch; however, non-compliance with reporting requirements remains a significant issue, making it difficult to know the real extent of bycatch and mortality (AFMA, August 2007).

However, scientists are clear that fishing activities in the Coral Sea have contributed to significant declines of sharks, turtles and seabirds on the adjoining Great Barrier Reef (see The Scientific Case in this submission). The ETBF is listed as a non-target shark

[1] See the following chapter - Management Implications - for a brief discussion of the Eastern Skipjack Tuna Fishery and the Southern Bluefin Tuna Fishery.
[2] http://www.afma.gov.au/fisheries/tuna/etbf/at_a_glance.htm.
[3] A minor line permit allows a holder to use a device which can catch only one fish at a time.

fishery in the *National Plan of Action of Action for the Conservation and Management of Sharks* (Gartside, 2001).

In addition, the only known spawning ground for black marlin in the Pacific Ocean occurs adjacent to the Ribbon Reefs in the GBRMP. Fish from across the Pacific concentrate at this spawning site. They are highly vulnerable to capture by longliners operating in the Coral Sea. Once they manage to enter the Great Barrier Reef Marine Park, they are protected from longlining.

CORAL SEA FISHERY

The Coral Sea Fishery is made up of five sectors, totaling 18 permits:

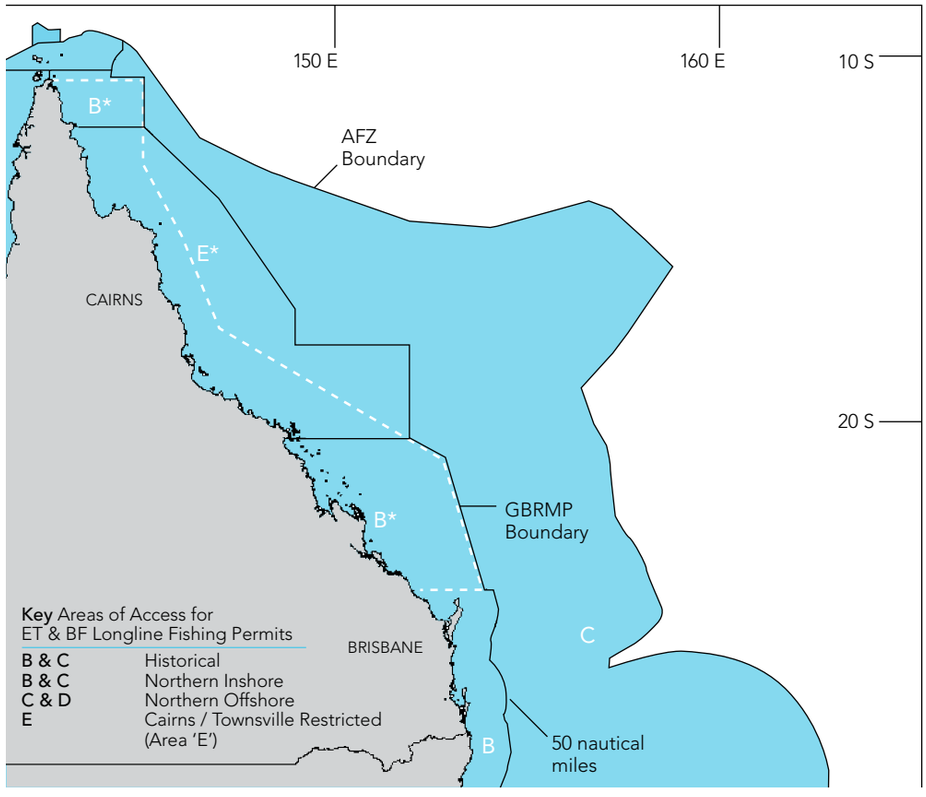
- sea cucumber by hand collection – 2 permits;
- trochus and tropical rock lobster by hand collection – 3 permits;
- aquarium fish by hand collection, hook and line or net – 2 permits;
- trawl – 2 permits; and
- demersal line and trawl – 9 permits.

AFMA has also allowed a trial fish trap fishery, open to some of the above permit holders. The 18 permits are held by 11 permit holders. In 2006, nine vessels were active (Table 3).

The fishery value in 2006 was A$503,000. *"The low gross value of production of the fishery indicates that any significant expenditure on fishery management for this fishery would dissipate any net returns in the fishery"* (BRS, 2007). In other words, if managed effectively, the fishery would cost more to manage than it generates in revenue.

The status of several sea cucumber species in the Coral Sea Fishery is uncertain (AFMA, 2007b). AFMA has noted concerns about the exploitation levels of several sea cucumber species targeted by the fishery. The line and trawl sectors of the Coral Sea Fishery have been identified as a hazard to target species, byproduct species, habitats and communities (AFMA, 2007b). The Coral Sea Fishery is listed as a target and non-target shark fishery in the *National Plan of Action for the Conservation and Management of Sharks*.

Figure 2: Eastern Tuna and Billfish Fishery Management Area (northern half)



Source: http://www.afma.gov.au/information/publications/fishery/data_summ/docs/ds_etbf_2005-06v7_20080407.pdf
Produced May 2002 using Geoscience Australian Data

Table 2: Eastern Tuna and Billfish Catch and Value by Latitude 2005–06

	9 – 25°		25 – 34°		34 – 39°	
Target Species	Catch (t)	Value	Catch (t)	Value	Catch (t)	Value
Yellowfin tuna	463	$3,430,830.00	880	$6,520,800.00	180	$1,333,800.00
Bigeye tuna	137	$1,190,530.00	400	$3,476,000.00	18	$156,420.00
Broadbill swordfish	127	$708,660.00	1,287	$7,181,460.00	33	$184,140.00
Striped marlin	80	$386,400.00	283	$1,366,890.00	142	$685,860.00
Albacore tuna	809	$1,537,100.00	739	$1,404,100.00	36	$68,400.00
Total	**1,616**	**$7,253,520.00**	**3,589**	**$19,949,250.00**	**409**	**$2,428,620.00**

Source: AFMA, May 2008

CHARTER FISHING IN THE CORAL SEA

Due to its distance from shore, most recreational fishing in the Coral Sea is carried out through the charter fishery. Charter boat operators are paid to take other people out fishing. This generally involves charter boat fishing operators taking recreational anglers fishing and hiring out their boat, equipment and knowledge (Gartside, 2001). The charter sector is comprised of the Queensland charter line fishery and the Queensland game fishery. The former targets both demersal and pelagic species whilst the latter targets pelagic species, primarily billfish such as black marlin, and to a lesser degree demersal species.

Public information on recreational fishing in the Coral Sea is relatively poor, however, it is recognised that recreational fishing opportunities are very limited. Recreational fisheries are managed by the Queensland Government under the Offshore Constitutional Settlement Agreement with the Commonwealth. The following information was obtained from the Queensland Department of Primary Industries and Fisheries, the Australian Institute of Marine Science and the Great Barrier Reef Marine Park Authority:

- the entire Queensland charter fishery is largely focused in the southern part of Queensland;
- the few charter fishing vessels that go to the Coral Sea tend to offer a combination of reef line fishing for coral trout, snapper and emperor, and trolling for pelagic species such as mahi mahi, wahoo, dogtooth tuna and Spanish mackerel;
- because of the distance from shore, these vessels tend to stay out for several days or weeks;
- reef line fishers on these vessels generally retain their catch, rather than engage in catch and release;
- most, but not all, licensed charter operators in the Coral Sea use multiple areas (the Coral Sea and the GBRMP) however, the majority of their income is derived from the Great Barrier Reef Marine Park simply because it is closer to ports;
- *"heavy tackle"* game fishing for large and reproductively mature black marlin occurs mostly inside the Great Barrier Reef Marine Park but outside the outer barrier reefs, mainly from Cairns north to Lizard Island;
- *"light tackle"* gamefishing for juvenile black marlin and sailfish occurs seasonally from various ports along the Queensland coast between Cooktown and the Gold Coast; this segment of the fishery (north of Fraser Island) typically targets waters in the barrier reef lagoon between the shore and mid-shelf/ outer reefs;
- game fishing is primarily a tag and release fishery; and
- in 2006, the Queensland Government, which manages the charter fishery, switched from managing the sector through annual permits to perpetual licences.

STRUCTURAL ADJUSTMENT

A small structural adjustment package would be required to buy out all effort in the Coral Sea Fishery. A limited licence buyout package may be needed in the ETBF for operators who have historically depended on fishing in the Coral Sea for the majority of their income. It is unclear at this stage how many charter operators in the Coral Sea would fall into this category.

OIL AND GAS EXPLORATION

Government policy does not allow oil and gas exploration in the Coral Sea, a position in effect since the creation of the Great Barrier Reef Marine Park in 1974. As a result, Geoscience Australia has no exploration or development program in the area. The prospect of hydrocarbon production in the East Coast region, including the Coral Sea, is low (Sinclair Knight Merz, 4 November 2007).

SUMMARY

Commercial fishing in the Coral Sea is quite limited. Although the ETBF has 159 concessions, most fishing effort takes place south of the proposed area of interest. In addition, Area E within the Coral Sea is restricted to 11 concessions, all of which are allowed to fish throughout the ETBF zone.

Net financial returns by the ETBF have been positive in only three of the last eleven surveyed years. The three most recent periods have all been negative. The 18 permit holders in the Coral Sea Fishery generate only a small amount of revenue. Recreational charter fishing is localised and very limited. No oil and gas exploration is allowed in the region.

Table 3: Catch, Gross Value of Production, Active Vessels – Coral Sea Fishery

Year	Catch (t)	GVP (A$m)	Active vessels
2002	157	0.574	10
2003	222	0.825	13
2004	209	0.875	12
2005	276	1.55	13
2006	105	0.503	9

Source: BRS, 2007

Above: Grey reef shark with rainbow runners
©Jurgen Freund

Below: Potato Cod
©Jurgen Freund

MANAGEMENT IMPLICATIONS

GEOGRAPHIC EXTENT OF PROPOSED MARINE PARK

CURRENT MANAGEMENT FRAMEWORK

BY
PROFESSOR MARTIN TSAMENYI,
QUENTIN HANICH & BEN MILLIGAN

This chapter examines the management implications of creating a large no-take marine park in the Coral Sea.

GEOGRAPHIC EXTENT OF PROPOSED MARINE PARK

The proposed marine park consists of an area bounded on the West by the Great Barrier Reef Marine Park and on the East by the limit of Australia's Exclusive Economic Zone. The Northern and Southern boundaries are likely to be in a similar latitude to the northern and southern boundaries of the Great Barrier Reef Marine Park. The proposed area lies entirely within Australia's maritime jurisdiction, which consists of Australia's Exclusive Economic Zone and portions of Territorial Sea. For the purposes of this paper, the term Coral Sea refers only to the area of the proposed marine park.

The Coral Sea is predominantly administered by the Commonwealth Government. Regulatory authority regarding charter and recreational fishing is exercised and administered by the Queensland Government.

LEGAL AUTHORITY OVER THE CORAL SEA

The Commonwealth Government exercises jurisdiction over the Coral Sea. In accordance with the *Coral Sea Islands Act 1969* (Cth), islands in the Coral Sea and the 12-mile Territorial Sea around each island are administered by Commonwealth law and laws of the Australian Capital Territory. Areas of the Coral Sea beyond the 12-mile Territorial Sea lie within Australia's Exclusive Economic Zone and are subject to Commonwealth law.

KEY COMMONWEALTH AGENCIES

The following Commonwealth agencies have management or policy responsibility regarding the Coral Sea.

Department of Environment, Water, Heritage and the Arts (DEWHA)

DEWHA administers Commonwealth environment and heritage laws, including the *Environment Protection and Biodiversity Conservation Act 1999* (Cth) (EPBC Act). In accordance with the EPBC Act, the Department assists the Commonwealth Minister for the Environment, Heritage and the Arts to review, assess and/or authorise activities that have environmental impacts in the Coral Sea. In accordance with the *Historic Shipwrecks Act 1976*, the Department manages a number of historic shipwrecks located in the region.

DEWHA also manages two Commonwealth Reserves located in the Coral Sea. The Coringa-Herald National Nature Reserve and Lihou Reef National Nature Reserve were declared in 1982 and are managed in accordance with the EPBC Act by the Director of National Parks. Administration, management and control of the reserves is delegated to the First Assistant Secretary of the Marine and Water Division of DEWHA.

DESIGNATING AND MANAGING THE PROPOSED MARINE PARK

IN LEGAL TERMS, THE PROPOSED NO-TAKE MARINE PARK WOULD ULTIMATELY TAKE THE FORM OF A COMMONWEALTH RESERVE ESTABLISHED IN ACCORDANCE WITH THE EPBC ACT

Australian Fisheries Management Authority (AFMA)

AFMA is a statutory authority empowered to manage Commonwealth fish resources by the *Fisheries Administration Act 1991* (Cth) and *Fisheries Management Act 1991* (Cth). AFMA grants fishing concessions that permit fishing vessels to participate in a Commonwealth fishery. Concessions are subject to detailed conditions designed to ensure that fishing occurs in an environmentally sustainable manner. AFMA manages four Commonwealth fisheries that authorise fishing in the Coral Sea: the Coral Sea Fishery; the Eastern Tuna and Billfish Fishery; The Eastern Skipjack Tuna Fishery; and the Southern Bluefin Tuna Fishery.

The Coral Sea Fishery permits activities including line fishing, trawl fishing and the collection of lobster, trochus, sea cucumber and aquarium fish[1]. The economic value of the fishery is small and contains 18 concessions. The estimated value of production for 2005–2006 was approximately $1.3 million[2].

The Eastern Tuna and Billfish Fishery extends from Cape York, Queensland, to the Victoria–South Australian border. The majority of fishing activity occurs south of the Coral Sea. The fishery contains 159 concessions and approximately 70 active fishing vessels[3]. Eleven concessions permit fishing in a restricted area of the Coral Sea between Cairns and Townsville. The estimated value of production for 2006–2007 for the entire ETBF was approximately $26.8 million[4].

The Eastern Skipjack Tuna Fishery extends throughout the area of the Eastern Tuna and Billfish Fishery. The abundance of Skipjack Tuna in Australian waters is extremely variable. The bulk of Australia's catch has traditionally been taken in fishing grounds outside the Coral Sea. The very small number of vessels in the skipjack fishery trigger commercial-in-confidence provisions, therefore it is not possible to provide statistics on exact skipjack fishing activity within the Coral Sea section but indications are that there has been no fishing activity for skipjack in the Coral Sea in recent years. The economic value of the fishery is small and variable. Over the last 10 years the estimated annual value of production for the eastern and western skipjack fisheries has ranged from $0 to $8.1m[5].

The Southern Bluefin Tuna Fishery extends throughout the Australian Fishing Zone. Concession holders for Southern Bluefin Tuna do not currently engage in fishing in the Coral Sea.

Department of Agriculture, Forestry and Fisheries (DAFF)

DAFF provides high level policy advice to government regarding management of Commonwealth fish resources. DAFF does not exercise direct management authority in respect of the Coral Sea.

Border Protection Command (BPC)

BPC is an organisation administered cooperatively by the Australian Customs Service and the Department of Defence. The Command is responsible for coordinating and controlling operations to protect against maritime security threats including illegal exploitation of natural resources, illegal activity in protected areas, unauthorised maritime arrivals, prohibited imports/exports, maritime terrorism, piracy, threats to biosecurity and marine pollution.

The Australian Customs Service and Royal Australian Navy exercise powers of arrest, monitoring and law enforcement in the Coral Sea. Both organisations conduct regular sea and aerial surveillance in the region.

The Australian Customs Service and the Department of Defence are currently participating in the development of the Australian Maritime Identification System (AMIS). When operational, AMIS will consolidate the collection of information from vessels navigating in Australian waters or intending to visit Australian ports.

Australian Maritime Safety Authority (AMSA)

In accordance with the *Australian Maritime Safety Authority Act 1990* (Cth), *Navigation Act 1912* (Cth) and other Commonwealth legislation, AMSA exercises responsibilities regarding enforcement of vessel pollution, coordination of search and rescue, and management of maritime traffic and safety in the Coral Sea. AMSA operates the Australian Ship Reporting System, which imposes notification and monitoring requirements on vessels navigating in Australian Waters, including the Coral Sea.

Other agencies

The Bureau of Meteorology, Commonwealth Scientific and Industrial Research Organisation and Australian Institute of Marine Science conduct meteorological, oceanographic and other scientific research in the Coral Sea. The Bureau of Meteorology operates a manned observation station on Willis Island. Unmanned weather stations, beacons and a lighthouse are located on other islands and reefs.

The Australia Communications and Media Authority exercises regulatory responsibilities regarding the APNG Cable system, a submarine telecommunications cable system in the Coral Sea linking Cairns and Port Moresby.

KEY QUEENSLAND GOVERNMENT AGENCIES

The Commonwealth has delegated the regulation of charter and recreational fishing in the Coral Sea to the Queensland Government. The Queensland Department of Primary Industries and Fisheries regulates charter and recreational fishing in accordance with the *Fisheries Act 1994* (Qld). In the absence of detailed information, AFMA considers that limited charter and recreational fishing occurs in the Coral Sea.

The Queensland Department of Infrastructure and Planning, in cooperation with the Commonwealth Government, has been involved in preliminary planning and assessment of the construction of a natural gas pipeline connecting Papua New Guinea with Queensland. As a result of prevailing economic conditions, work on this project has been suspended.

[1] http://www.afma.gov.au/fisheries/ext_territories/coral_sea/at_a_glance.htm
[2] Ibid.
[3] http://www.afma.gov.au/fisheries/tuna/etbf/at_a_glance.htm
[4] Ibid.
[5] http://www.afma.gov.au/fisheries/tuna/skipjack/at_a_glance.htm

Breaching humpback whale
©Jurgen Freund

Commonwealth law enables the designation of a no-take marine park in the Coral Sea. Existing marine protected areas in Australia are administered according to detailed management plans that could be readily adapted for use in the proposed park.

LEGAL MECHANISMS FOR DESIGNATING THE PARK

In legal terms, the proposed no-take marine park would ultimately take the form of a Commonwealth Reserve established in accordance with the EPBC Act. The EPBC Act would permit the Governor-General of Australia to declare a Commonwealth Reserve encompassing the entire Coral Sea at the conclusion of a statutory process involving mandatory assessment procedures and public comment periods. The EPBC Act would also permit the Governor General to declare a Conservation Zone in the Coral Sea while the area was being assessed for inclusion in a Commonwealth Reserve. Establishment of a Conservation Zone in the Coral Sea would enable the Commonwealth Government to take interim restrictive measures to protect biodiversity in the region.

Establishment of a no-take marine park encompassing the entire Coral Sea would assist Australia to meet its obligations, under the *Convention on Biological Diversity 1992*, to protect marine ecosystems and maintain viable populations of marine species.

SUGGESTED MANAGEMENT FRAMEWORKS

In accordance with the EPBC Act, a function of the Director of National Parks is to administer, manage and control Commonwealth reserves. These functions may also be delegated to an appropriate organisation. Ongoing administration, management and control of a marine park encompassing the entire Coral Sea could be delegated to such organisations as the Great Barrier Reef Marine Park Authority (GBRMPA) or the Marine and Water Division of DEWHA.

A delegation of functions to GBRMPA would need to comply with provisions of the *Great Barrier Reef Marine Park Act 1975* (Cth) regarding institutional cooperation.

The EPBC Act requires all Commonwealth Reserves to be administered according to a management plan. Management plans are prepared by the Director of National Parks, with public input, and approved by the Minister for the Environment, Heritage and the Arts. Management plans are required to set out how the reserve is to be managed, what activities will be allowed within the reserve and how they must be carried out. A management plan for a Commonwealth Reserve may divide the reserve into zones and must assign the reserve, and any zones, to an International Union for Conservation of Nature (IUCN) category. IUCN categories are indicative of the degree of environmental protection used in the reserve and its constituent zones. Management plans used in relation to a number of existing Commonwealth Reserves could be readily adapted for use in a no-take marine park encompassing the entire Coral Sea.

EXISTING CORAL SEA NATIONAL NATURE RESERVES

The Coringa-Herald National Nature Reserve and Lihou Reef National Nature Reserve are managed in accordance with a joint management plan. The reserves are categorised as "IUCN Ia – strict nature reserve". Consequently, they are managed primarily for scientific research to ensure Coral Sea habitats, ecosystems and native species are preserved in as undisturbed a state as possible. Commercial and scientific activity in the reserves is subject to a strict permit system. No commercial fishing is permitted in the reserves. Research and monitoring is undertaken in close cooperation with the Royal Australian Navy, the Australian Customs Service and several scientific organisations.

CONSULTATION AND MANAGEMENT CHANGES IN AUSTRALIA

Establishment of a no-take marine park in the Coral Sea would require consultation with the key Commonwealth and State agencies identified above and relevant industry, community and any indigenous stakeholders. Apart from changes to the regulation of Commonwealth Fisheries (see below), establishment of the proposed park would not necessarily entail significant operational changes for these agencies.

Management of the four Commonwealth Fisheries discussed above would need to be altered in order to establish the proposed park. The Coral Sea Fishery would have to be closed. Concessions granted in relation to the Eastern Tuna and Billfish Fishery, Eastern Skipjack Tuna Fishery and Southern Bluefin Tuna Fishery would need to be modified in a manner that prohibited fishing in the Coral Sea.

Left: Dwarf minke whale
©Jurgen Freund

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ATTACHMENTS

MESSAGE FROM THE HON. KEVIN RUDD, PRIME MINISTER, TO THE 66TH COMMEMORATIVE SERVICE FOR THE BATTLE OF THE CORAL SEA

PRIME MINISTER
CANBERRA

MESSAGE: COMMEMORATIVE SERVICE FOR THE BATTLE OF THE CORAL SEA

Today we gather to remember the brave Australian and American service personnel who fought in the Battle of the Coral Sea. They served so that we might live in peace and freedom.

The Battle of the Coral Sea took place sixty-six years ago in May 1942. It was the first major setback to the Japanese advance in the Pacific during the Second World War. It was a fierce battle that changed the course of the War in the Pacific. We recognise the important contribution of those who fought for the protection of Australia at a time of grave threat to our sovereignty and national security.

Australians and Americans fought side by side in the Battle of the Coral Sea. The bonds between our two nations pre-date that famous battle, but the War in the Pacific marked a dramatic and permanent strengthening of those ties. The friendship, cooperation and mutual respect that were forged between our peoples in that time of war continue undiminished to this day and will endure and strengthen into the future.

On this 66th Anniversary of the Battle of the Coral Sea, we honour those Australian and American service personnel whose courage, sacrifice and cooperation made victory possible. Their valour and resilience shall not be forgotten.

The Honourable Kevin Rudd MP
Prime Minister of Australia

A JOINT LETTER TO THE FEDERAL ENVIRONMENT MINISTER FROM ENVIRONMENT NGOS

The Hon. Peter Garrett AM MP
Minister for the Environment, Water, Heritage and the Arts
Parliament House
Canberra ACT 2600

15 April 2008

Dear Minister

A Large No-Take Oceanic Park for Australia's Coral Sea

As a network of national, state and regional environmental organizations with a vital interest in marine conservation, we write to you to express our strong support for a very large no-take oceanic park in Australia's Coral Sea between the Great Barrier Reef Marine Park and Australia's Exclusive Economic Zone.

The Coral Sea is an international marine icon.

It contains habitats as diverse as abyssal plains, deep-sea canyons, underwater mountains, shallow reefs, remote islands and sandy cays. Its spectacular wildlife includes top predators such as sharks, tuna, marlin and swordfish; threatened turtles, whales, seabirds and a huge range of corals and reef fish.

A great outcome for the Coral Sea will lift the bar for marine conservation around the nation.

We understand that you are shortly to receive a briefing from your Department on the Coral Sea.

As you consider your opportunities to further protect Australia's marine heritage, we respectfully ask you to treat the Coral Sea as an iconic area, outside the Regional Marine Planning process, and to support a very high level of protection for this magnificent marine jewel.

Yours sincerely

Don Henry
Executive Director
Australian Conservation Foundation
Floor 1, 60 Leicester St
Carlton, VIC 3053

Imogen Zethoven
Director, Coral Sea Campaign,
Pew Environment Group
Suite 603, 185 Elizabeth St
Sydney, NSW 2000

On behalf of:
Australian Marine Conservation Society
The Wilderness Society Inc.
International Fund for Animal Welfare
Queensland Conservation Council
North Queensland Conservation Council

Greenpeace Australia Pacific
Whale and Dolphin Conservation Society
Humane Society International
Cairns and Far North Environment Centre

CC. Matt Levey, Advisor to the Minister for the Environment, Water, Heritage and the Arts

KNOWN SHIPWRECKS IN THE CORAL SEA
1800-1950

Name	Type	Date Wrecked	Where Wrecked	Found?
Cato	Ship	1803/08/17	Porpoise Cay (Wreck Reef) (Coral Sea)	Yes
Porpoise, HMS	Ship	1803/08/17	Porpoise Cay, Wreck Reef, Coral Sea	Yes
Amelia	Brig	1816/01/17	Between Sydney and Java	No
Frederick	Ship	1818/08/01	Stanley I, (Bathurst Bay) (GBR)	No
Echo	Ship	1820/04/21	Wreck Reef (Coral Sea)	No
Royal Charlotte	Ship	1825/06/20	Frederick Reef, Coral Sea	No
Sun	Snow	1826/06/01	Easternfields Reef (Coral Sea)	No
Venus	Snow	1826/07/01	Alert Reef (=Lihou Reef) (Coral Sea)	No
Bona Vista	Brig	1828/03/18	Kenn Reef (Coral Sea)	No
Woodlark	Brigantine	1828/04/18	Saumarez Reef (Coral Sea)	No
Comet	Brig	1829/04/30	South of Boot Reef (Coral Sea)	No
Madeira Packet	Schooner	1831/12/01	Bampton Reefs (Coral Sea)	No
Montreal	Barque	1841/01/01	Alert Reef (=Lihou Reef) (Coral Sea)	No
Clarence	Brig	1844/06/09	Bampton Shoal (Horseshoe Reef) (Coral Sea)	No
Lady Gray	Brig	1844/09/06	Alert Reef (=Lihou Reef) (Coral Sea)	No
Elizabeth	Schooner	1845/01/05	Bampton Reef (Coral Sea)	No
Coringa Packet	Barque	1845/05/08	Coringa Its (NE of Chilcott I/ Coral Sea)	Yes
Pocahontas	–	1846/01/01	Bampton Shoal, Coral Sea	No
Dundee Merchant	Schooner	1846/07/17	Chesterfield Group ? (Coral Sea)	No
Canton	Barque	1848/01/01	Between Sydney and Hong Kong	No
Unidentified	–	1849/01/01	Alert Reef (= Lihou Reef)	No
Ceres	Ship	1849/06/29	Osprey Reef (Coral Sea)	No
Breeze	Schooner	1849/07/01	Stewart Island (Chesterfield Group?)	No
Jenny Lind	Barque	1850/09/21	Kenn Reef (Coral Sea)	No

Name	Type	Date Wrecked	Where Wrecked	Found?
Elizabeth Brown	Barque	1851/08/01	Between Sydney and India	No
Thomas King	Barque	1852/04/17	Cato Reef (Coral Sea)	Yes
Dockenhuden	Brig	1853/08/07	Cato Reef (Coral Sea)	No
Jacoba Cornelia	Barque	1854/01/01	Coral Sea	No
Doelwijk	Barque	1854/04/21	Kenn Reef (Coral Sea)	No
Hester	Ship	1854/04/21	Kenn Reef (Coral Sea)	No
Mahaica	Barque	1854/05/30	Wreck Reef (Coral Sea)	Yes
Delta	Ship	1854/05/30	Kenn Reef (Coral Sea)	No
Thomasine	Barque	1854/06/19	Holmes Reef, Coral Sea (16.29'S 149.05'E)	No
Maria Sophia	Barque	1854/07/04	Coral Sea	No
Grimeneza	Barque	1854/07/04	Bampton Reefs (Coral Sea)	No
Reindeer	–	1855/09/26	Pocklington (Jones) Reef, Coral Sea	No
Duroc	–	1856/08/13	Mellish Reef (Coral Sea)	No
Lion	Ship	1856/12/04	Wreck Reef (Coral Sea)	No
Olivier Van Noort	Barque	1858/06/07	Kenn Reef (Coral Sea)	No
Rodney	Ship	1858/06/07	Kenn Reef (Coral Sea)	No
Harp	Brigantine	1861/06/14	Bird I (Wreck Reef)(Coral Sea)	No
Hope	Brig	1863/10/17	Bampton Shoal (Coral Sea)	No
Sporting Lass	Brig	1863/11/15	Bampton Shoal (Coral Sea)	No
Cathay	Barque	1866/07/19	Easternfields Reef (Coral Sea)	No
Euromedha	Barque	1869/10/02	Eastern edge of Bampton Reef, Coral Sea	No
Colleen Bawn	Ketch	1870/01/01	Coral Sea	No
James Shears	Barque	1871/01/01	Bampton or Brampton Reef	No
Leila M. Long	Barque	1871/01/01	Lost between Newcastle and Manila	No
Lone Star	Brigantine	1871/09/10	Wreck Reef (Whalebone Cay?) (Coral Sea)	Yes

Source: Australian National Shipwreck Database
Department of the Environment, Water, Heritage and the Arts.
http://www.environment.gov.au/cgi-bin/heritage/nsd/nsd_list.pl

Name	Type	Date Wrecked	Where Wrecked	Found?
Illagong	Schooner	1872/01/01	between Sydney and Torres Strait	No
Alice Cameron	Barque	1874/01/01	Between Newcastle and Manila	No
Charles Auguste	Barque	1874/04/27	Easternfields Reef (Coral Sea)	No
Burnside	Barque	1875/04/01	between Newcastle and Hong Kong	No
Burton Stather	Barque	1877/01/01	Between Sydney and China	No
Bauda	Barque	1877/05/21	Bampton Shoals	No
Banda	Barque	1877/05/21	Bampton Shoal (Coral Sea)	No
Western Star	Brig	1878/01/28	Bampton Reef (Coral Sea)	No
Wolverine	Brig	1879/01/08	Bird I (Wreck Reef)(Coral Sea)	Yes
Noumea	Schooner	1880/05/13	Saumarez Reef (Coral Sea)	No
Annie	Brigantine	1882/07/16	Bird I, Wreck Reef	No
Io	Schooner	1882/08/06	Wansfell/Marion Reefs (Coral Sea)	No
Freya	Steamship	1882/10/12	Osprey Reef (Coral Sea)	No
Ceres	Barque	1883/09/05	Bampton Reef (Coral Sea)	No
Day Dawn	Cutter	1884/01/30	off Bowen (GBR/Coral Sea?)	No
Thomas Day	Ketch	1884/02/21	off Cooktown (GBR/Coral Sea?)	No
Kate Kearney	Brigantine	1884/02/22	off Cooktown (GBR/Coral Sea?)	No
Alfred Vittery	Schooner	1884/03/09	Kahn Reef? (Coral Sea)	No
Pizarro	Ship	1884/04/01	off Cooktown? (GBR/Coral Sea?)	No
Edith Carmichael	Barque	1884/08/20	Easternfields Reef (Coral Sea)	No
George Gordon	Ship	1884/09/11	Easternfields Reef (Coral Sea)	No
John De Costa	Ship	1885/07/18	off Cooktown (GBR/Coral Sea?)	No
Papua	Steamship	1885/12/09	Osprey Reef (Coral Sea)	No
Guichen	Barque	1886/05/09	Wreck Reef (Coral Sea)	No
Ettalong	Schooner	1887/01/01	Mellish Reef (Coral Sea)	No
Niagara	Brig	1889/01/01	Between Newcastle and Noumea	No

Name	Type	Date Wrecked	Where Wrecked	Found?
Niagara	Brig	1889/01/01	Between Newcastle and Noumea	No
Bona Fides	Barque	1889/01/01	Easternfields (Coral Sea)	No
Crinoline	Schooner	1889/01/01	off Bowen (GBR/Coral Sea?)	No
Pacific Slope	Barque	1889/03/01	Between Sydney and Shanghai	No
Brazos	Barque	1889/06/07	Bellona Shoal (Coral Sea)	No
Ellen Rickmers	Barque	1891/02/28	Coral Sea?	No
Index	Ketch	1891/10/01	off Port Douglas (GBR/Coral Sea?)	No
Elisabeth	Barque	1892/04/28	Lihou Reef (Coral Sea)	No
Waireka	Schooner	1892/05/27	Chesterfield reefs	No
Jessie	Brigantine	1893/01/17	Chesterfield Reef (Coral Sea)	No
Eillan Donan	Brigantine	1893/12/09	Chesterfield Reef (Coral Sea)	No
Renard	Schooner	1894/01/01	Between Brisbane and the Solomon Islands	No
Sarah S Ridgway	Barque	1895/01/18	Bellona Shoals (Coral Sea)	No
Nornan	Ship	1896/07/01	Easternfields (Coral Sea)	No
Sisken	Ketch	1896/10/30	Chesterfield Group	No
Glenfinlas	Ship	1897/09/10	Great Barrier Reef/Coral Sea?	No
Queen Cristina	Steamer screw	1899/12/23	Lihou Reef (Coral Sea)	No
Sybil	Schooner	1902/02/01	In the Coral Sea	No
Malekula	–	1910/01/09	Bampton Reef (Coral Sea)	No
Federal	Schooner	1914/06/22	Turtle Group (Lihou?)	No
Mindini	Steamer screw	1923/03/08	Mellish Reef (Coral Sea)	No
Kensen Maru	Steamship	1933/03/14	Bampton Reef	No
Atlantic	Motor Vessel	1939/06/11	Flinders Reef	No
Atlas	–	1945/01/01	Bougainville Reef	No
Francis Preston Blair	Steamship	1945/07/15	Saumarez Reef (Coral Sea)	Yes

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