Australian Government

Australian Institute of Marine Science

ANNUAL REPORT 2016-17

AIMS: Australia's tropical marine research agency.

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The research reported herein is based on early analyses of complex datasets and should not be considered definitive in all cases. Institutions or individuals interested in all consequences or applications of the Australian Institute of Marine Science's research are invited to contact the Chief Executive Officer at the Townsville address below.

For additional copies of this report, please phone AIMS on (07) 4753 4444, write to us at the Townsville address or email media@aims.gov.au.

This report, along with a range of other information about AIMS, is available online at www.aims.gov.au.

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The Australian Institute of Marine Science (AIMS) acknowledges the Traditional Owners of the land and sea on which we work. We recognise the unique relationships and enduring cultural and spiritual connection that Aboriginal and Torres Strait Islander people have to land and sea, and pay our respects to Elders past, present and future.

We particularly recognise the Traditional Owners of our main laboratory and office bases: the Bindal and Wulgurukaba peoples in Townsville, the Larrakia people in Darwin, and the Noongar people in Perth. We also recognise and pay our respects to Aboriginal and Torres Strait Islanders who are Traditional Owners of the areas of our marine science operations across tropical northern Australia. We expressly acknowledge the extensive and intimate knowledge of country held by Traditional Owners, and share their aspirations for sustainable land and sea management for future generations.

Warning: Aboriginal and Torres Strait Islander persons should be aware that this document may contain images of people who have passed away since publication.

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20 September 2017

Senator the Honourable Arthur Sinodinos AO
Minister for Industry, Innovation and Science
Parliament House
CANBERRA ACT 2600

Dear Minister

On behalf of the Council (as the accountable authority of the Australian Institute of Marine Science—AIMS), we have pleasure in presenting our 45th annual report, for the year ended 30 June 2017. The report is forwarded to you in accordance with section 46 of the *Public Governance, Performance and Accountability Act 2013*.

This report provides information so that you, the Parliament of Australia, and users of AIMS' research outputs can make an informed judgement about AIMS' performance during the 2016–17 financial year.

This report has been prepared in accordance with the requirements of the *Australian Institute of Marine Science Act 1972* and in accordance with section 46 of the *Public Governance, Performance and Accountability Act 2013* and with the requirements of the Public Governance, Performance and Accountability Amendment (Corporate Commonwealth Entity Annual Reporting) Rule 2016.

The Council endorsed the content of the AIMS Annual Report 2016–17 by a resolution on 20 September 2017.

Yours sincerely,

The Honourable Penelope Wensley AC
Chairman
Australian Institute of Marine Science

Dr Paul Hardisty
Chief Executive Officer
Australian Institute of Marine Science

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AIMS' main facilities near Townsville, North Queensland.

ABOUT AIMS

The Australian Institute of Marine Science (AIMS) is a corporate Commonwealth entity established under the *Australian Institute of Marine Science Act 1972* (AIMS Act). As Australia's tropical marine research agency, we conduct innovative, world-class scientific and technological research to support sustainable growth in the use and effective environmental management and protection of Australia's tropical marine estate.

AIMS' headquarters was established near Townsville in recognition of the importance of the Great Barrier Reef (GBR) to Australia. Today, we also operate from bases in Perth and Darwin, which allows us to undertake research across northern Australia, spanning two oceans and three regional seas (Figure 1).

To ensure that the outputs of our research are transferred to users, and have the required impact, AIMS actively engages with government (ministers, policy-makers, resource managers and environmental regulators), private industry sectors (ports, oil and gas, mining, tourism, services), non-government organisations, scientific peers and the Australian public.

The Institute:

- conducts strategic and applied research into marine life, from microbes to whole-of-ecosystem studies, and the processes that sustain them
- monitors the condition of, and trends in, the marine environment
- builds models and decision-support tools to help users interpret the data we collect
- develops a broad spectrum of enabling technologies that facilitate research at molecular to oceanic scales.

AIMS' research is targeted to priorities of the Australian and state governments and industry. Over the past year the Institute's research has continued to:

- underpin Australia's environmental management of the GBR to ensure that this World Heritage area remains healthy and resilient
- support the sustainable development of coastal industries and ports across northern Australia from Gladstone to the Pilbara
- provide the environmental baselines, and condition and risk assessments required for development of the offshore oil and gas industry in north-western Australia.

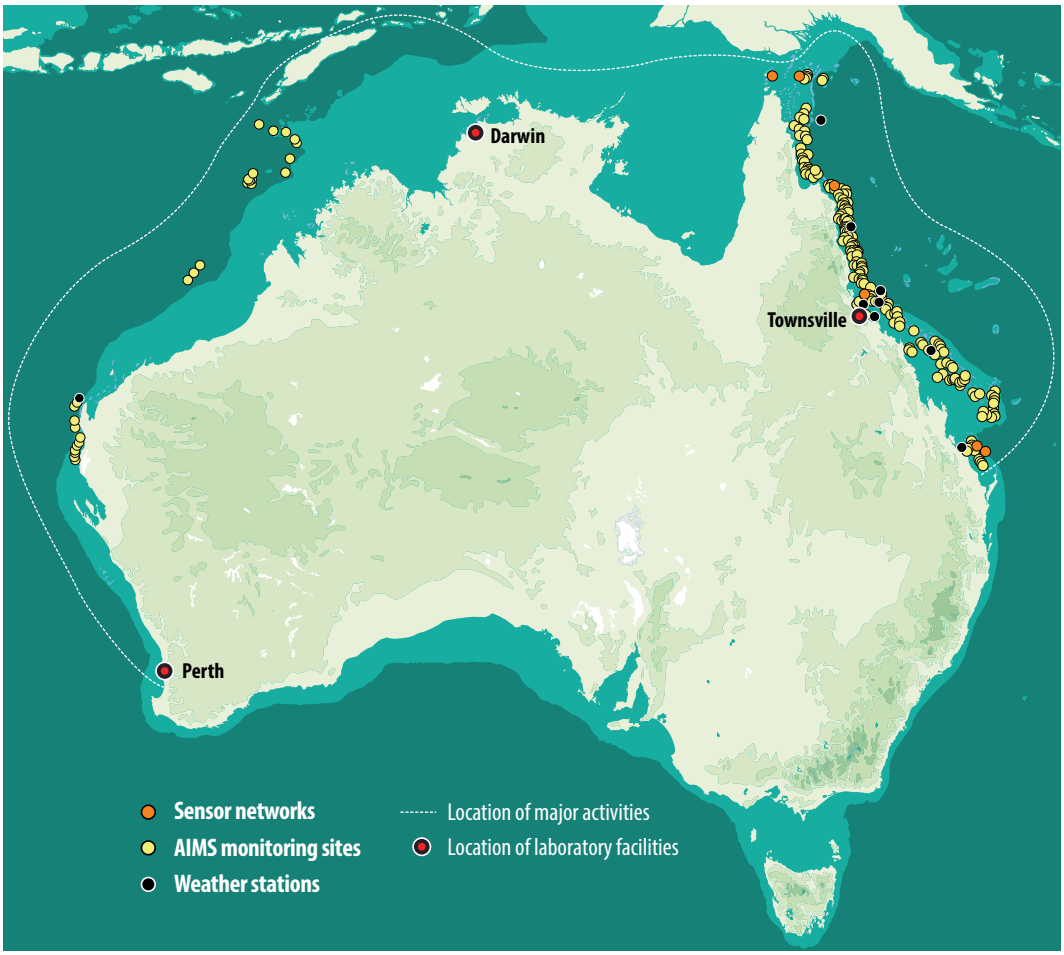


Figure 1: Location of AIMS' major activities and facilities.

AIMS recognises that Indigenous peoples are the traditional custodians of much of the Sea Country within which AIMS works, and are significant stakeholders in the research that AIMS conducts. During the past year, AIMS has developed and adopted an Aboriginal and Torres Strait Islander engagement strategy with close consultation with a number of Indigenous individuals and groups with an interest in sea country management. The strategy builds on strong historical partnerships and relationships that AIMS has had with Traditional Owners and provides a strategic corporate approach to Indigenous engagement. The strategy describes actions to achieve the following five goals:

1. Incorporate Indigenous engagement in the governance of AIMS.
2. Improve the cultural competency of AIMS staff including ways to demonstrate respect and acknowledgement of Aboriginal and Torres Strait Island people and their culture.
3. Establish and foster strong mutually beneficial relationships with relevant Indigenous individuals and groups with and interest in sea country management.
4. Improve marine science capacity and capability in AIMS and Indigenous groups and individuals by doing joint projects together.
5. Increase the employment of Aboriginal and Torres Strait Islander people in marine science-related fields (including support for pathways to employment).

THE YEAR IN REVIEW: REPORT FROM THE CHAIRMAN

As Chairman of the Council of the Australian Institute of Marine Science, I am pleased to introduce the annual report of the Institute for 2016–17. The past year has been a highly productive year for AIMS, confirming its position as one of the world's leading marine science research agencies. Throughout the year, within the framework of AIMS Strategic Plan 2015–25, and its seven identified areas of research priority, AIMS' researchers delivered an impressive flow of well-targeted, high-quality scientific data and reports, to provide government, industry and the wider community with the information and advice needed to make informed decisions about the management of Australia's extensive marine estate.

The value of that estate and its importance for our future prosperity gained greater recognition this year, with the release in March 2017 of AIMS' Marine Industry Report. This comprehensive biennial survey of the sector showed that Australia's 'blue economy' contributes more than $74 billion directly and indirectly to annual gross domestic product and provides almost 400,000 jobs; it is projected to grow to $100 billion by 2025. With governments and communities around the world focusing more attention on developing their blue economies, and at the same time, increasingly concerned about the state of the world's oceans and marine ecosystems and the need to do more to safeguard their health, the work carried out by AIMS has assumed greater significance and is attracting substantial interest internationally. One priority this year for Council and the AIMS leadership team has been the development of an international engagement strategy, to maximise the opportunities this represents. This strategy will be developed further and refined during the coming year.

Another major preoccupation for Council during the year was the selection of a new CEO for AIMS, to succeed Mr John Gunn, stepping down after almost six years in the role. Mr Gunn was an energetic and committed CEO, dedicated to advancing marine science and AIMS' position and standing in Australia and overseas. We thank him for all he contributed to AIMS' growth and development during his tenure and wish him well for the future.

The appointment of Dr Paul Hardisty as CEO is welcomed warmly by Council. Dr Hardisty is an accomplished scientist and innovator, with substantial private sector and business experience. This multi-sector experience—and the fresh ideas and perspectives he will bring to the position—will be of great benefit to AIMS at this time of considerable change and opportunity for the Institute. We look forward to working with him to enable AIMS to continue to grow and deliver the best possible outcomes during the coming year, building on the achievements presented in this report.

Penelope Wensley AC


neptune
AUSTRALIA

THE YEAR IN REVIEW: REPORT FROM THE CEO

It has been a busy and very positive year for AIMS on many fronts. The Institute's science excellence in marine and freshwater biology was recognised in the Thomson Reuters 2011–2016 international rankings for science impact, where we placed first nationally and second globally. As a publicly funded research agency, AIMS' commitment to science excellence is matched by a drive to ensure that our science is strategically aligned to, and meeting the needs of the private and government sectors. Success is measured by maintaining our reputation as a trusted adviser on sustainable development and management of Australia's immense Exclusive Economic Zone.

In March 2017, Minister Sinodinos launched an update of *The AIMS Index of Marine Industry* which for the last decade has tracked the value of Australia's marine industries—our blue economy. Marine industries are now contributing more than $74 billion directly and indirectly to annual national gross domestic product. This is projected to grow to $100 billion by 2025 as marine trade, offshore oil and gas production and tourism grow. Sustainable fisheries and aquaculture will continue to be an important source of food and export revenue, alongside growing recreational use of coastal systems. It is worth noting that the rate of growth in this sector over the last decade has been more than three times that of the national economy.

Despite its economic value and environmental significance, much of the national marine estate, particularly the remote coastal regions across our north, remains unexplored and un-described. For decades AIMS has been at the forefront of exploring and understanding our coral reefs and tropical continental shelf waters. Over the last 12 months, we have begun a significant expansion of our engagement with Aboriginal and Torres Strait Island communities across northern Australia, helping them supplement their considerable customary knowledge with the latest technology and approaches to mapping and understanding their sea country. We have engaged with communities from the Kimberley, right across the north and along the Great Barrier Reef (GBR) coast in training sea rangers to use a range of sampling technologies, developing smartphone apps to support their data collection and reporting, and using the information to plan the management of their resources.

While efforts to provide baseline information will need to continue, sustainable development and conservation challenges are increasing in number and complexity as the impacts of global change, population growth and increased coastal development unfold. AIMS has begun a strategic shift of focus towards creating and supporting solutions to these challenges. At the forefront of this shift is a major push to develop new technologies and engineering approaches to assist corals to adapt to warming oceans and to restore reefs damaged by climate change, crown-of-thorns starfish and cyclones. Such a massive challenge is beyond the capability of any one organisation, so AIMS has led development of a major national partnership with other research and development providers (CSIRO, University of Queensland, Queensland University of Technology, James Cook University), policy-makers and regulators (Great Barrier Reef Marine Park Authority, Queensland and Australian Government environment departments) and the Great Barrier Reef Foundation. We are also engaging a range of international leaders in relevant disciplines.

AIMS continues to play a key role in the National Marine Science Committee, the peak body for marine science in Australia representing 24 marine research organisations, universities and government departments. The committee is focused on implementation of the National Marine Science Plan 2015–25 with AIMS leading work on developing a National Marine Baselines and Monitoring Program, and contributing to the push for investment in critical marine research infrastructure (research vessels, supercomputers, observing systems and a national facility based on the National Sea Simulator located at AIMS headquarters in Townsville).

Highlights of 2016–17

AIMS set a new publication record, with scientists and researchers publishing 236 journal articles. One scientific paper lead by AIMS and CSIRO researchers entitled ´Towards protecting the Great Barrier Reef from land-based pollution' was one of the top 15 most downloaded papers in 2016.

We undertook crown-of-thorns starfish outbreak mitigation, with work on restoring populations of Pacific triton, a natural predator of the starfish.

Using the National Sea Simulator (SeaSim) we continued to establish concentration response relationships and thresholds of sediments, pCO_2, turbidity, nutrients, light, salinity and temperature on selected species.

We continued to develop experimental aquarium systems in the SeaSim to study the impacts of increased temperature and pH on coral-reef and fish communities to adapt to the change.

- Camera trials with a view for putting an eye on the reef were successfully completed and cameras went live in November 2016 at Davies and Myrmidon Reefs.
- International engagement has strengthened, with the establishment of the Sino–Australian Centre for Healthy Coasts in partnership with the Institute of Oceanology, Chinese Academy of Science. The joint centre will explore solutions for management of coastal pollution and ecosystem protection to improve the health of our multi-use coastal zones.
- Research into CO_2 levels in the biochemistry of reef fish is being undertaken in collaboration with James Cook University, and researchers from the University of Miami and the King Abdullah University of Science and Technology, who travelled to AIMS to study at the SeaSim.
- The $62 million, six-storey Indian Ocean Marine Research Centre opened in Perth in August 2017, putting 300 marine researchers across a variety of disciplines representing AIMS, the University of Western Australia, CSIRO and the Western Australian Department of Primary Industries, under one roof. The facility further positioned Australia as a global leader in marine and ocean research, bringing together the largest cohort of marine researchers in the country.
- AIMS continued historical reconstructions of coral growth, environmental events and impacts on the Great Barrier Reef.
- The Western Australian Marine Science Institution (WAMSI) dredging program looking at how sediments impact benthic organisms, was completed in the SeaSim.
- AIMS documented and analysed the 2016 coral bleaching event.
- AIMS led the research on water quality effects on coastal and marine ecosystems for the Reef Plan 2017's scientific consensus statement. We are also advisers in setting new water quality targets and a risk assessment for the plan.

- An observational and modelling study on sediment transport in Melville Bay (Gove, Northern Territory) has begun in partnership with Rio Tinto.
- We improved and further refined existing water quality models of Darwin Harbour, Northern Territory.
- AIMS and the Anindilyakwa Land Council signed an agreement to undertake sea mapping and fish and water quality surveys of their Indigenous protected area in the Northern Territory.

Engagement with industry and mining continues to grow

The joint Australian and Queensland governments' Reef Plan program has led to promising reductions in sediment and nutrient loads entering rivers as a result of improved farming practices.

AIMS continued our strong partnerships with Australia's offshore oil and gas companies operating on the North West Shelf. Our scientists are at the cutting edge of smart technologies to create good solutions for these companies.

The Woodside Master Services Agreement, along with Shell Australia, Chevron, INPEX, ConocoPhillips and the exciting Quadrant program all continued to access AIMS' marine environmental survey capabilities to support the assessment and management of their operational and business risks.

The Northern Territory Government has met its water quality objectives in Darwin Harbour, with the help of AIMS' water quality design support system for new suburban developments.

Our data collection and modelling in Darwin Harbour has also allowed port pilots to better assess conditions when bringing a large vessel into a mooring under prevailing winds and dangerous currents.

Our research and collaborative work with Townsville Port in Queensland has also ensured industry has access to best practice and good outcomes based on scientific data.

AIMS is also engaging with a broad range of marine industries, government agencies and communities under the Northern Australian Marine and Coastal User Needs Analysis project to improve our understanding of marine environments. The objective of the initiative is to bring together the Northern Territory Government, industry and community end users of marine and coastal systems to participate in a process that will articulate in detail the strategic, policy and operational challenges and opportunities faced by these sectors.

International collaboration

International collaboration has never been more critical for marine nations to ensure the health, safety and prosperity of marine populations, economies and environments.

AIMS and the Institute of Oceanology, Chinese Academy of Science, are working together on a major project called the Sino–Australia Centre for Healthy Coasts, using technology developed at AIMS to create a pilot water health report card for Jiaozhou Bay.

The Chinese ambassador to Australia visited AIMS Queensland in August to cement the close ties between the research teams.

Our researchers are also working with the Hawaii Institute of Marine Biology, developing coral stocks to explore how coral reefs around the world adapt to climate change.

We are also working closely with research partners from Saudi Arabia, USA and the UK to develop advanced technology that could transform the way governments, industry and scientists monitor, understand and manage the ocean and its wildlife.

SeaSim continues to attract researchers from around the world to our facility near Townsville, Queensland. The aquarium is the most advanced facility of its kind in the world.

During 2016–17 AIMS' long-term partnership with Boeing saw the development of next-generation systems for measuring and monitoring ecosystem health, biodiversity and water quality on the GBR, Ningaloo Reef and coastal waters.

Supporting decision-makers

AIMS' work provides policy-makers, regulators and managers with robust evidence to navigate complex decisions, stakeholder conflict and the need for both economic growth and environmental sustainability.

In the past year, we have worked closely with researchers from the Great Barrier Reef Marine Park Authority and James Cook University to present a comprehensive and authoritative picture of how the 2016–17 coral bleaching impacted the World Heritage ecosystem as a whole.

AIMS' long-term whole-reef research provides a basis for placing the impacts of bleaching in the context of the reef's history.

Bleaching in 2016, which came on the heels of cyclones in 2014–15, is unprecedented. Crown-of-thorns starfish and coral bleaching have affected parts of the GBR over the past two years, but at the same time we have seen very rapid recovery of coral cover in the southern GBR after it was devastated in 2009.

Our applied research continues to support better decision-making, planning, management and mitigation by government and industry. It also brokers better relationships between some of these stakeholders, and the comprehensive research into the 2016 coral bleaching, brought balance to public debate.

AIMS new Chief Executive Officer

Paul Hardisty will come on board as AIMS CEO in August 2017, bringing a wealth of experience and energy to the role. Dr Hardisty is an environmental engineer with global experience in research leadership, collaboration and innovation. Paul's background in engineering and business, and former role as director of CSIRO'S Climate Adaptation Flagship will stand him in good stead to continue growing Australia's leading marine science agency.

It has been an honour to steer Australia's leading marine science agency in positive growth as the CEO over the past five years, alongside our Chairman the Hon Penelope Wensley AC.

John Gunn

HIGHLIGHTS

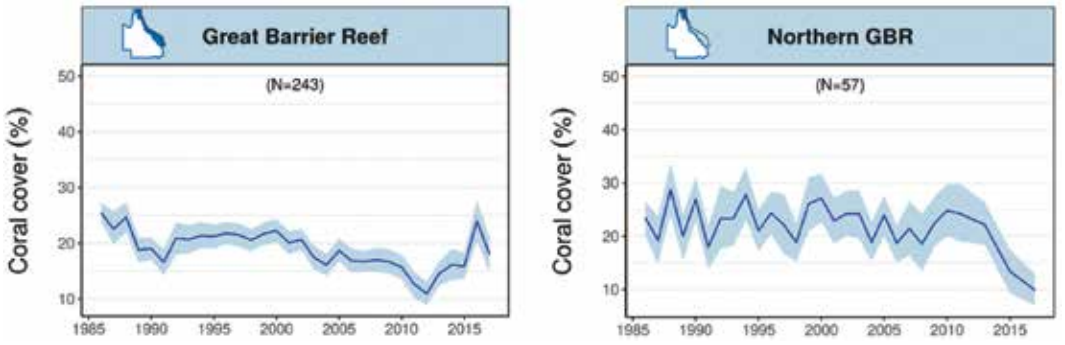
Long-term monitoring of the Great Barrier Reef (GBR) provides essential context

30 years of monitoring change on the GBR provides context for interpreting recent extreme events

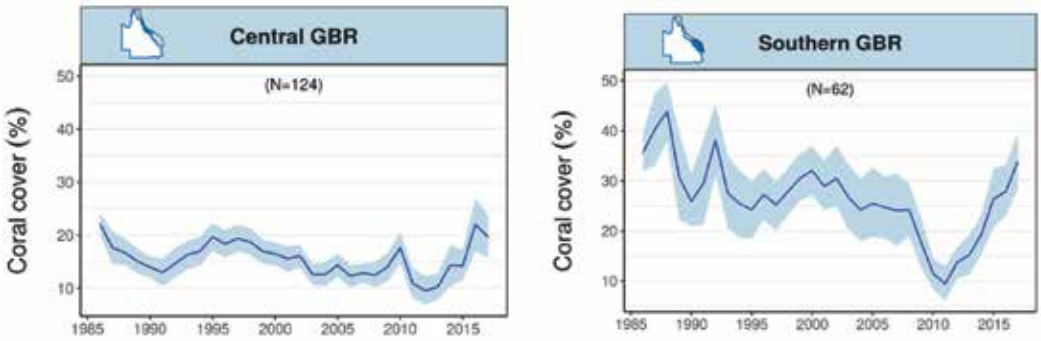
Starting in 1985, AIMS has surveyed more than 100 coral reefs every year to represent the status of reefs throughout the GBR Marine Park. In a landmark publication in 2012, AIMS reported that average coral cover had declined slowly over 27 years to half of its starting value due to the cumulative impacts of multiple disturbances. The main agents of change were tropical cyclones, crown-of-thorns starfish, and coral bleaching, in that order. In the summer of 2015–16, severe bleaching was detected throughout the northern GBR and surveys by the AIMS Long-term Monitoring Program (LTMP) during 2016–17 have shown a subsequent level of coral mortality that has been unprecedented in three decades of monitoring.

Manta tows provide an efficient means of monitoring reef condition over large areas.

Prior to the most recent surveys, average coral cover on the GBR had been increasing from a low point in 2011 caused by the cumulative effect of multiple severe tropical cyclones including Tropical Cyclone (TC) Hamish (2009) and TC Yasi (2011). The 2016–17 surveys reveal that much of this recent gain has been lost and the general pattern obscures a more dramatic and unprecedented downturn in hard coral cover on the northern third of the GBR to the lowest cover since monitoring began.



Patterns in GBR-wide coral cover (left panel) obscure a recent dramatic decline in coral cover on the northern GBR (right panel).



Coral cover was recovering in the central and southern GBR up to March 2017.

The recoveries evident on the central and southern thirds of the GBR show encouraging signs of the resilience of coral communities when rested from major disturbance but only represent their status up to March 2017. Consequently, the results do not include the impacts from severe TC Debbie that stormed through the Whitsunday Islands at the end of March 2017, or a further episode of mass coral bleaching over the northern half of the GBR in the summer of 2016–17. Both these more recent extreme events have resulted in additional coral mortality in the central GBR; cumulative impacts from these events will be reported in 2018.

Severe Tropical Cyclone Debbie leaves its mark on the reef

The footprint of this violent storm will require at least a decade to erase

Satellite view of severe TC Debbie as it crossed the coast near Airlie Beach.

In addition to the LTMP, which surveys mostly mid- and outer-shelf reefs, AIMS started a separate program in 2006 for monitoring inshore coral reefs to inform the GBR Reef Water Quality Protection Plan of the Queensland and Australian governments. Because of the turbid conditions typical of coastal water in North Queensland, this program uses different survey methods and operates from small boats. The flexibility of boats enabled AIMS divers to re-survey long-term monitoring sites in the Whitsunday Islands shortly after TC Debbie passed over the area in March 2017 to provide an early damage assessment to the Great Barrier Reef Marine Park Authority.

Severe TC Debbie was a broad, slow-moving system estimated to have impacted as much as a quarter of the GBR Marine Park. When the category-four system reached the Whitsundays off North Queensland, the region was battered for 48 hours by winds reaching 260 kilometres per hour.

On revisiting their monitoring sites, AIMS scientists found that most areas had suffered substantial loss of coral; the most affected sites lost more than 95% of the pre-existing coral cover.

Photographs of coral cover on the same plot before and after the passage of TC Debbie.

In shallow waters, where previously 60–70% of the bottom had been covered in fragile branching corals, most sites were found scoured to bare surfaces.

In deeper waters, typically occupied by larger and more massive corals tolerant of low-light conditions, colonies had been overturned, rolled about or reduced to rubble. On some reef slopes, there were signs of physical collapse with sloughing of all live corals.

The level of damage was the largest change in 11 years of monitoring at these sites and full recovery will require more than a decade free from further disturbance.

Two consecutive years of coral bleaching

Unprecedented back-to-back years of coral bleaching have lowered coral cover further on the northern GBR

Following the summer of 2015–16, when high water temperatures in the northern third of the GBR Marine Park caused widespread coral bleaching and subsequent mortality, fresh signs of renewed coral bleaching were observed after the 2016–17 summer. It appears that prolonged heat stress, which was not fully relieved during the intervening winter, has resulted in the first consecutive, mass bleaching events on the GBR following past episodes of widespread bleaching in 1997–98 and 2005-06.

In the 2015–16 event, the northern third of the GBR, from Port Douglas to the Torres Strait, was severely bleached and lost at least 30% of the living coral cover. Although 70% of the reefs along the length of the GBR were bleached to levels that exceeded 30% of the coral-reef commun ity, ultimately mortality in the central and southern thirds of the GBR was less than 5% of the corals that initially bleached.

In the 2016–17 event, the summer heat wave extended further south to include nearly two-thirds of the GBR. Bleaching severity increased through this region compared with 2016 and resulted in 76% of the reefs in the central sector bleaching at severe levels (more than 60% of the community). At the peak of the event, 15–60% of the living corals as far south as Townsville were estimated to be at risk of death.

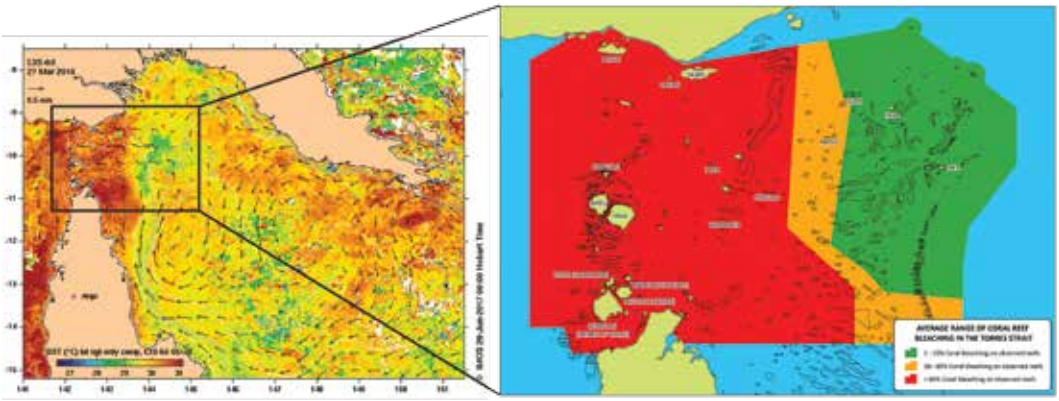
Partly because of the widespread mortality of northern corals in the previous year, preliminary surveys underwater in the first half of 2017 suggest that the highest levels of coral mortality will be experienced between Cairns and Townsville. The full status of coral cover will only become evident in late 2017 but the expectation is that significant coral loss will have occurred throughout the northern half of the GBR as a result of the cumulative impacts of two consecutive seasons of coral bleaching. The wide extent and relative severity of these back-to-back bleaching events is unprecedented in the 32-year record of broad-scale monitoring maintained by the Institute.

After bleaching (white corals in the left frame), dead corals are quickly overgrown by algae (right frame).

Ocean modelling predicts coral bleaching and potentially safe spaces

Coral bleaching is the result of predictable thermal stress but some places have lower risk

Bleaching is a stress response by reef-building corals to anomalously high water temperatures. This stress can accumulate either by short exposure to high temperatures and high light, or longer exposure to slightly elevated conditions; either way, eventually threshold values are reached at which coral polyps begin to expel their symbiotic microalgae and bleach. If the stress is relieved while the animals retain some symbionts, they can return to a healthy state. If not, they will starve because the symbionts produce most of their energy.



Cooler waters east of Torres Strait (green in the inset) resulted in less coral bleaching.

Corals living in different places within the huge GBR ecosystem experience different seasonal temperature cycles but all become stressed after prolonged exposure to seawater that is as little as one degree warmer than the long-term average for that location. Ocean temperatures have been monitored by satellites for decades and their observations calibrated finely through direct comparison with moored and moving sensors in the water column. As with weather forecasting, vast data streams are assimilated in 3D models that can accurately represent the movement of ocean currents and various properties of seawater, including temperature. The archive of measurements is so large that reliable climatologies are available for any location within the 365,000 square kilometres of the GBR Marine Park; these models are the most efficient way of detecting and forecasting thermal stress at any time or place.

In the past two summers, ocean models at AIMS have provided reliable guidance about the accumulation of heat stress within the Marine Park and have proven efficient at predicting the extent and severity of coral bleaching. Apart from providing an early-warning system and identifying those places most at risk of coral bleaching, the models have also explained why some locations are natural refugia from thermal stress. The example above shows cooler sea waters to the east of Torres Strait where strong tides through the Strait mix with upwelled cold water from deep below the surface at the continental margin. As predicted by the model, aerial surveys in 2017 by the National Taskforce on Coral Bleaching and Torres Strait Regional Authority revealed little or no bleaching in this area, unlike the severe bleaching observed in the central Torres Strait. The significance of these natural refugia is yet to be determined, but the oceanographic models reveal other similar, potentially safe spaces for corals along the outer margin of the GBR.

Great Barrier Reef no-take marine reserves protect more than just fish

An analysis of long-term monitoring data reveals that protected areas have greater resilience

Marine protected areas are widely advocated as 'set-and-forget' strategies for conserving and managing marine biodiversity. While globally numerous studies show fast and rapid benefit of marine reserves harvested species, understanding of their benefits for conserving non-target species and wider ecosystem functions has remained elusive despite extensive research. In 2016, AIMS scientists published important research showing that no-take marine reserves in the GBR Marine Park have increased the resilience of coral-reef communities to various natural disturbances including coral bleaching, coral diseases, outbreaks of crown-of-thorns starfish and storms.

Using 20 years of monitoring data collected by the AIMS LTMP from 20 protected and 26 unprotected reefs, scientists found that within protected reefs (1) reef community composition was 21–38% more stable, (2) the magnitude of disturbance impacts was 30% lower, and (3) the recovery after disturbances was 20% faster than that on adjacent unprotected reefs. For example, full recovery of the coral community following an outbreak of crown-of-thorns starfish outbreak required on average nine years on unprotected reefs but just over six years inside no-take green zones.

At a time when the world's largest coral-reef ecosystem (the GBR) is facing multiple and growing pressures from natural and anthropogenic disturbances, this proof of increased resilience from protective spatial management offers some encouragement to reef managers.

Although more work is required to explain the causal mechanisms, researchers propose that the faster recovery observed on protected reefs is linked with reduced impacts from biological disturbances such as disease and starfish predation. While the mechanism is unclear, the evidence suggests that fishing of top predators results in a loss or reduction of one or more essential ecological functions and that some areas should be protected from all harvesting.

A resilient reef recovering from past storm damage through regrowth of diverse corals.

In 2004, the GBR Marine Park was rezoned to increase the area of no-take zones from less than 5% in the original zoning plans to 33% of the total area. The park now has a very high level of protection compared to global standards.

Learning the language of crown-of-thorns starfish communication

Crown-of-thorns starfish communicate through chemical signals that might be used to control their behaviour

The crown-of-thorns starfish is a natural pest that has been responsible for as much as 40% of the coral losses observed on the GBR through three decades of monitoring by the AIMS LTMP. In 2012, when AIMS scientists reported the loss of 50% coral cover over 27 years, their statistical models predicted that coral cover would have increased, not decreased, during this period without the impacts from starfish. Compared with other uncontrollable sources of coral mortality such as storms and bleaching, starfish are an obvious target for population control.

While the tourism industry, supported by funds from the Queensland and Australian governments, employs teams of divers to cull starfish with lethal injections, control by hand is only effective for defending local areas and can never reach more than a tiny proportion of the total population, which is numbered in many millions. Hence, there is strong incentive to discover additional, alternative methods of biological control to suppress this native pest.

Scientists are researching efficient ways to control crown-of-thorns starfish, a coral-eating pest.

In 2016, AIMS scientists were part of an international collaboration to map and publish the complete genomes of starfish collected from Australia and Japan. Within these blueprints lie the genetic codes for constructing the full set of chemical signals that the starfish use to communicate. For example, starfish often aggregate to enhance the effectiveness of their spawning; these aggregations are likely to be the result of chemical attractants secreted into the seawater. Laboratory tests have shown that starfish attacked by a natural enemy, the triton, secrete different chemicals that induce a flight response in other starfish.

The laborious task of isolating and purifying chemicals with attractant and repellant properties is now underway and has been greatly assisted by the deciphering of the genomes. Despite the distance between the subject animals, Australian and Japanese starfish secrete identical chemicals. Consequently, any discoveries and subsequent applications as a biocontrol agent will have instant transferability to all regions where the starfish has pest status, probably throughout the majority of its range.

More CO_2 seep sites located in Papua New Guinea

A new site confirms past findings about the impacts of ocean acidification on reef communities

Ocean acidification arises when carbon dioxide (CO_2) dissolves in seawater and makes it less alkaline. Since the Industrial Revolution, the global oceans have been slowly becoming more acidic due to partial uptake of the extra CO_2 added to the earth's atmosphere by the burning of fossil fuels.

Thousands of experiments have been done in laboratories around the world seeking to predict the impacts of changing ocean chemistry on marine life. While there have been some large-scale field experiments designed to overcome the artificiality of the laboratory experiments, AIMS has pioneered the study of reef communities around natural volcanic seeps where continuous bubble streams of almost pure CO_2 have produced chronic acidification of seawater in the middle of otherwise undisturbed and flourishing coral reefs.

Over the last decade, AIMS has led multiple international expeditions to volcanic seeps in the Milne Bay Province of Papua New Guinea (PNG). Teams have produced more than 20 significant publications predicting what coral reefs, seagrasses, sediment communities and tropical plankton might look like in a future world. Some of the changes evident around the Milne Bay seep sites are profound, with both winners and losers in the altered ecosystems. The scientists have long sought comparison sites to validate and generalise these findings.

In late 2016, AIMS scientists led an expedition to Tuluman Island with international collaborators from the National Oceanic and Atmospheric Administration, University of Miami, University of Queensland and The Nature Conservancy. This small island lies in Manus Province, PNG, which is 900 km from Milne Bay Province and much closer to the equator. Tuluman was formed during submarine volcanic eruptions in 1953–1957. Consequently, all substrata and reefs around the island are of recent origin and identical age (approximately 50 years).

The team compared three sections of the fringing reefs around Tuluman Island exposed to elevated CO_2 with nearby control sites exposed to normal seawater. The seeping was less than the Milne Bay sites, resulting in smaller reductions in pH (less than 0.1 units). Nevertheless, high-CO_2 sites at Tuluman were dominated by massive and robust corals but structurally complex corals and crustose coralline algae were sparse. Coral juvenile densities were low compared to the control sites, while macroalgae was more abundant. All these differences matched the patterns observed at the Milne Bay CO_2 seeps.

Field data and retained samples (gas, sediments, macroalgae, reef cores, photo transects) are being analysed to assess differences in framework stability, macroalgal and coral communities between the seeps and control sites at Tuluman. However, preliminary results suggest that most of the responses observed at the high-CO_2 sites in Milne Bay Province are also seen at this new location, endowing extra credibility to the extensive studies done in Milne Bay.

Tuluman Island with its coral reefs and CO_2 seeps (bubbles in the background to the divers).

Drone technology captures the spectral reef

Hyperspectral cameras provide new ways of seeing coral reefs

Coral reefs are an explosion of colour. Corals, fish, starfish and molluscs are rich in diverse and attractive colours, but beyond the colours that we can see are those that we cannot. Human eyes only see a narrow range of wavelengths within the light spectrum, but multispectral scanners are able to capture a much broader range. This new imaging technology is rapidly becoming both inexpensive and miniaturised to the point where it is feasible to deploy hyperspectral sensors on unmanned underwater and aerial vehicles.

Hyperspectral cameras can capture both visible and invisible (to human eyes) imagery. In medicine, the additional wavelengths can distinguish tumours from healthy tissue, allowing surgeons to more precisely excise cancers. In environmental science, the more discriminating pictures of biodiversity afforded by this technology may be used to distinguish different species and potentially reveal the health status of organisms. It is possible that hyperspectral measurements could provide assessments of sublethal coral stress and early warnings of imminent coral bleaching to validate the predictions made by ocean models.

AIMS is currently exploring the potential of these new tools to make monitoring more efficient and more cost effective. Test images are being collected from a hyperspectral camera immersed in one of the large coral-reef mesocosms in the SeaSim as part of a program to collect diagnostic signatures from common corals in different health states (normal, bleached, dead) when imaged against common backgrounds found in the field (coral, sand, algae).

During a recent survey of coral bleaching after the summer of 2016–17, hyperspectral imaging from an unmanned aerial vehicle collected a rich dataset from low-altitude, high-resolution transects that were subsequently surveyed by divers. Cross-validation will reveal the potential for future hyperspectral surveys to provide reliable monitoring and rapid assessments of bleaching in shallow water coral communities.

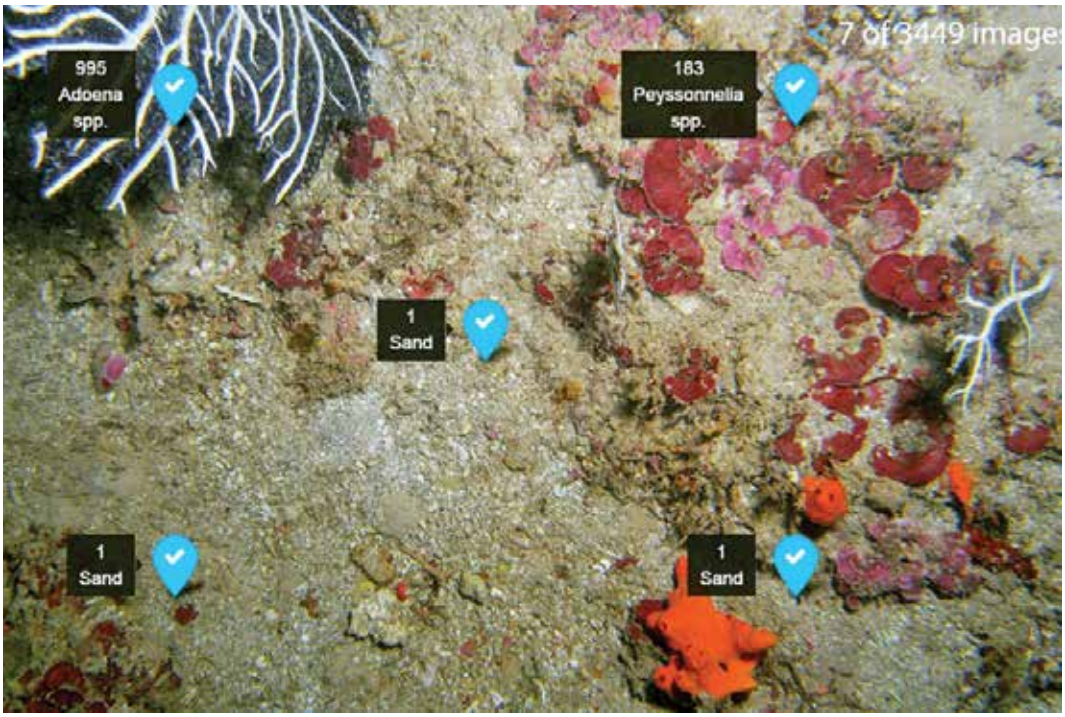
Aerial drones with hyperspectral cameras provide efficient assessments of shallow habitats.

Benthobox *provides automatic image analysis for smarter monitoring*

Scientists find ways to reduce the costly overhead of analysing vast photographic libraries

Benthobox is a computer program and interface developed by AIMS scientists to automate the task of classifying biodiversity from benthic imagery. The example below shows a digital image subsampled at five points in the frame. The work builds on an international effort on Computer-Aided Feature Extraction, which represents the next generation of existing image identification systems such as CoralNet.

Each year, AIMS generates vast numbers of benthic images through monitoring programs such as the LTMP and towed videos in Western Australia. To date, these images have been scored manually with each day of fieldwork typically requiring ten days of post-processing after an expedition. *Benthobox* was built to address this image-processing bottleneck and expensive overhead.



One example of many thousands of images classified by unsupervised computer software.

After an initial training phase, *Benthobox* uses previously classified images and deep machine learning techniques to recognise substrates and organisms. Early results from a recent survey that collected 140,000 images showed *Benthobox* capable of correctly identifying 80,000 images as not of interest. Consequently, this first pass screening eliminated the need for an expert to examine almost 60% of the extensive archive. Of the 60,000 images retained, expert analysis showed that *Benthobox* produced correct assignments for over 80% of points. With these savings alone, *Benthobox* has the potential to reduce the post-processing overhead from 10:1 towards 2:1, drastically reducing the need for human intervention.

The system also has considerable potential to save time in the field and increase the effectiveness of field sampling through reactive monitoring. Since the process can be run overnight at sea, preliminary results from each day of sampling can be used to guide effort on the following day. This feedback in near real time can be used to save costly field time and/or to produce a superior product.

Dredging science delivers evidence-based decisions for operators and regulators

AIMS leads science to mitigate the harmful effects of marine dredging projects

Many large dredging operations are happening, or are planned, for tropical Australia, including substantial port expansions in the Great Barrier Reef World Heritage Area, the Northern Territory and the Pilbara Coast of Western Australia. Except for the GBR, where spoil from capital (but not maintenance) dredging must be placed on land, dredge operations to deepen sections of seabed inevitably result in broad turbid plumes and unnatural siltation near the extraction zone and near the spoil grounds when the extracted sediments are dumped at sea. These highly visible signatures of disturbance have provoked strong citizen action over the desirability of dredging, especially in the GBR, leading to demands from industry, government and regulators for better information to understand and potentially mitigate any environmental risks arising from dredging.

AIMS staff from Perth and Darwin have been leading the national effort to meet this demand. Projects co-funded by the National Environmental Science Programme (NESP) and Western Australian Marine Science Institution's (WAMSI) Dredging Science Node include

1) reviewing and consolidating knowledge about the environmental effects of dredging
2) measuring key stressors arising from dredging
3) measuring stress in corals, sponges and seagrasses to advise on thresholds and trigger values to limit the impacts of dredging operations
4) developing models for benthic irradiance as a key indicator of water quality.

More information about these outputs and their subsequent use can be found at http://www.wamsi.org.au/dredging-science-node

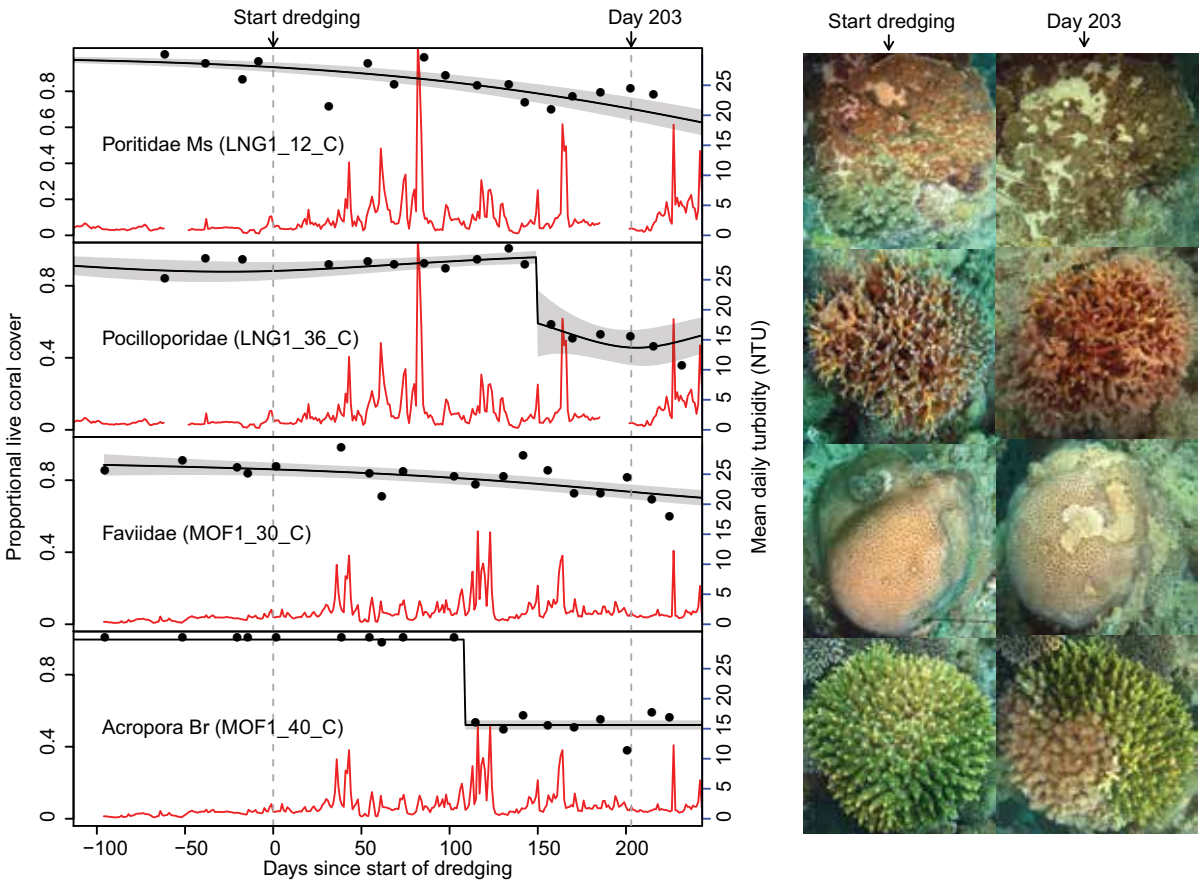
The innovative capabilities of SeaSim at the Institute's base in Townsville have been essential to the creation of new knowledge about dredging impacts and evidence-based advice on thresholds for light and siltation designed to mitigate environmental impact. SeaSim allows researchers to mimic the conditions on reefs from around the country, and to alter them in ways that emulate realistic exposure to dredging impacts. The results have reduced uncertainties about the risks of dredging to key marine organisms exposed to reduced light and increased siltation near marine dredging operations.

Research into the environmental effects of dredging is having real-world impact. The work of AIMS scientists is informing regulators and guiding industry best practice. Findings from our dredging science have been incorporated in multi-million-dollar port expansion plans in Darwin and Port Hedland. In particular, recent advice on sediment transport, ecotoxicology, and hydrodynamic modelling has informed the design of capital dredging works for the Darwin East Arm Wharf project and resulted in best-practice operations.

The impact of the Institute's work on dredging science is also clear in the international literature. The WAMSI Dredging Science Node has produced 19 peer-reviewed articles over the last five years. AIMS scientists are first authors on 14 of these papers, with another five now in the pipeline. This is an exceptional contribution to a research field with national and international applications.

Dredging science connects stakeholders from government, industry and research and helps them to mitigate the environmental risks caused by dredging. These actions will reduce the footprint of dredge operations on tropical marine ecosystems and ensure that critical port infrastructure is expanded in the most sustainable way.

The WAMSI Dredging Science Node was made possible through $9.5 million invested by Woodside Energy, Chevron Australia and BHP Billiton as environmental offsets. A further $9.5 million was co-invested by the WAMSI Joint Venture partners. The node was also supported through critical data provided by Chevron Australia, Woodside Energy and Rio Tinto Iron Ore.



(Left) Plots of live cover for four different types of coral (dark circles) following their exposure to elevated water turbidity as measured by the red lines after Day 0. (Right) Examples of sublethal damage to monitored colonies from the four coral types.

Impacts of artificial light on turtle hatchlings

Hatchlings born on beaches with light pollution are more vulnerable to marine predators

Coastal development and the artificial lighting that goes with it poses a significant threat to sea turtle populations. Hatchlings are attracted to light, and light pollution on their natal beaches interferes with their ability to find the sea after emerging from nests on the beach, leading to death from exhaustion or predation from land-based predators. AIMS scientists have now shown that light pollution on the beaches also affects hatchlings' swimming behaviour on reaching the sea and makes them more vulnerable to marine predators in the shallows.

Until now, the effect of artificial lighting on turtle hatchlings once they enter the sea has been unknown because migrations happen in darkness and there have been no tracking devices small enough not to affect the swimming ability of the tiny turtles. With recent new miniaturised technology, AIMS scientists have attached tiny acoustic transmitters temporarily to green turtle hatchlings to track their movements in nearshore waters at Ningaloo Reef, Western Australia, in the presence and absence of artificial light on water.

Artificial light on water proved to be strongly attractive to turtle hatchlings and caused them to divert from their usual course. Instead of their normal behaviour of swimming steadily towards the offshore horizon (as was observed off dark beaches), hatchlings from beaches with significant light pollution showed disorientated movements and dithered in the shallows, making them more vulnerable to the marine predators that patrol the beaches during nesting season.

This research is the first clear demonstration of the heightened risk of marine predation on wild turtle hatchlings caused by light pollution without the confounding influences of observers and boats. The research provides strong evidence for the need to mitigate light pollution from coastal developments near nesting beaches, especially industrial complexes that typically require higher intensity lighting as part of safe operating environments.

Of additional concern is that artificial lighting in coastal environments now extends far beyond the shoreline. Port infrastructure such as long wharves, and offshore facilities such as oil platforms can extend the footprint of artificial light sources many kilometres from the coast; in some places turtle hatchlings must deal with the consequences of artificial light over a significant part of their journey across the continental shelf to their juvenile nurseries in the open ocean.

Turtle hatchling bearing tiny acoustic tag (pink) that does not impede normal swimming. Image: Joan Costa

Exceptional fish diversity found on Australia's north-west oceanic shoals

This unique bioregion supports the highest fish diversity on mesophotic reefs globally

AIMS scientists have surveyed nine oceanic shoals near Ashmore Reef located 400 km off the north coast of Western Australia in the Timor Sea. These submerged banks rise steeply from seabed of 200 m depth to 30–50 m below the surface. Reef communities in depths of 20–80 m are classified as 'mesophotic' or mid-light coral reefs and they represent a unique ecosystem within Australia's marine jurisdiction.

These deep reef communities lie beyond the reach of scuba divers and hence are little known. An AIMS expedition used remote monitoring technologies including multibeam echo sounders to map the terrain and diverse camera systems to survey the benthic communities. Fish were recorded with baited remote underwater video systems (BRUVS) and were a standout feature of these ecosystems. The brief expedition recorded 341 species of fish from 47 families, including ten species of shark, five species of rays and two species of sea snakes. These statistics make the fish communities 50% more diverse than, and twice as abundant, as assemblages from mesophotic reefs on the GBR.

The clear oceanic waters of the north-west oceanic shoals allow hard corals and macroalgae to grow to greater depths than elsewhere, with communities at 60–70 m depth having levels of biodiversity similar to some of the most diverse shallow coral-reef systems. Despite the clear water, fishes may also benefit from enhanced productivity due to localised upwelling bringing deeper nutrients to the reef ecosystem. The rich fish communities include many species of conservation interest such as giant humphead wrasse and diverse top predators including sharks and groupers.

One-third of GBR mesophotic reefs lie within no-take management zones offering them protection from harvesting and potentially strengthening their resilience to natural disturbances. In contrast, just 1% of the north-west oceanic shoals bioregion has similar levels of protection despite their greater biodiversity value and many species of conservation interest. The results from the AIMS surveys have been shared with the oil and gas industry that operates near the bioregion and with marine planners responsible for this part of Australia's marine jurisdiction.

Fishes (snapper, bream, triggerfish, unicornfish, and shark) visit a baited remote underwater video station.

Global FinPrint assessing elasmobranchs in two oceans

AIMS scientists are assessing the status of sharks and rays across half of the world's tropical oceans

The Global FinPrint project is designed to produce the world's first standardised survey of shark and ray (elasmobranch) populations in coral-reef environments (www.globalfinprint.org). The purposes of this research are to understand the importance of elasmobranchs to coral-reef ecosystems, to understand how humans are impacting them, and to improve local and global measures to conserve and manage these high-value cartilaginous fishes. The project has major financial support from the Paul G. Allen Foundation.

AIMS scientists are responsible for elasmobranch assessments in the western Pacific Ocean and much of the Indian Ocean, a combined territory that represents nearly half of the world's tropical oceans. All global participants in the project use BRUVS designs pioneered by AIMS because they offer an easily standardised, non-intrusive way to film shark and reef-fish communities.

Field sampling is almost complete in the Pacific with more than 1,200 hours of recordings obtained from the GBR, Palau, American Samoa, Jarvis Reef and Niue. Effort in 2016–17 was concentrated on Kiribati, Federated States of Micronesia, the Hawaiian Islands, Tonga and the Marshall Islands. Partners are providing data from Guam, the Marianas and the Line Islands. Independent Samoa has also asked to be included in the final program. Field locations in the Indian Ocean include Qatar, Sri Lanka, Mozambique, South Africa, Seychelles, Maldives, Mayotte and northern Western Australia, with partners providing data from Tanzania, Saudi Arabia and India.

Preliminary results have shown that, while very remote atolls such as the uninhabited Jarvis Reef (Line Islands) can have high abundances of reef sharks, the northern GBR holds the greatest elasmobranch diversity of all sites sampled worldwide. This region generally sustains less fishing pressure and has until recently retained high coral cover. Sharks are present in all habitats and have been seen in most video sets collected from this region. Although it was not a planned objective of the Global FinPrint project, the video records collected from the northern GBR will provide invaluable baseline data on shark abundance that can be compared with future surveys once the full impact of the 2015–16 and 2016–17 mass coral bleaching events unfold. As apex predators, large sharks are expected to be among the species most affected by such fundamental shifts in the fabric of the reef.

Shark populations are assessed at baited remote underwater video stations.

Indigenous partnerships in marine science

AIMS scientists are partnering with multiple ranger groups to study sea country

Traditional Owners have thousands of years of unbroken connection with their local sea country. Through this history, they have acquired deep knowledge of seasonal and decadal changes as well as intimate knowledge of the local fauna and flora. The following two examples celebrate recent collaborations between AIMS scientists and Indigenous ranger groups to share experiences and knowledge sets when exploring coastal sea country in northern Western Australia. All participants agreed that these were positive and beneficial partnerships.

Bardi-Jawi country, established by a native title declaration, covers the tip of the Dampier Peninsula, about 160 km north of Broome. The native title holders have developed the Bardi-Jawi Indigenous Protected Area (IPA) Management Plan (2013–2023), which includes all areas of unalienated sea country bordering their land. AIMS scientists have worked with the Bardi-Jawi marine rangers since 2013 to align their research questions with the goals outlined in the IPA so that the information collected on ecosystem processes and environmental health helps the rangers make evidence-based management decisions.

Traditional Owners and AIMS scientists map intertidal habitats in Bardi-Jawi Sea Country.

The two partners are currently delivering a WAMSI research project into fish and coral recruitment processes. Both acknowledge that these processes are critical to marine ecosystem health because they underpin the replenishment of key resources in the region.

Because the macro-tidal environment of the Kimberley lies outside the usual experience of AIMS scientists, traditional knowledge of the area was key to locating key habitats and finalising the design of surveys. Rangers share the fieldwork, collecting settlement tiles for coral recruitment monthly, and work with AIMS scientists in the field to collect juvenile fishes and make underwater video surveys.

To the north of King Sound, the Wunambal Gaambera people have native title to 2.5 million hectares of land and sea representing much of the northern Kimberley coastline. Aspirations for their land are set out in the Wunambal Gaambera Healthy Country Plan (2010–2020) but as expected from saltwater people they have a well-developed plan (the Uunguu Indigenous Protected Area: Wundaagu (Saltwater) Indicative Plan of Management) to cover the adjacent sea country.

In 2016–17, AIMS scientists conducted joint surveys of nearshore marine habitats in this sea country from the *RV Solander* as part of the WAMSI Benthic Habitat Project. The science party included six Uunguu rangers. The *RV Solander* travelled from Darwin to Broome stopping at key locations for the Wunambal Gaambera people, including the Eclipse Islands, Vansittart Bay, Cape Bougainville, Long Reef, Cape Voltaire and Bigge Island.

Surveys with drop-down cameras were made in many shallow sites to identify areas with high abundance of coral and seagrass. Despite the turbid conditions typical of this macro-tidal region, the surveys revealed coral communities in some places that were as rich as anywhere on the offshore Rowley Shoals and Ningaloo Reef to the south. The surveys supplemented previous studies and filled in critical knowledge gaps. They helped build a more complete picture of regional coral communities, showing that they are rich and diverse in some places but patchy with low to moderate abundance in others. The Uunguu rangers returned after the voyage with new knowledge about the status of one of their nearshore resources and able to conduct similar surveys to their own design in the future.

Uunguu rangers collaborated with AIMS scientists to survey sea country with RV Solander.

The Bardi-Jawi IPA and Uunguu Wundaagu IPA can be found on the North West Atlas (http://northwestatlas.org/node/1707) together with much more information about Indigenous management and governance of Australian coastal waters.

Visualisation tools provide a public interface with complex models

The eReefs visualisation portal allows users to browse 12 terabytes of maps in seconds

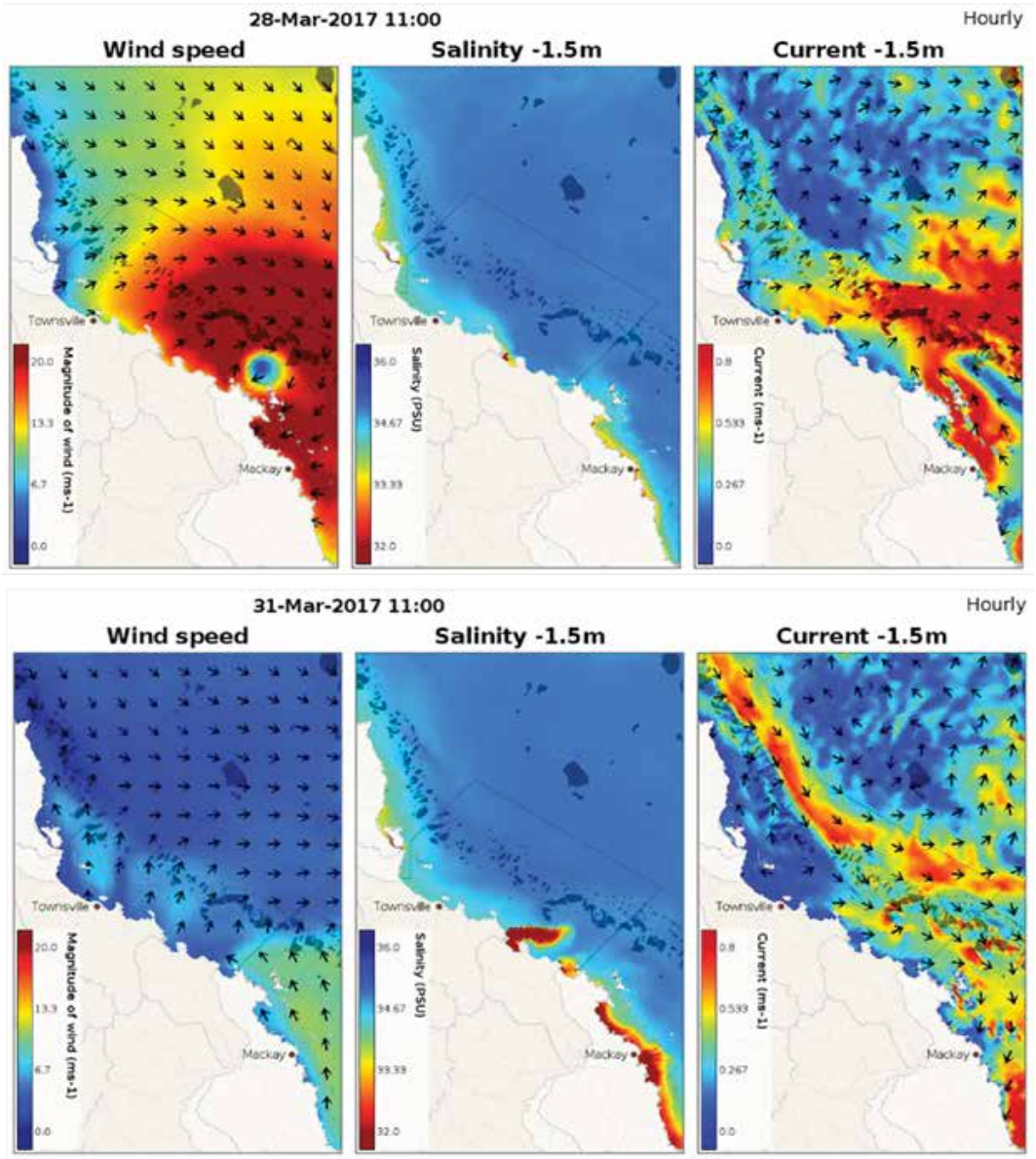
The GBR Marine Park covers a large area of almost 350,000 square kilometres that includes unique biodiversity values and complex ecosystem processes. This vast system changes with seasonal rhythms that also vary among years in response to large-scale ocean oscillations in the Pacific Ocean, including the El Niño–La Niña cycle, which affect ocean temperature, rainfall and cyclone frequency on the North Queensland coast. The only way to capture the almost mind-numbing complexity of this vast and dynamic ensemble is to model its current state in near real time based on best-available mapping of the driving forces and scientific understanding of the ensuing ecosystem processes. In the last five years, access to national supercomputers has allowed this grand vision to be realised through an emerging suite of models for the GBR known collectively as eReefs.

eReefs is a collaboration between CSIRO, AIMS and the Bureau of Meteorology, with financial support from the Great Barrier Reef Foundation, the Queensland Government and industry (BHP Billiton Mitsubishi Alliance). The models are designed to emulate and predict key features of GBR ecosystems in a manner similar to weather forecasting. As of 2016–17, eReefs can provide accurate and reliable predictions of water circulation and water quality throughout the GBR Marine Park. Based on this validated performance, eReefs will be used from 2017 to forecast water quality improvements arising from the implementation of the Reef 2050 Water Quality Improvement Plan, a joint program of the Australian and Queensland governments intended to ensure no detrimental impact of land-based pollution on the World Heritage values of the GBR.

An inevitable consequence of the detailed nature of the eReefs models is that they generate vast amounts of data. The combination of multiple physical, chemical and biological variables modelled everywhere in a very large domain at multiple depths in hourly time steps has produced over 50 million potential maps to date, and this data archive expands every day because the model has been running in this manner, forced by real weather patterns, since 2011. Potential users of this data mountain include natural resource managers, scientists and members of the public. All users have different needs, such that it would be impossibly inefficient to rerun the full model for each tailored enquiry.

To solve this problem of big data, AIMS has developed the eReefs Visualisation Portal (http://aims.ereefs.org.au). This site allows first-time and casual users to browse quickly through the full historical outputs of eReefs via a series of pre-rendered video animations and maps. From global to regional scales, major output variables can be displayed at hourly scale or aggregated to monthly or annual results.

As an example, the selected snapshots below show the band of destructive winds and strong offshore currents predicted as severe TC Debbie approached the Whitsunday Islands in March 2017 (upper panel). This was followed 36 hours later by light winds across much of the region, strong plumes of freshwater from rivers south of Townsville after the cyclone had collapsed into a rain depression, and strong southerly currents along the deep ocean boundary between Cairns and Townsville as the waters in the Coral Sea resumed their normal travel. The full evolution of this event can be observed in a video for the whole month of March accessible from http://aims.ereefs.org.au/aims-ereefs/temp-wind-salt-current#year=2017;month=3;region=burdekin



Computer simulations of wind speed, discharge of freshwater from rivers into the coastal sea, and ocean surface currents, as severe TC Debbie passed over the Whitsunday Islands (upper panel) and three days later (lower panel).

Additional tools to deal with oil spills

Inorganic sorbents offer potentially non-toxic protection of intertidal habitats and species

When oil spills occur at sea, the classic response is to diffuse and sink surface slicks with chemical dispersants that can be sprayed from ships or aerial platforms. However, this solution is not appropriate in some areas, such as shallow and enclosed coastal waters, where the priority is to recover the released oil. Intertidal habitats are especially challenging as broad swathes of habitat can be oiled during tidal changes, and there are no non-destructive methods available for recovering oil from fouled plants like mangroves and seagrasses. In 2016–17, AIMS scientists were commissioned by the Australian Maritime Safety Authority to test the potential for a new commercial product to provide barrier protection and facilitate recovery of spilled oil from intertidal communities.

The novel approach aims to apply loose buoyant inorganic sorbents (essentially floating sand) either before or after oil arrives in the intertidal zone. The effectiveness of this approach was tested in the SeaSim in large tanks designed to expose various plants and corals to natural tidal cycles and wave action. Several different trials simulated different intervention scenarios.

The small floating particles are effective at mopping up oil floating on the water surface. The resulting mixture can be harvested mechanically, and the sorbents reused after suitable washing. The particles also form an effective physical barrier when applied floating over or directly upon the intertidal receptors. Thus, early intervention in this mode could potentially prevent much of the oil from reaching vulnerable targets in the first place. There were some indications that the floating sorbent–oil mixtures were not as sticky as oil alone; thus providing at least partial protection without recovery. Finally, the sorbents were applied in excess to pre-oiled surfaces simulating a late-stage intervention. The resulting sticky paste required little wave energy to detach from non-living surfaces like sand and rubble but was more persistent on leaves and roots. Nonetheless, over a week of continual wave and tidal action a substantial fraction of the deposited oil was released. The degree of success of these experiments justifies further research into the ultimate fate and potential toxicity of the sorbent–oil mixture if left in the marine environment. This work is ongoing.

A large experimental tank with tide and wave action used in barrier experiments showing various receptors of oil (foreground), floating sorbents (olive) and the simulated oil spill (black at the rear of the tank).

How to restore coral reefs?

An international workshop recommends science to restore and protect coral cover on damaged reefs

While the Paris Agreement provides a strong framework for global efforts to reduce emissions and limit average temperature increase to less than 2°C, there is substantial inertia in the world's climate system, which means that global oceans will continue to warm and become less alkaline for many decades. For coral reefs, this means a greater risk of mass coral bleaching resulting in the loss of habitat and resources for many thousands of dependent species. In this future, conventional reef management approaches are likely to be inadequate to protect diverse coral reefs and the livelihoods and industries that depend on them. New and potentially radical interventions may now be needed to augment existing management and policy tools. The challenge ahead is to identify and develop safe, effective and socially acceptable interventions that can be implemented at ecosystem scale to maintain and potentially rebuild coral cover on severely damaged reefs.

In March 2017, AIMS convened an international workshop to develop targets for coral-reef recovery and restoration. The workshop brought together a multidisciplinary group of 25 prominent researchers in the fields of reef biology, terrestrial restoration ecology, reef restoration techniques, molecular biology, modelling, decision science, biosecurity, tourism, economics, natural resource management and policy. The workshop proceedings were published in the journal Nature Ecology & Evolution under the title "New interventions are needed to save coral reefs".

The article addresses two key questions. If global warming could be limited to 1.5°C, the aspirational target included in the Paris Agreement, will current management approaches be enough to protect coral reefs? If not, what new interventions could be added to the reef managers' toolbox? The article makes a strong case for immediate investment in new science to explore and improve emerging technologies from ways to enhance natural replenishment and promote gene flow among naturally occurring varieties, through to selective breeding and genetic engineering for assisted evolution of more resilient corals. As the warming of the oceans continues, it is more than prudent to have answers ready for a time when reef managers and citizens ask what more we can do to save coral reefs and the livelihoods that depend on them.

Can we rebuild reefs that look like this if they are lost? Image: Christopher Brunner

PERFORMANCE STATEMENT

Australian Government | Australian Institute of Marine Science | TOWNSVILLE | DARWIN | PERTH

STATEMENT OF PREPARATION

I, as the accountable authority of the Australian Institute of Marine Science, present the 2016–17 annual performance statements of the Australian Institute of Marine Science, as required under paragraph 39(1)(a) of the *Public Governance, Performance and Accountability Act 2013* (PGPA Act) and other applicable legislation. In my opinion, these annual performance statements are based on properly maintained records, accurately reflect the performance of the entity, and comply with subsection 39(2) of the PGPA Act.

Council endorsed the content of the performance statements by a resolution on [20 September 2017.]

The Honourable Penelope Wensley AC
Chairman
Australian Institute of Marine Science

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www.aims.gov.au

ENTITY PURPOSE

AIMS was established by the Australian Government in 1972 to carry out research and development relating to, and to promote the application and use of, marine science and marine technology. The functions and powers of the Institute are fully described in Appendix 3 Legislative foundation and ministerial powers on page 163. AIMS' mission statement provides a contemporary overview of the Institute's research focus:

AIMS' mission:

To provide the research and knowledge of Australia's tropical marine estate required to support growth in its use, effective environmental management and protection of its unique ecosystems.

INTENDED OUTCOMES

The Institute's annual Portfolio Budget Statement (PBS) provides the Commonwealth Parliament with information on how AIMS will use its allocated resources to achieve government outcomes over the current budget and forward years.

The 2016–17 PBS describes AIMS as contributing to Outcome 1: Growth of knowledge to support protection and sustainable development of Australia's marine resources through innovative marine science and technology. AIMS' activities contribute to the achievement of Outcome 1 through Program 1.1: Marine Research.

Through engagement with stakeholders across government and industry, AIMS has developed a comprehensive research program that continues to produce excellent science while ensuring that its multidisciplinary science capability, infrastructure and research investment remain focused on, and address, national needs and aspirations.

AIMS' 2016–17 PBS and Corporate Plan 2015–19 identified three specific focus areas:

1. A healthy and resilient Great Barrier Reef
2. Sustainable coastal ecosystems and industries across northern Australia
3. Environmentally sustainable offshore oil and gas development.

In 2015–16, AIMS established a series of five-year research goals addressing key issues associated with these focus areas. The goals targeted for delivery by 2020 are still valid and are mapped against the current Australian Government's national Science and Research Priorities.

AIMS' Corporate Plan 2016–17 identified the specific objectives and associated performance measures intended to deliver on year two of the five-year Corporate Plan 2015–19. An overview of organisational performance against those measures is provided in Table 1 (page 34). Table 2 (page 38) provides a summary of performance against the specific research and development activities undertaken during 2016–17.

RESULTS AND COMMENTARY ON PERFORMANCE

AIMS achieved all high-priority research outcomes detailed in the AIMS Corporate Plan 2015–16. This was an excellent outcome, particularly given the global commodity price downturn and associated impact on revenue earnings.

At the commencement of each annual reporting cycle, only a proportion of external revenue (40–60%) is contracted. This creates two risks that AIMS manages within the cycle:

- Annual external revenue earnings, and hence the capability AIMS can retain and the associated research outputs it should target, is subject to forecasting error. Note that the market sectors in which AIMS operates are typified by short-term bespoke research projects; there are no routine or regulated external revenue sources.
- Customers contract AIMS to undertake specific research projects (that is, the research scope is contractually linked to the funding). While AIMS undertakes extensive stakeholder consultations when setting plans, it is still not feasible to predict exactly what areas of research will be externally funded.

In response, AIMS operates an adaptive research planning process that continually reviews and adjusts research programs so that the highest-priority research is completed. It achieves this by adjusting the research it funds with its government funding appropriation to 'fill around' that funded externally.

In 2016–17 external revenue was lower than budgeted due to factors including market downturns (across several industry sectors), delays and increased competition in government funding programs, and pressure to increase the percentage AIMS is funding within co-investment projects. These pressures are expected to continue into 2017–18.

Tables 1 and 2 provide an assessment of outcomes against the specific objectives detailed in the AIMS Corporate Plan 2016–17.

Table 1: Overall performance summary

Aspect and objective	Performance criterion	Achievement and commentary	Achievement references
Research planning *To establish research goals and objectives that meet high-priority stakeholder needs.*	Assessment of AIMS research activities that directly align and contribute to national science and research priorities Mapping of research against stakeholder needs Assessment of research milestone completion against planned targets	The Institute's strategic research objectives and goals are defined in the AIMS Strategic Plan 2015–25. The five-year research goals identified in the plan cascade down into annual plans. These goals and plans are both aligned to national science and research priorities and the needs of AIMS' key stakeholders. AIMS uses a centralised project database and a rigorous internal review and approval system to ensure that projects deliver high-quality research outputs to stakeholders and end users on time. During 2016–17 AIMS achieved its milestone delivery targets.	• AIMS Strategic Plan 2015–25 • Stakeholder engagement (page 71) • Science quality assurance (page 69)
Research delivery *To establish and deliver high-quality research outcomes designed to achieve research goals and meet stakeholder needs.*	Assessment of AIMS research activities that directly align and contribute to national science and research priorities Mapping of research against stakeholder needs Assessment of research milestone completion against planned targets	All of the research completed was aligned to AIMS Strategic Plan 2015–25. This plan is aligned to national science and research priorities and the needs of AIMS' key stakeholders. During 2016–17, AIMS completed all high-priority research tasks and achieved its milestone delivery targets.	• AIMS Strategic Plan 2015–25 • Stakeholder engagement (page 71) • Science quality assurance (page 69) • Table 2 Summary of AIMS performance against 2016–17 research goals (page 38)

Aspect and objective	Performance criterion	Achievement and commentary	Achievement references
Research communication and extension *To ensure that AIMS research is communicated and provided to stakeholders in a range of manners such that they derive maximum possible value from the public investment in AIMS.*	Stakeholder satisfaction measured via surveys Number of peer-reviewed scientific publications and client reports Participation in panels and advisory committees Number of jointly supervised Doctor of Philosophy (PhD) students and postdoctoral fellows	AIMS periodically conducts surveys to evaluate stakeholder satisfaction and uptake of AIMS research outputs. AIMS was not due to conduct a survey during 2016–17, however, the results of the last survey conducted in 2015–16 indicated that AIMS was a highly valued research provider well positioned to deliver stakeholder knowledge needs. AIMS works to maintain its position as a trusted advisor through co-design of research and close consultation with stakeholders. AIMS communicated its research findings via a wide range of mechanisms. These included peer-reviewed publications, reports, panels and advisory committees, presentations, conferences, websites, articles in news media and social media posts. During 2016 calendar year, AIMS established a new annual publications record. AIMS continues to foster research capability through the establishment of formal collaborative programs, joint supervision of PhD students and support to postdoctoral fellows.	• Publications (page 48) • Appendix 1 Science Publications (page 134) • Expert advice (page 56) • Appendix 2 External committees (page 159) • Fostering research capability (page 63)
Research excellence *To ensure that AIMS undertakes quality, independently reviewed research that stakeholders can rely on.*	Global rankings based on publications in relevant scientific fields Stakeholder surveys Mapping of completed research against stakeholder needs	AIMS maintained its scientific excellence as measured by its global rankings. AIMS continued to deliver high-quality research aligned to national science and research priorities and the needs of AIMS' key stakeholders.	• Publications (page 48) • AIMS Strategic Plan 2015–25 • Table 8: Stakeholders benefiting from AIMS activities in 2016–17 (page 71)

Aspect and objective	Performance criterion	Achievement and commentary	Achievement references
Health, safety and environment (HSE) performance *To provide a workplace where HSE risks are managed to be as low as reasonably practicable.*	Lost time and total injury frequency rates Completion of system audits Training and compliance rates	AIMS continued to provide a healthy and safe workplace and to proactively manage its health, safety and environmental risks. An increased focus on hazard reporting resulted in a threefold increase in reporting compared to 2014–15. No high potential or notifiable incidents occurred. AIMS' outstanding HSE performance is recognised by industry partners, particularly those involved in offshore oil and gas development, and is a key enabler of AIMS' ongoing ability to establish research partnerships. AIMS laboratory and field-based research (often in remote locations) have high inherent risk, and over time AIMS has developed a comprehensive safety management system to manage these risks.	• Health and safety (page 95) • System audits and inspections (page 98) • Incidents and hazards (page 98) • Environmental performance (page 98)

Aspect and objective	Performance criterion	Achievement and commentary	Achievement references
Operational performance *To provide the most cost effective and efficient research capability required to deliver our research goals.*	Research vessel and National Sea Simulator (SeaSim) availability and use Number of joint ventures and strategic alliances Percentage of collaborative research projects Retention of staff and infrastructure capabilities Delivery of planned training and development programs	AIMS operates an extensive research infrastructure portfolio that complements its human resource capability. This includes research laboratories, the internationally significant SeaSim, coastal class research vessels and a large portfolio of field monitoring infrastructure. All infrastructure performance metrics were excellent, with benchmark levels of reliability, availability and functional performance achieved. This performance continues to be recognised by collaborative research partners, with 50% of all vessel trips and 80% of SeaSim experiments involving national or international collaborating partners. AIMS continued to extend its research capability and regional impact with institutional collaborations, partnerships and memorandums of understanding with over 50 companies, institutions and government stakeholders.	• Research infrastructure (page 74) • Marine operations (page 75) • Partnerships (page 57) • Research collaboration (page 67) • Fostering research capability (page 63) • Staff (page 91)
Financial performance *Financially sustainable performance where opportunities and risk are appropriately managed.*	Achieving operational revenue earnings Delivering outputs within budgeted expenses Achieving capital investment plans	Approximately 32% of AIMS' operating expenditure (excluding depreciation) was funded through external revenue sources during 2015–16. However, while external revenue was lower than targeted, AIMS was able to retain core capabilities and deliver on key research programs while achieving a balanced cash budget outcome.	• Revenue (page 77) • Financial statements (page 101)

Table legend	All expectations met	Most expectations met	Did not meet expectations

Table 2: Summary of AIMS' performance against 2016–17 research goals

Deliverable identified in the Corporate Plan 2015–19	Achievement and commentary	Examples of achievement
Work with Commonwealth and State agencies, as well as other research organisations, to coordinate and design a fully integrated monitoring program for the GBR that incorporates AIMS' inshore and shelf reef monitoring data, provides situation awareness of the condition of the GBR, and informs both the GBR Outlook Report and implementation of the Reef 2050 Long-Term Sustainability Plan	AIMS continues to work closely with Australian and Queensland government agencies, research organisations and stakeholders to design and develop the Reef 2050 Integrated Monitoring and Reporting Program (RIMReP), which is a major initiative of the Reef 2050 Long-Term Sustainability Plan (Reef 2050 Plan). Phase 1 of the design of RIMReP was completed during 2016–17, and the desktop analyses to be delivered in Phase 2 commenced. The delivery of final recommendations is due in 2017–18.	• AIMS involvement in the implementation of the Reef 2050 Long-term Sustainability Plan (page 53)
Collaborate with industry and research partners to build baseline knowledge of the biodiversity and ecology of Australia's north-west region to facilitate management of Commonwealth marine reserves, develop predictive habitat models and understand natural and anthropogenic drivers of change	With support from the National Environmental Science Programme (NESP) and the oil and gas industry, AIMS continues to partner with industry and research collaborators to build greater understanding of the biodiversity of Australia's north-west shelf region, and the impacts of natural and anthropogenic pressures. The outcomes of this research have been made available to government, industry and the general public through a variety of mechanisms including the industry-funded North West Atlas.	• Exceptional fish diversity found on Australia's north-west oceanic shoals (page 22)
Investigate and develop potential mechanisms for assessing and controlling crown-of-thorns starfish (COTS) outbreaks	AIMS continued to work closely with key partners (Great Barrier Reef Marine Park Authority, University of Queensland, Association of Marine Park Tourism Operators and James Cook University) to inform GBRMPA's COTS response plan including undertaking further work in modelling the effectiveness of surveillance and cull options with GBRMPA and finalising a model estimating the payoff of COTS control options described in terms of expected coral cover. In addition, AIMS has been part of an international collaboration to map and publish the complete genomes of starfish collected from Australia and Japan to identify chemical signals that illicit attraction and repulsion responses in starfish, which may provide biocontrol solutions to this natural pest.	• Learning the language of crown-of-thorns starfish communication (page 15)

Deliverable identified in the Corporate Plan 2015–19	Achievement and commentary	Examples of achievement
Use the state-of-the-art capability provided by the SeaSim, in combination with targeted field studies, to investigate the individual and cumulative effects of global (elevated sea temperature, ocean acidification) and local (nutrients, sediments, light, pollutants) pressures on the health, thresholds, adaptive capacity and resilience of key components and processes of tropical marine ecosystems to enhance our capability to predict and manage impacts	AIMS is conducting a range of ambitious, multi-generational experiments within the SeaSim to investigate the capacity of corals, sponges, echinoderms, molluscs, seagrasses and other organisms to adapt or acclimatise to likely future temperature- and carbon dioxide-driven ocean acidification scenarios. In addition, the state-of-the-art capability of the SeaSim has been used to reduce uncertainty regarding the impacts of dredging on key organisms such as corals, seagrasses and sponges. The results of this work is having real-world impact, with findings informing the design and best-practice operations of multi-million dollar port expansion programs in Darwin and Port Hedland.	• Dredging science delivers for decision-makers (page 19)
Systematically investigate the potential for, and the mechanisms underpinning, acclimation and adaptation in key coral-reef taxa to develop potential tools for reef restoration and enhanced resilience	The GBR remains under pressure from a variety of sources, particularly climate change. Mass coral bleaching events caused by anomalously high sea temperatures have caused substantial losses of coral in the northern and central sections of the GBR in both 2016 and 2017, and it is widely held that climate-related disturbances will continue to affect the reef. AIMS is using the SeaSim to systematically investigate the potential mechanisms by which corals and other key reef taxa can acclimate or adapt to predicted future climate conditions. This research is aimed at developing a suite of tools that can be used to restore and enhance the resilience of the reef.	• How to restore coral reefs (page 29)
Systematically examine the impacts and thresholds of dredging-related pressures on key tropical marine organisms and critical ecological processes to establish water quality guidelines and better predict and manage impacts	Using funding from industry offsets made available through WAMSI and NESP, and in collaboration with industry and government, AIMS staff from Perth and Darwin have been leading the national effort to better understand the impacts of dredging and sediment disposal at sea. The results of this work have informed the design and best-practice operations of multi-million-dollar port expansion programs in Darwin and Port Hedland and are having real-world impact.	• Dredging science delivers for decision-makers (page 19)

Deliverable identified in the Corporate Plan 2015–19	Achievement and commentary	Examples of achievement
Build on the Institute's observation and modelling capabilities to link hydrodynamic processes with fundamental marine processes (e.g. primary production, respiration, calcification, nutrient cycling), and to investigate the influence of agricultural, urban and industrial development on Australia's coastal marine systems	AIMS has built on its unique observation and modelling capabilities to develop light and water quality metrics that describe the condition of coastal marine systems along the GBR coast. In addition, ocean models developed by AIMS have provided reliable guidance on the accumulation of heat stress within the Marine Park, which has proven efficient at predicting the extent and severity of coral bleaching. These models provide an early-warning system that identifies places most at risk of coral bleaching, and explains why some locations provide corals with natural refugia from thermal stress.	• Ocean modelling predicts coral bleaching and potentially safe spaces (page 13)
Develop and apply ecotoxicological methods to investigate the environmental risks and acute and chronic impacts of known and emerging contaminants entering the Great Barrier Reef and Australia's other tropical coastal marine ecosystems	Understanding of the chronic and acute effects of pollutants in tropical marine environments has been hampered by a lack of toxicity tests specifically for the species living in these environments. AIMS has developed a suite of ecotoxicological assays for a range of species from different animal groups and functional levels within the marine environment. In addition, AIMS has worked with government and industry partners to examine the prevalence and toxicity of a range of pollutants ranging from pesticides in the GBR to mercury and metals in estuaries and coastal waters of the Northern Territory. The outcomes of this work will inform guidelines for fresh and marine water quality.	• Additional tools to deal with oil spills (page 28)
Determine the status, movement and habitat use of key megafauna species, the influence exerted by coastal development and industry activities, and the implications for conservation and management	With funding from NESP, industry and philanthropic organisations, AIMS has investigated the influence exerted by coastal development and industry activities, including fishing, on the status, movement and habitat use of key megafauna species, particularly sharks, turtle hatchlings and sea snakes. The results of this research will inform efforts to manage and conserve these species.	• Global FinPrint assessing elasmobranches in two oceans (page 23) • Impacts of artificial light on turtle hatchlings (page 21)

Deliverable identified in the Corporate Plan 2015–19	Achievement and commentary	Examples of achievement
Draw on the outcomes of monitoring, field and experimental work to develop effective decision-support tools to assist management agencies to evaluate potential management options to maintain the health and resilience of tropical marine ecosystems	AIMS has applied its decision-support expertise to examining the feasibility of restoring ecosystems and maintaining their resilience aided by funding from NESP and philanthropic sources, and in partnership with relevant government agencies. The outcomes of these projects will identify locations that might provide refugia from natural and anthropogenic pressures and options for active restoration to secure conservation outcomes for matters of national environmental significance.	• Dredging science delivers for decision-makers (page 19)
Develop autonomous technologies to expand the type, geographic range and quality of marine observations	Advancing technologies are increasing the number of mechanisms available to observe the marine environment. To capitalise on this technological revolution, AIMS has developed a technology roadmap, and is partnering with industry and research organisation to enhance our capability to capture environmental data that informs management of Australia's marine ecosystems.	• Drone technology captures the spectral reef (page 17)
Develop automated data and image analysis pathways to enhance operational efficiencies	One of the greatest challenges of the technology revolution is the ability to process and analyse the vast quantity of data that is being collected. This is a particular challenge for AIMS which collects petabytes of image data from underwater surveys conducted throughout Australia's tropical marine estate annually. To meet this challenge and to reduce the costly overhead of manually processing thousands of images, AIMS is building on international efforts to automate the task of classifying biodiversity from benthic imagery. This work has the potential to reduce the post-processing overhead from 10:1 to 2:1, greatly increasing the efficiency with which huge amounts of data are processed.	• *Benthobox* provides automatic image analysis for smarter monitoring (page 18)

Deliverable identified in the Corporate Plan 2015–19	Achievement and commentary	Examples of achievement
Delivery of the 32nd year of the AIMS Long-term Monitoring Program, and lead development and implementation of a comprehensive design for a Reef Integrated Monitoring and Reporting Program to support the Reef 2050 Plan	AIMS has continued to deliver the long-term monitoring program and the Reef 2050 Plan Marine Monitoring Program. These programs have been instrumental in documenting the impacts of disturbances such as the 2016 and 2017 mass coral bleaching events, TC Debbie and the ongoing COTS outbreak. In addition, these programs provide government managers and stakeholders with the situational awareness of the status of the GBR to underpin operational decisions concerning the management of the World Heritage area.	• Long-term monitoring of the GBR provides essential context (page 9) • Two consecutive years of coral bleaching (page 12) • Severe Tropical Cyclone Debbie leaves its mark on the reef (page 10) • GBR no-take marine reserves protect more than just fish (page 14)
Service and maintenance of marine research infrastructure across northern Australia, continued provision of data streams in near real time to national and international partners, and incorporation of these data into oceanographic and ecosystem models	AIMS, in collaboration with the Integrated Marine Observing System (IMOS), has continued to maintaining a comprehensive environmental monitoring network on the GBR and across northern Australia (moorings, weather stations, sensor networks, temperature loggers, ocean gliders and underway sampling). The data collected from these networks are quality controlled and provided in near real time to national and international partners who use them for a variety of monitoring and modelling activities. For example, the AIMS-maintained marine infrastructure provided unparalleled capability to describe the oceanic conditions that lead to unprecedented mass coral bleaching on the GBR during 2016 and 2017.	• Ocean modelling predicts coral bleaching and potentially safe spaces (page 13)

Deliverable identified in the Corporate Plan 2015–19	Achievement and commentary	Examples of achievement
Development and enhancement of information management systems, visualisation and reporting tools for Australia's tropical marine systems that directly inform industry, government and the public	With support from the Australian Government and industry, AIMS has developed the eAtlas to preserve and present environmental research data and knowledge online to help researchers and managers better understand the marine environment. The eAtlas platform has been adopted by a number of initiatives and applied to a range of geographic locations around Australia, most notably by the oil and gas sector in north-west Australia, by the Torres Strait Regional Authority in Torres Strait, by Parks Australia to deliver information describing the network of Commonwealth Marine Reserves and by the NESP Tropical Water Quality Hub as the primary repository for all data generated by the Hub. In addition, the eAtlas is providing a platform to deliver automated visualisation and processing of eReefs data.	• Visualisation tools provide public interface with complex models (page 26)

Table legend	All expectations met	Most expectations met	Did not meet expectations

Statement of (Ministerial) Expectations

In 2015, then Minister for Industry and Science, the Hon Ian Macfarlane MP provided the AIMS Council with a statement of expectations, outlining the minister's expectations regarding the quality and focus of AIMS' research, its contribution to Australian Government priorities and initiatives, and AIMS' governance and communication responsibilities. The Chairman of the AIMS Council, the Hon Penelope Wensley AC, responded with the AIMS statement of intent (www.aims.gov.au/docs/about/corporate/corporate-profile-governance/statement-of-intent) identifying AIMS' commitment to the Australian Government's policy agenda and the strong connections between this and AIMS' Strategic Plan 2015–25.

In 2016–17, AIMS continued to achieve outcomes that directly support the minister's statement of expectations, as identified in Table 3.

Table 3: AIMS delivery against Minister's expectations

Minister's expectation	AIMS delivery against expectation
AIMS to actively engage in the specific actions and overall spirit of the Boosting Commercial Returns from Research agenda, ensuring the Commonwealth's $9.2 billion per year investment in research furthers the interests of the Australian community and maximises our commercial return	AIMS continues to take an active role in Australian Government science and research policy development and participates into initiatives such as the National Collaborative Research Infrastructure Strategy, and the 2016 National Research Infrastructure Roadmap
The government is finalising its first set of Science and Research Priorities (SRPs) developed by the Chief Scientist and considered by the Commonwealth Science Council (CSC), and I expect that AIMS to give consideration as to how it can best contribute to these research areas of national priority	AIMS' research program is aligned with three of the SRPs, most strongly with 'soil and water' and 'environmental changes', and to a lesser extent with the energy SRP
Consistent with its legislative functions, AIMS to contribute to the government's science, technology, engineering and mathematics (STEM) agenda to increase Australia's STEM performance	AIMS delivers on its commitment to support the growth of (marine science) STEM capabilities by co-supervising postgraduate students and providing postdoctoral employment opportunities
The government will respond to the Research Infrastructure Review. AIMS to provide input, through the Department of Industry, to this process of policy development including on matters such as depreciation, governance, access management, long-term planning and prioritisation and sources of funding	AIMS contributed to both the Research Infrastructure Review and the development of the related 2016 National Research Infrastructure Roadmap

AIMS to continue to deliver world-class research and development in relation to marine science and marine technology that underpins the sustainable long-term management of Australian marine environments, including the Great Barrier Reef, as well as associated impartial and accurate advice. In doing so, it should focus its scientific research on areas where it has or can establish a competitive edge, in terms of excellence and scale, and encourage the application and adoption of this research, especially where it can drive improvements in Australia's economic competitiveness	This is a core function of AIMS. A recent analysis of AIMS' citation impact in the field of marine and freshwater biology—our core area of expertise—using Thomson Reuters InCites research analytical tool, which queries more than 12,000 journals in the Web of Science, provides a strong endorsement of the approach taken at AIMS. Over the period 2011–2016, AIMS ranked first nationally and second internationally in this field
AIMS to support the Minister for Industry in his role as Deputy Chair to the Prime Minister of the CSC	AIMS continues to provide support to the membership of the CSC at all appropriate levels
AIMS to engage with the Chief Scientist of Australia, including when a member of the National Science, Technology and Research Committee	AIMS' CEO met with the Chief Scientist on a number of occasions, both personally and as a member of a consultative forum
In advancing the government's agenda, AIMS to collaborate with universities, other publicly funded research agencies and industry to achieve common objectives. In particular, AIMS should not rely entirely on its own resources but should also use national and international collaboration to increase the capacity and responsiveness of the nation's ability to translate marine science research into outcomes	Most of AIMS' research has involved collaborations with other parties (universities and other publicly funded research agencies)
AIMS to work in partnership with business to identify and develop the science to address industry problems and to underpin Australia's aim of increased competitiveness. The knowledge and ideas of its researchers can substantially improve the productivity of industry and businesses. AIMS and business should therefore work together to continue growth in the knowledge-based sectors. Further, AIMS to engage with those industries where AIMS' capability can help them to become globally competitive	AIMS continues to have an extensive research portfolio related to industry, particularly the Western Australian offshore oil and gas sector. AIMS also provides research-based support to other Australian industries, including ports, tourism and agriculture
AIMS should maximise use of its national scientific facilities and collections by Australian and international researchers, including by encouraging industry access to relevant facilities. In encouraging such access, AIMS has a role to play in communicating and educating business on the benefits such infrastructure can provide	AIMS' national research infrastructure, the SeaSim, and AIMS' research vessels continued to be used frequently by other researchers and industry as part of collaborative research projects

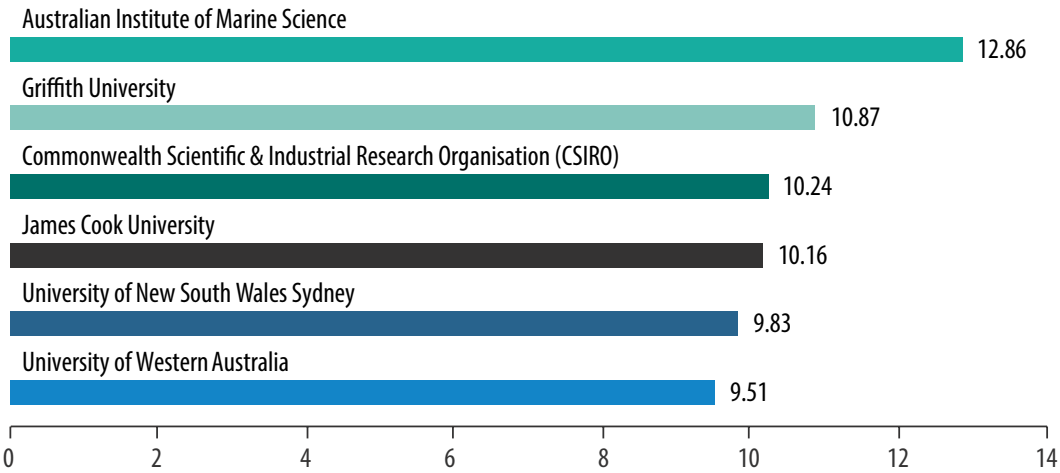
AIMS to raise community awareness of its activities and communicate its research and technical knowledge through the publication of peer-reviewed scientific papers and the provision of marine science and technology goods and services	AIMS continues to deliver its science to the broader community through a variety of communication mechanisms including through the AIMS website, and by publishing numerous high-quality scientific papers
Research publications produced by AIMS that arise from public funding should be openly available at no charge within 12 months of original publication, excepting where contractual arrangements preclude this or are at significant cost, noting that such arrangements are to be minimised. This could be done by making publications accessible via the agency web site; by depositing the output to an organisation, institution or discipline electronic archive that provides open access; by publishing in open-access journals; or by ensuring publications are available on a journal or publisher web site	AIMS publishes research papers in open-access journals and also advises its research on the AIMS' website, noting that copies of research papers can be obtained from the author. The outputs of research funded by specific government programs are made publicly available on the appropriate (government) website on completion
Consistent with its legislative functions, AIMS to invest in industry-relevant research training. AIMS to encourage engagement between researchers and business, including by facilitating mobility between AIMS and other research organisations and industry. AIMS to encourage its researchers to be entrepreneurial and support realisation of commercialisation outcomes for industry. AIMS to support risk taking, as part of a resilient strategic approach to solving the big problems facing Australia, within the context of maintaining good governance and learning from failure	AIMS recognises the need to build skills, expertise and partnerships to enhance innovation and secure positive economic outcomes. AIMS supports this expectation through training of postgraduate scientists in industry-supported fields of research, collaborating with other national and international research organisations, and partnering with major industry sectors to develop innovative solutions that yield beneficial economic and environmental outcomes.
AIMS to identify and take, where practicable, opportunities to support new companies to commercialise AIMS's discoveries and expertise	AIMS maintains a close eye on potential commercial development opportunities arising from AIMS' research. AIMS has a record of supporting companies in their efforts to realise commercial benefits of AIMS' discoveries and expertise. AIMS will continue such active engagement in the future.
AIMS to work closely with the Department of Industry and Science (the department). Aside from regular meetings between AIMS and the minister, regular meetings between the senior executives of AIMS and the department are to be held. AIMS to work with the department to promote the scientific work of AIMS	AIMS works closely with relevant Australian Government departments, and staffs a small office in Canberra for the purpose of maintaining a close, timely and relevant point of connection with government. Providing regular six-weekly briefs to Australian Government ministers responsible for science, identifying significant published and emerging AIMS research findings

AIMS to keep the minister and the department informed, in a timely and accurate way, of significant issues relating to the health and work of the organisation. AIMS to provide input and information to the department as required ensuring that advice to the minister's office and the government canvasses relevant issues and sensitivities and reflects a portfolio response. AIMS to provide copies of ministerial briefings and correspondence to the relevant areas of the minister's office and the department, in parallel. AIMS to provide prior notice, to the minister's office and the department, of significant announcements and events that are likely to attract media attention	AIMS continues to provide a range of timely and informative briefings to Australian Government ministers and departments on relevant marine science issues
In accordance with the *Public Governance, Performance and Accountability Act 2013* (PGPA Act), AIMS to develop an annual corporate plan and to provide that plan to the responsible portfolio minister, and the Minister for Finance. In developing the corporate plan, AIMS to consult with the minister and the department, and to take into account the priorities and policies of the government, especially as articulated in the statement of expectations	Consistent with the requirements of the PGPA Act, AIMS released its 2016-17 Corporate Plan in August 2016 and is scheduled to provide an update in August 2017
AIMS to provide Parliamentary Secretary Andrews and her office with the same level of communication, and timely, accurate advice and information, as to the minister and the department	AIMS official briefs provided to the Minister for Industry Innovation and Science are copied, where relevant, to other portfolio ministers. All AIMS briefs are lodged with, and available to the executive of the Department of Industry, Innovation and Science

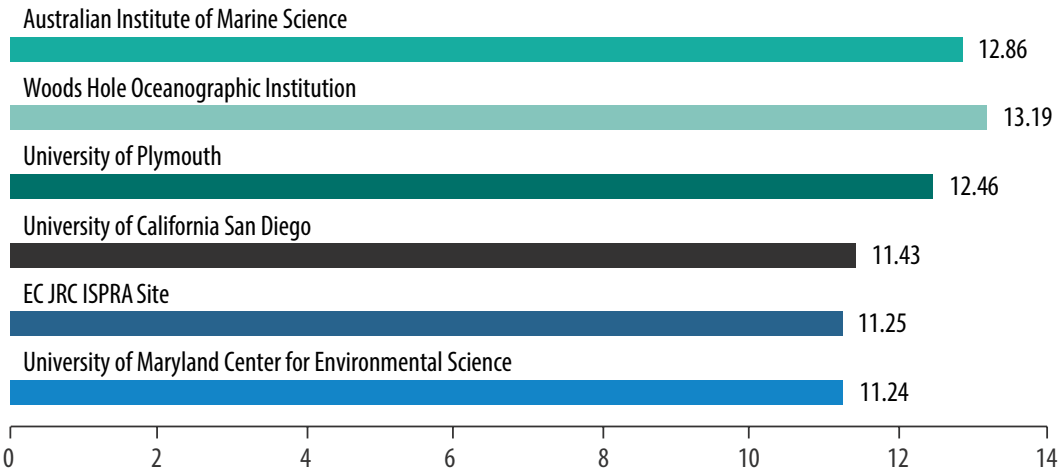
Publications

AIMS has a strong publication record within its fields of expertise, particularly climate change and ocean acidification, marine biodiversity, ecosystem processes, ecosystem status and trends, water quality and marine microbiology.

Recent benchmarking of AIMS' citation impact nationally and internationally demonstrated that in the field of marine and freshwater research, AIMS was the top-ranked research institution in Australia and second in the world over the period 2011 to 2016.[1]



Top nine organisations in Australia in the field of marine and freshwater biology ranked by citation impact between 2011 and 2016 (InCites 2017).



Top nine organisations globally in the field of marine and freshwater biology ranged by citation impact between 2011 and 2016 (InCites 2017).

1 *Benchmarking was conducted using Thomson Reuters InCites research analytical tool, which queries more than 12,000 journals comprising the Web of Science. The analysis assessed the citation impact of Australian and international research institutions that had published more than 200 peer reviewed publications in the field of marine and freshwater biology between 2011 and 2016. The citation impact of an institution is determined by the number of times all publications produced by the institution are cited in other publications divided by the total number of publications produced by the Institute.*

In addition, in 2012–2015, benchmarking analyses identified between 13 and 24 additional articles publishing research done at AIMS by former staff, postdoctoral fellows and students, indicating that AIMS' publication record is, in fact, better than previously reported.

AIMS' scientists produced 309 publications during calendar year 2016 (Figure 2).[2] The publications comprised 237 journal articles, 12 book chapters, 35 reports, and 19 PhD and six Master of Science (MSc) theses (Appendix 1 Science publications).

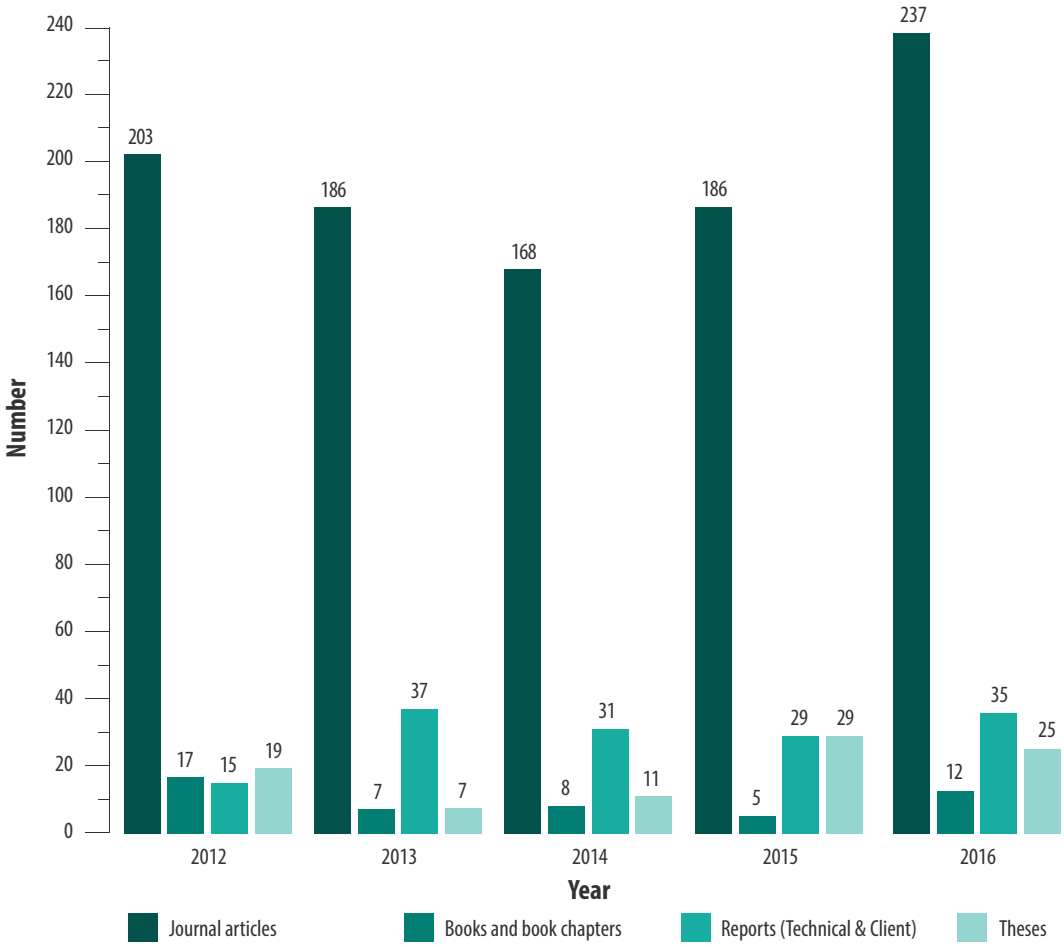


Figure 2: Number of AIMS publications by type (2012–16).

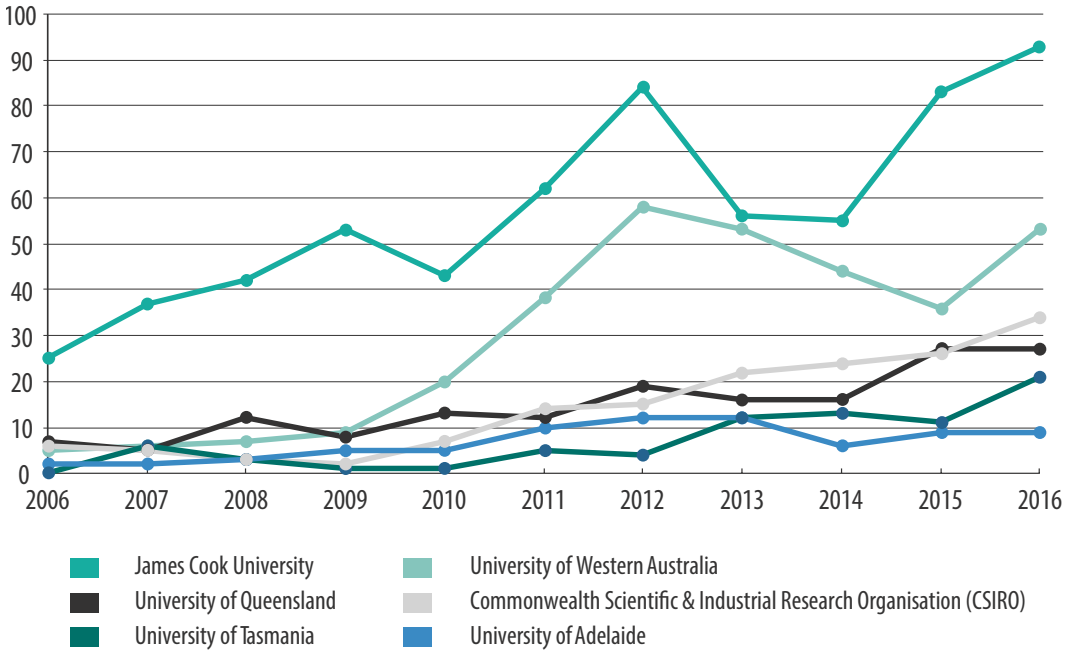
2 *The majority of AIMS publication information (including collaboration data) is based on information collected over the calendar, rather than financial, year.*

High-profile articles published by AIMS scientists (underlined) in some of the world's most prestigious multidisciplinary journals included:

- Kroon FJ, Thorburn P, Schaffelke B, Whitten S (2016) Towards protecting the Great Barrier Reef from land-based pollution. Global Change Biology 22(6): 1985–2002
- Mellin C, MacNeil MA, Cheal AJ, Emslie MJ, Caley MJ (2016) Marine protected areas increase resilience among coral-reef communities. Ecology Letters 19(6): 629–637
- Bourne DG, Morrow KM, Webster NS (2016) Insights into the coral microbiome: underpinning the health and resilience of reef ecosystems. Annual Review of Microbiology 70: 317–340
- Smith JN, De'ath G, Richter C, Cornils A, Hall-Spencer JM, Fabricius KE (2016) Ocean acidification reduces demersal zooplankton that reside in tropical coral reefs. Nature Climate Change 6: 112–1129
- Wernberg T, Bennett S, Babcock R, de Bettignies T, Cure K, Depczynski M, Dufois F, Fromont J, Fulton CJ, Hovey RK, Harvey ES, Holmes TH, Kendrick GA, Radford B, Santana-Garcon J, Saunders BJ, Smale DA, Thomsen MS, Tuckett CA, Tuya F, Vanderklift MA, Wilson S (2016) Climate-driven regime shift of a temperate marine ecosystem. Science 353(6295): 169–172
- Cinner JE, Huchery C, MacNeil MA, Graham NA, McClanahan TR, Maina J, Maire E, Kittinger JN, Hicks CC, Mora C, Allison EH, D'Agata S, Hoey A, Feary DA, Crowder L, Williams ID, Kulbicki M, Vigliola L, Wantiez L, Edgar G, Stuart-Smith RD, Sandin SA, Green AL, Hardt MJ, Beger M, Friedlander A, Campbell SJ, Holmes KE, Wilson SK, Brokovich E, Brooks AJ, Cruz-Motta JJ, Booth DJ, Chabanet P, Gough C, Tupper M, Ferse SC, Sumaila UR, Mouillot D (2016) Bright spots among the world's coral reefs. Nature 535(7612): 416–419
- Lough JL (2016) Coral reefs: turning back time. Nature 531: 314–315

The paper "Towards protecting the Great Barrier Reef from land-based pollution" by Frederieke Kroon (AIMS), Peter Thorburn (CSIRO), Britta Schaffelke (AIMS) and Stuart Whitten (CSIRO) published in Global Change Biology (22(6): 1985–2002) was one of the 15 most downloaded papers in 2016.

In addition, the number of chapter downloads from the book *Coral Bleaching. Patterns, Processes Causes and Consequences* (van Oppen & Lough, 2009) has almost doubled between 2015 and 2016, reaching a total of 27,000 (SpringerLink). Drs van Oppen and Lough are currently working on an updated 2nd edition due for publication in 2018.



Trends in collaborative publications (all research) illustrating the top six research institutions, 2006–2016 (InCites 2017).

Collaborative research accounts for a high proportion of our scientific publications: of the 237 journal articles published by AIMS scientists, 50% included co-authors from other Australian research organisations and 42% involved international colleagues. Only 20 articles (8%) were authored solely by AIMS staff (Figure 7, page 68).

Leadership

AIMS plays a number of important science leadership roles, including setting research agendas through strategic workshops on key issues, giving keynote talks at international symposiums and contributing to issues of national importance through input to government committees and policy projects. Here we outline several of the key leadership roles that AIMS has played during the year.

Contributing to issues of national importance

National Coral Bleaching Taskforce

The National Coral Bleaching Taskforce was formed to coordinate research and monitoring efforts among Australia's marine science community in response to the mass coral bleaching event in Australia, the most severe on record. The taskforce is an unofficial body that brought together researchers from ten research institutions across Australia to coordinate surveys and data collection during the bleaching event and to facilitate collaboration on the data analyses that will continue well into 2017 and later. The taskforce was initiated by the Australian Research Council (ARC) Centre of Excellence for Coral Reef Studies (based at James Cook University, JCU) and included AIMS, the Great Barrier Reef Marine Park Authority (GBRMPA), the US National Oceanic and Atmospheric Administration, CSIRO, University of Queensland (UQ), University of Sydney, University of Western Australia (UWA) and the Western Australian Department of Parks and Wildlife.

National Research Infrastructure Roadmap

AIMS' CEO was invited to be a member of the National Research Infrastructure Roadmap Capability Experts Panel. The 2016 National Research Infrastructure Roadmap (the 2016 Roadmap) identifies priority research infrastructure for the coming decade in nine areas that will underpin research in which Australia can and must excel to deliver long-term national benefit and foster strategic international partnerships.

The 2016 Roadmap identifies nine focus areas for infrastructure investment:

- digital data and eresearch platforms
- platforms for humanities, arts and social sciences
- characterisation (techniques for understanding the properties of materials)
- advanced fabrication and manufacturing
- advanced physics and astronomy
- earth and environmental systems
- biosecurity
- complex biology
- therapeutic development.

The 2016 Roadmap was released by the Minister for Education and Training, Senator Simon Birmingham, and the Minister for Industry, Innovation and Science, Senator Arthur Sinodinos, who congratulated Australia's Chief Scientist, Dr Alan Finkel, and the expert working group on a thorough analysis of Australia's research infrastructure priorities.

"The Roadmap provides comprehensive advice and highlights the success of Australia's current research infrastructure system in supporting research excellence," Minister Sinodinos said.

National Marine Science Committee

The National Marine Science Committee (NMSC), which is comprised of 29 representatives of research institutions, universities, industries and government departments with a stake in marine science (including the Department of Industry, Innovation and Science, Geoscience Australia and CSIRO), is responsible for implementing Australia's National Marine Science Plan 2015–2025 which was released in August 2015. The plan addresses the national marine science challenges identified in the Marine Nation 2025 position paper. It works hand-in-hand with the national strategic Science and Research Priorities set by the Commonwealth Science Council, and with a number of other national and international efforts to prioritise ocean, earth system and climate science. The plan highlights areas where national collaborations can strengthen both science and end-user communities, and recommends investment in national research infrastructure and high-priority science programs to maximise the marine sector's contribution to the growth of Australia's $74 billion blue economy.

AIMS provided strong leadership during the development of the National Marine Science Plan 2015–2025 and continues to make significant contributions to the NMSC and its subsidiary working groups that have been established to help implement the plan.

Reef 2050 Long-Term Sustainability Plan

The Reef 2050 Plan aims to maintain and enhance the health and resilience of the GBR while allowing ecologically sustainable development. Specifically, the plan aims to ensure that the outstanding universal values of the GBR continue to improve each decade between now and 2050, which will guarantee that the GBR remains a natural wonder for successive generations. The plan sets out concrete objectives, outcomes, targets and actions. It was developed in close collaboration with a partnership involving government, key industry organisations, Traditional Owners, environment groups, researchers and the community.

AIMS continued to provide strong leadership in the implementation of the Reef 2050 Plan through the direct involvement of:

- John Gunn, member of the GBR Advisory Committee that oversees the implementation of the Reef 2050 Plan, and a member of the Reef 2050 Integrated Monitoring and Reporting Program (RIMReP) Steering Committee
- Dr David Souter, Co-Chair of the Program Design Working Group responsible for overseeing the design of the RIMReP
- Dr Britta Schaffelke, member of both the Commonwealth and state independent expert panels and the RIMReP Reporting and Synthesis Working Group
- Dr Eric Lawrey, member of the RIMReP Data Management and Integration Working Group.

Indigenous partnerships in marine science

AIMS has established a number of Indigenous partnerships with Traditional Owners in northern Australia.

Within the WAMSI Kimberley Marine Research Program, AIMS has worked with the Bardi-Jawi rangers and the Bardi and Jawi Traditional Owners to investigate fish and coral connectivity and recruitment processes. Close consultation occurred between AIMS and Traditional Owners through all stages of the projects, to ensure that the research focused on fish species and marine sites of greatest relevance to Traditional Owners using methods that could be applied by all parties. The results of these projects will help the Bardi-Jawi rangers manage their marine assets and contribute to achieving the goals outlined in the Bardi-Jawi Indigenous Protected Area Management Plan 2013–2023. These collaborations will form the basis for future engagement between AIMS and Traditional Owners within the region.

Further north, AIMS has led a program of research with WAMSI partners to explore seabed biodiversity along the nearshore Kimberley coast. AIMS collaborated with Indigenous sea rangers and Wunambal Gaambera and Dambimangari Traditional Owners of the sea country. The project involved direct participation by rangers and Traditional Owners aboard the *RV Solander* in March–May 2017 between Camden Sound and Cape Bougainville, including the application of seabed habitat sampling methods. There is a strong interest among the ranger groups to develop greater capacity in marine research and monitoring techniques to inform management of the natural and cultural values of their sea country.

AIMS is also working closely with the land and sea rangers of the Anindilyakwa Land Council on Groote Eylandt to implement 'Mapping Mukata', a project to map the habitats and fish biodiversity within their Indigenous protected area. The project combines traditional knowledge with the latest methods in hydroacoustic multibeam and satellite remote sensing, to promote 'two-way' learning and ultimately to enhance management and monitoring of sea country.

Contributing to issues of international importance

Global FinPrint

The Global FinPrint project is an ambitious venture funded by philanthropist Paul G. Allen that will consolidate existing and the newly collected data obtained using baited remote underwater video stations (BRUVS) into a single analysis to produce the first globally standard survey of shark diversity and abundance over the world's continental and insular shelves, with a key focus on coral reefs. BRUVS are a non-intrusive method of obtaining information on shark and reef-fish communities. This large-scale effort will fill important knowledge gaps and will have a significant impact on reef elasmobranch conservation efforts.

The Global FinPrint project brings together experts from around the world, including researchers from Florida International University, JCU, Curtin University and AIMS. To date, more than 216 coral reefs have been sampled a year and a half ahead of schedule through the assistance of collaborating scientists, non-governmental organisations and volunteers. It is hoped that global analyses will provide new insights identifying which socioeconomic, management and environmental features create conditions that are conducive to healthy shark and ray populations, and highlighting how reefs can be restored on a global scale.

AIMS is responsible for surveying sites at:

- Indian Ocean: Sri Lanka, Seychelles, Maldives, Mozambique, Scott Reef/Rowley Shoals, South Africa, Qatar
- Pacific Ocean: Palau, American Samoa, GBR (far north, central and southern sites), Kiritimati (Christmas) Island, Kiribati, Marshall Islands, Tonga

First outputs from Australia–China joint research centre

Managing multi-use coastal zones is a challenge for both China and Australia, with industrialisation, tourism, agriculture and aquaculture compounding pressures on coastal ecosystems. While both countries have invested in coastal observing and marine ecosystem monitoring programs, there remains a compelling need to bridge the gap between science and management actions.

The Sino–Australian Centre for Healthy Coasts was established in July 2016 through a grant from the Department of Industry, Innovation and Science, under the Australia–China Strategic Research Fund. The centre brings together AIMS and the Institute of Oceanology, Chinese Academy of Sciences (IOCAS) to develop novel approaches to integrate monitoring, models and research on ecological responses to coastal pollution. The centre will develop management products and tools to guide sustainable coastal use and development.

A key outcome of the research centre in 2016 has been the production of a marine health report card for Jiaozhou Bay, a large embayment surrounded by a population of more than 9 million, that supports major shipping activities, industrial development and aquaculture. Since 1999, IOCAS, through their Jiaozhou Bay Marine Ecosystem Research Station, has been monitoring water quality parameters and plankton communities in the bay. These data have been used on numerous occasions to assess the state of the 'health' of the bay. However, the delivery of the data has primarily occurred through technical reports that are unlikely to effectively communicate the status and trends of the health of the bay in a way that can be appreciated by local government administrators and managers. Centre researchers have used a subset of the Jiaozhou Bay data to develop a water quality report card (Figure 3), using water quality data analytical and presentation methods developed at AIMS and applied to a number of Australian localities (e.g. Gladstone Harbour, Darwin Harbour and GBR).

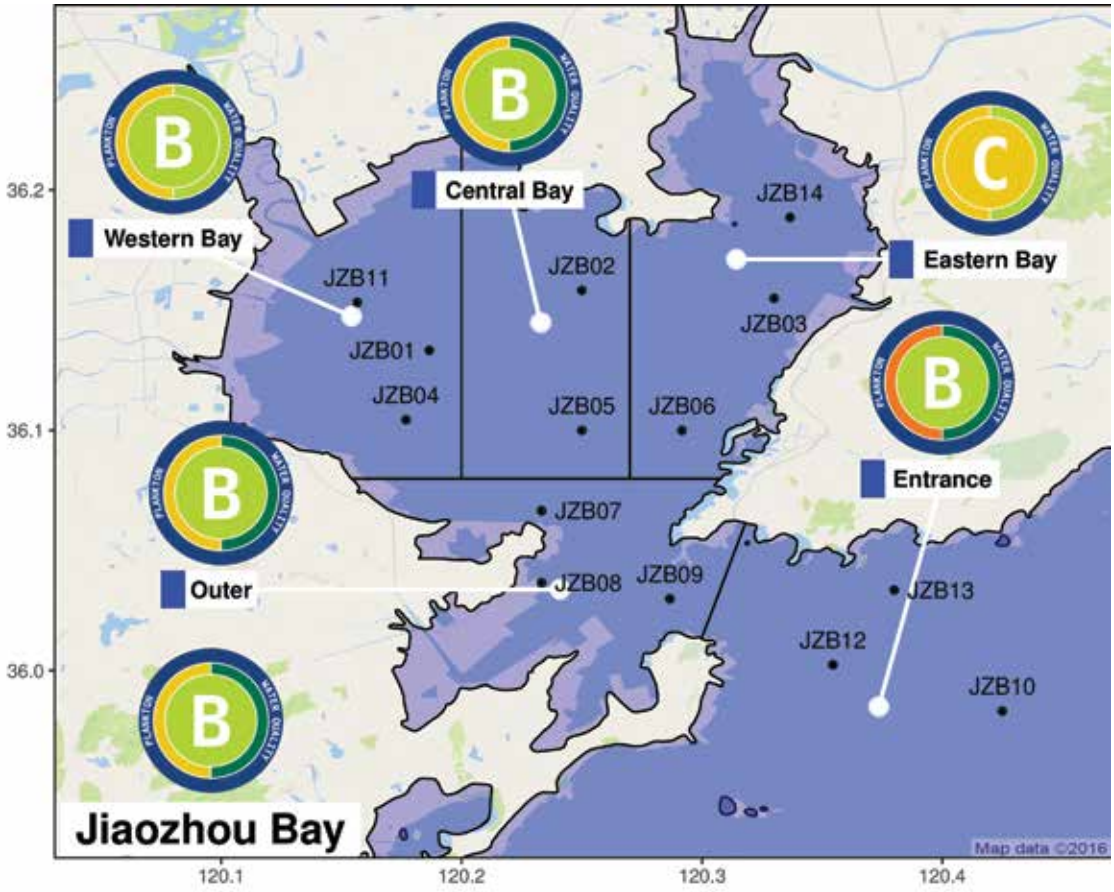


Figure 3: The pilot water quality report card for Jiaozhou Bay (2006–2010), based on long-term mean observed data. The white letters on the coloured circles indicate the score of the region within the bay (on a scale where A = very good, C = pass and D or E are below expectations). The peripheral coloured semi-circular bands indicate the score of water quality (left) and plankton (right). The overall score for the bay was 'B', shown on the bottom left of the figure.

Expert advice

AIMS gave expert advice and contributed to the following reports and reviews:

- GBRMPA permission system
- Independent Commonwealth Marine Reserves Review
- IMOS Five-Year Plan, 2017–22
- Performance Review of the ARC Centre of Excellence for Integrated Coral Reef Studies
- Australian Senate Environment and Communications References Committee on current and future impacts of climate change on marine fisheries and biodiversity
- National Research Infrastructure Capability Issues Paper for the 2016 Research Infrastructure Roadmap
- Productivity Commission Issues Paper: Data Availability and Use

In addition, AIMS staff contributed in many committees and groups:

- John Gunn was an invited member of the National Research Infrastructure Roadmap Capability Experts Panel.
- John Gunn was the Co-Chair of the Intergovernmental Oceanographic Commission Global Ocean Observing System Steering Committee.
- Drs Britta Schaffelke and Richard Brinkman are members of the GHHP Independent Science Panel.
- John Gunn was a member of the National Marine Science Committee.
- See also Reef 2050 Long-term Sustainability Plan above.

Partnerships

AIMS has created and participated in an array of joint ventures, strategic alliances and significant collaborations that maximise the Institute's ability to deliver high-quality science. These arrangements increase the critical mass and diversify the skill base that can be applied to answer complex questions about the sustainable use, management and protection of marine resources. In 2016–17, most of AIMS' scientific tasks received external co-investment involving stakeholders and partners who actively participated in research design, implementation and knowledge dissemination.

AIMS is, or has been, a member of the following partnerships:

- the Arafura Timor Research Facility
- the ARC Centre of Excellence in Coral Reef Studies
- the Reef 2050 Plan Marine Monitoring Program
- the National Environmental Science Programme (NESP) Tropical Water Quality Hub
- the NESP Marine Biodiversity Hub
- the Integrated Marine Observing System
- the Western Australian Marine Science Institution
- the Indian Ocean Marine Research Centre
- AIMS@JCU
- the ARC Centre of Excellence for Mathematical and Statistical Frontiers of Big Data, Big Models, New Insights

A brief synopsis of each of these partnerships is given below.

The **Arafura Timor Research Facility (ATRF)** was established in 2006, as a joint venture between AIMS and the Australian National University (ANU), with a mission to support marine science across northern Australia and other countries bordering the Arafura and Timor Seas (Indonesia, Papua New Guinea and Timor Leste). With construction funding as a Major National Research Facility provided by the Australian Government, the ATRF consists of an office and laboratory complex in Darwin, and is adjacent to the campus of Charles Darwin University (CDU). A $5 million upgrade during 2011–12, under the Australian Government's Super Science (Marine and Climate) Initiative, added a seawater research aquarium, modern meeting facilities, workshop facilities to support oceanographic research and additional offices.

At the end of June 2014, AIMS assumed sole management of the ATRF and has since initiated upgrades to improve efficiency of operation: a new chiller unit and solar panels have been installed. Science activities have continued to revolve around Darwin Harbour, but with a renewed focus on the Gulf of Carpentaria. Enhancing the aquarium facility has brought about exciting advances in tropical ecotoxicology. The next stage of development—an expanded shed for logistics (boat storage, upgraded storage and workshop)—has been planned and approved, with construction to follow in 2017–18. AIMS sees a strong need for marine research in the region, and finds itself well placed to realise this with the ATRF.

Further details at www.atrf.org.au.

The **ARC Centre of Excellence for Coral Reef Studies (Coral CoE)** was established in 2005, and in 2013 received a further seven years and $28 million of ARC funding. AIMS' CEO John Gunn was a member of the Coral CoE's Advisory Board, and two senior AIMS scientists, Drs Janice Lough and Madeleine van Oppen, are partner investigators. AIMS and the Coral CoE jointly support several postdoctoral fellowships over the life of the centre.

The Coral CoE undertakes research to provide the scientific knowledge necessary for sustaining ecosystem goods and services of the world's coral reefs. The centre seeks to build bridges between the natural and social sciences, strengthening capacity and informing and supporting transformative changes in coral-reef governance and management. The centre involves 30 chief and partner investigators from ten organisations, including JCU, AIMS, UQ, ANU, UWA, GBRMPA, the WorldFish Center, Stanford University, the International Union for Conservation of Nature (IUCN) and the National Centre for Scientific Research. The centre's partnership with AIMS cements Australia's global leadership in coral-reef sciences and strengthens collaborative links between the major partners and international collaborators from 40 countries.

Further details at www.coralcoe.org.au.

The **Reef 2050 Plan Marine Monitoring Program (MMP)** was designed and developed by GBRMPA in collaboration with science agencies, and is currently funded under the Reef 2050 Plan. Managing water quality remains a strategic priority for GBRMPA, to ensure the long-term protection of the coastal and inshore ecosystems of the GBR. A key management tool is the Reef Water Quality Protection Plan, with the actions being delivered through the Reef 2050 Plan. The MMP forms an integral part of the Paddock-to-Reef Integrated Monitoring, Modelling and Reporting Program (Paddock-to-Reef Program), which is a key action of the Reef Water Quality Protection Plan. The program is designed to report on progress towards, and evaluate the efficiency and effectiveness of implementation of, the Reef 2050 Plan actions and targets. A key output of the Paddock-to-Reef Program is an annual report card, including an assessment of GBR water quality and ecosystem condition, to which the MMP contributes assessments and information. The report card is available at www.reefplan.qld.gov.au.

Since 2005, AIMS has provided the MMP with data from monitoring inshore water quality and the condition of inshore coral reefs. AIMS, in partnership with JCU, monitors the water quality of the receiving waters at 28 fixed sites along more than 700 km of coastline 3–11 times per year. In addition, AIMS surveys the health of 36 coastal and inshore coral reefs from the Wet Tropics to the Fitzroy Region on a biennial schedule.

A summary of the MMP's overall goals and objectives, and descriptions of the subprograms, are available at www.gbrmpa.gov.au/managing-the-reef/how-the-reefs-managed/reef-2050-marine-monitoring-program and e-atlas.org.au/rrmmp.

The **NESP Tropical Water Quality Hub** is a collaboration among researchers from AIMS, CSIRO and four Queensland universities (Central Queensland University, Griffith University, JCU, and UQ), administered by the Reef and Rainforest Research Centre in Cairns. The Hub has a transdisciplinary research model, with a focus on the water quality of the GBR and its associated catchments and the Torres Strait. The objectives are to:

- improve the understanding of the impacts, including cumulative impacts, and pressures on high-priority freshwater, coastal and marine ecosystems and species
- maximise the resilience of vulnerable species to the impacts of climate change and climate variability by reducing other pressures, including poor water quality
- identify natural resource management improvements based on sound understanding of the status and long-term trends of high-priority species and systems.

To date, the Tropical Water Quality Hub has distributed three rounds of funding, with annual funding rounds expected to 2019.

Further details at www.nesptropical.edu.au.

The **NESP Marine Biodiversity Hub** is a collaborative partnership supported by Australian Government NESP funding, which is administered by the Department of the Environment and Energy. The Marine Biodiversity Hub focuses its research efforts on Australian oceans and marine environments, including temperate coastal water quality and marine species, with funding of $23.88 million through the University of Tasmania (UTAS). The hub is a collaboration among researchers from AIMS, CDU, CSIRO, Geoscience Australia, IMOS, Museum Victoria, NSW Department of Primary Industries, NSW Office of Environment and Heritage, UTAS and UWA.

Research is conducted within four themes:

- improving the management of marine threatened and migratory species
- supporting management decision-making
- improving our understanding of pressures on the marine environment
- improving our understanding of the marine environment, including biophysical, economic and social aspects.

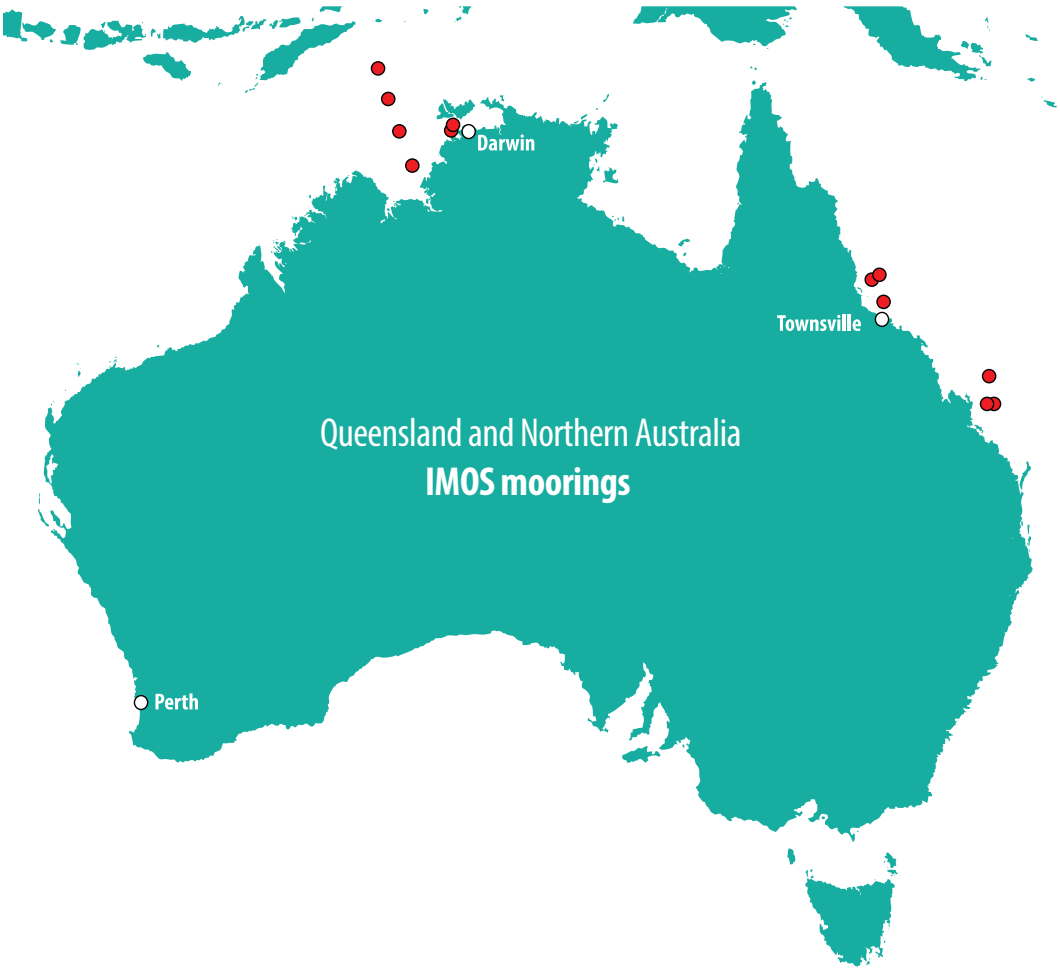
Further details at www.nespmarine.edu.au

The **Integrated Marine Observing System (IMOS)** is a foundation national marine observing capability established in 2006 by the Australian Government's National Collaborative Research Infrastructure Strategy (NCRIS). IMOS provides infrastructure and a free, open-access data portal for a national system of sustained observations on ocean variability covering physical, chemical and biological variables, with data streams collected throughout the Australian marine territories. The operational model of IMOS distributes the responsibility for observing infrastructure across operating institutions comprising universities, state and Commonwealth agencies and publicly funded research agencies, including AIMS.

AIMS has been an active partner and foundational operator of infrastructure across Australia's vast and remote tropical marine estate. As the lead agency of the Queensland node, and primary operator of a number of IMOS facilities, AIMS continues to make a significant contribution to collaborative science planning and operational implementation of a national marine observing vision.

The first decade of IMOS has demonstrated that a collaborative, integrated approach to marine observation can deliver sustained benefits for marine management and improved weather prediction in the sea and on the land, and can reveal the critical contribution of the oceans to our ever-changing climate. The value of IMOS to Australia's blue economy is recognised in the decadal National Marine Science Plan 2015–2025, which recommends sustaining and expanding marine observation and modelling capability to address challenges across environmental change, energy security and improving predictions of the ocean state. The Australian Government's 2015 National Innovation and Science Agenda included an ongoing commitment to NCRIS of $1.5 billion over the next ten years. The 2016 National Research Infrastructure Roadmap identified IMOS as a priority area for enhancement, requiring additional investment. IMOS is therefore well placed to secure long-term funding to move into its second decade of operation.

Further details at www.imos.org.au



Location of IMOS moorings operated by AIMS as part of the Queensland and Northern Australian Moorings sub-facility.

The **Western Australian Marine Science Institution (WAMSI)** is a partnership of four Western Australian universities (UWA, Murdoch University, Edith Cowan University and Curtin University), a major resource company (Woodside Energy Limited), three Commonwealth organisations (CSIRO, AIMS and the Bureau of Meteorology), four Western Australian Government departments (Parks and Wildlife, Premier and Cabinet, Fisheries and the Environmental Protection Authority), the Western Australian Museum, ChemCentre and a regional ocean observing network for the Indian Ocean (WA Global Ocean Observing System). WAMSI was established to improve knowledge and understanding of Western Australia's marine environment for better resource development, management and conservation outcomes. WAMSI was launched in May 2007 with an initial investment of $21 million over five years from the state government. In 2011–12, the Western Australian Government provided $12 million over six years for the institution's continued development. In each case, these funds generated matching investments from WAMSI research partners, providing substantial leverage of the government funds to target high-priority marine science needs in Western Australia.

WAMSI's ability to deliver programs, such as the $30 million Kimberley Marine Research Program, draws on the capability of 200 scientists from 11 partner organisations. Importantly, the projects in the Kimberley region have been developed to have significant engagement and partnership with local Indigenous groups. Traditional Owners and sea rangers are now taking part in the field components of the WAMSI Kimberley program at Cygnet Bay, Cape Leveque and Sunday Islands, and Camden Sound.

WAMSI also partners with industry to deliver programs that benefit both industry and the community, such as the $18 million Dredging Science Node. The node was established in 2011–12 to understand and mitigate the impacts of coastal dredging, which is a critical component of most major marine infrastructure developments in Western Australia. To meet the objectives of the node, AIMS researchers have established a series of experiments in the SeaSim aquarium facility in Townsville to examine the impacts of dredging sediment on key marine taxa, such as corals and sponges.

Further details at www.wamsi.org.au.

The **Indian Ocean Marine Research Centre (IOMRC)** is a joint venture that unites the four leading Australian research organisations working in and around the Indian Ocean (AIMS, CSIRO, UWA and the Western Australian Department of Fisheries).

The collaboration includes developing new multidisciplinary research teams and creating a graduate training environment that will significantly advance Australia's marine science capacity, capability and profile.

Completed in September 2016, the new IOMRC building located on UWA's Crawley campus contains the largest concentration of marine research capability in the southern hemisphere, and the largest research capability in marine research on the Indian Ocean rim.

The Department of Fisheries' Watermans Bay Marine Centre underwent significant refurbishments, including upgrades to the internal laboratories, offices and marine culture facilities, with direct access to high-quality seawater. IOMRC partners began taking occupancy in 2016.

These building projects were initiated in the 2010–11 financial year, with UWA awarded $34 million from the Australian Government through the Education Investment Fund Round 3 for the IOMRC project, and co-investment of $29 million.

Further details at www.oceans.uwa.edu.au/iomrc.

AIMS@JCU is a strategic partnership between AIMS and JCU that takes advantage of their world-class expertise in marine science and co-location in Townsville by facilitating greater collaboration and joint use of infrastructure. It was established in 2004 as a joint venture with a special allocation of Australian Government funding, and refocused in 2010 to facilitate the next generation of marine scientists through joint higher degree research (HDR) training and AIMS-based internships and work-integrated learning for students of marine science enrolled at JCU.

Since 2004, over 100 PhDs have been awarded through the AIMS@JCU alliance, and the number of annual graduates continues to steadily increase. By facilitating the link between JCU's research education strategy and AIMS' research plan, AIMS@JCU delivers significant value beyond the dollar investment. This includes a higher completion rate (compared to the JCU average), greater research outputs, and cohorts of work-ready graduates with experience within a publicly funded research agency. Such industry exposure within HDR training is a key recommendation of the recent review into Australia's research training system by the Australian Council of Learned Academies.

Through a management committee and a scientific advisory committee, which includes representatives from both organisations, AIMS@JCU flexibly and strategically focuses the research supported by the program to best meet national science priorities. Most recently, to focus on the growing skills gap in quantitative marine science (as identified in the National Marine Science Plan), AIMS@JCU restructured its scholarships to four years (instead of the usual three years), with the extra year available for professional development in quantitative methods customised on a case-by-case basis for each student and their advisory team. AIMS@JCU members benefit from access to competitive funding awards for project costs, travel and science communication, professional development opportunities and being well positioned within the combined peer networks of AIMS and JCU.

AIMS@JCU also supports the pipeline of marine science HDR candidates through fostering work-integrated learning placements including internships, and links with science, technology, engineering and mathematics (STEM) programs for high schools. The latter include those focused on Indigenous participation (for example, Aboriginals and Torres Strait Islanders in Marine Science and the Aboriginal Summer School for Excellence in Technology and Science).

AIMS@JCU currently has 297 members, of which 50 are PhD candidates and 82 are other students (MSc, undergraduate or interns). Further details at www.aims.jcu.edu.au

The **ARC Centre of Excellence for Mathematical and Statistical Frontiers of Big Data, Big Models, New Insights (ACEMS)** successfully attracted seven years of funding from the Australian Government in December 2013 and commenced operation in 2016–17. ACEMS concentrates on the massive amounts of data collected daily in a variety of forms and from many sources. Many of the resulting datasets have the potential to make vital contributions to society, business and government, but are so large or complex they are difficult to process and analyse using traditional tools.

The new centre, led by the University of Melbourne, brings AIMS scientists together with a world-class set of collaborators and partner organisations, including the University of California, Berkeley, Queensland University of Technology (QUT), University of Adelaide, University of Oxford, University of Technology Sydney, University of New South Wales, UQ, Harvard School of Public Health, CSIRO, Sax Institute, Australian Bureau of Statistics, Mathematics of Information Technology and Complex Systems, Canada, University of British Columbia, Vic Roads and AT&T Labs–Research.

ACEMS aims to create innovative mathematical and statistical models that can uncover the knowledge concealed by the size and complexity of these big datasets. From a marine science perspective, the collaboration will let AIMS, and others, add value to the data collected on the GBR to increase our knowledge of the GBR and its processes, and improve reef management.

Further details at www.acems.org.au

Fostering research capability

In December 2016, Dr Nicole Webster set sail on a 30-day voyage to Antarctica on the inaugural Homeward Bound voyage, which is a key component of a new, transformational year-long program aimed at empowering women with critical science backgrounds to take on influential leadership roles that shape the health of the planet. The focus of the program was to empower the participants with new skills in transformational leadership, strategic thinking and a connection to a network of talented and passionate Homeward Bound women.

AIMS is committed to early-career researcher (ECR) training to help develop the research and innovation capacity needed to meet the opportunities and challenges facing the marine environment, and to keep Australia globally competitive. AIMS maximises its impact by providing opportunities to develop a research career, including:

- postdoctoral studies
- postgraduate studies
- scholarship funding for postgraduates
- occupational trainees
- exposing Indigenous high-school students to marine science.

Postdoctoral research

During 2016–17, the last four North Australia Marine Research Alliance (AIMS, CDU, ANU and the Northern Territory Government) funded fellowships were completed.

As at 30 June 2017, AIMS co-funds/supports 14 postdoctoral fellows (Figure 4) under agreements with:

- ARC Centre of Excellence for Coral Reef Studies (2)
- AIMS–QUT Memorandum of Understanding (2)
- NESP Marine Biodiversity Hub (2)
- Vulcan Foundation within the Global FinPrint project (2)
- AIMS (3)
- Woodside Energy Limited (1)
- Great Barrier Reef Foundation (1)
- Charles Darwin University (1)

In addition, the IOMRC partnership has resulted in the recruitment of four research fellows to investigate critical topics for understanding the marine environment along the Western Australian coastline.

AIMS also supports two ARC Discovery Early Career Researcher Award fellows that are based at the University of Western Australia and the University of Adelaide.

During 2016–17, AIMS advertised an additional six three-year postdoctoral fellowships, with anticipated commencement during the 2017–18 year.

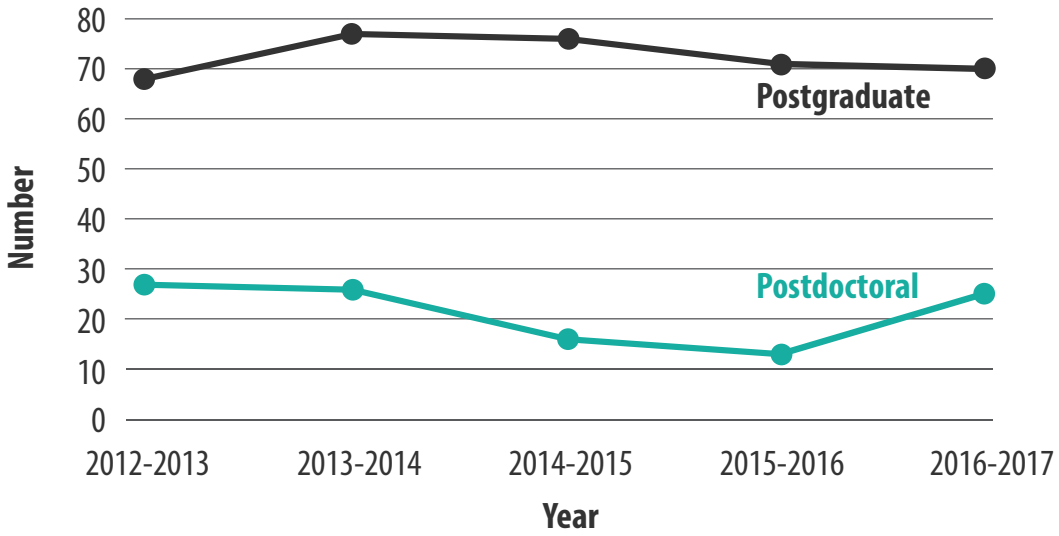


Figure 4: Number of AIMS postgraduate and postdoctoral researchers as at June 2017.

Postgraduate studies

AIMS' involvement in ECR training is reflected in the fact that 28 staff members hold adjunct academic appointments at Australian and/or international institutions, including:

- James Cook University, primarily within the Coral CoE, the College of Science and Engineering, and the Division of Research and Innovation (through the AIMS@JCU partnership)
- University of Queensland
- University of Western Australia
- Charles Darwin University
- Queensland University of Technology
- Swinburne University of Technology
- Dalhousie University, Canada
- University of Windsor, Canada
- University of Auckland, New Zealand
- Victoria University of Wellington, New Zealand.

Most of these adjunct positions reflect a large personal contribution to postgraduate supervision.

During 2016–17, a total of 25 AIMS affiliated PhD and MSc degrees were awarded by Australian and international universities, and at June 2017, an additional 13 postgraduate students had submitted their theses. AIMS staff supervised 70 postgraduate students (Table 4, Figure 4), comprising:

- 27 at AIMS Townsville (of which five submitted their theses)
- 4 at the IOMRC
- 39 studying externally at their respective universities (of which eight have submitted).

Table 4: Number of AIMS postgraduate students

Postgraduate student	2012–13	2013–14	2014–15	2015–16	2016–17
AIMS science staff enrolled in postgraduate studies	0	0	0	0	0
Students working at AIMS supervised by AIMS staff	26	31	34	34	31
Students working externally supervised by AIMS staff	42	46	43	37	39

Occupational trainees

AIMS supported ten trainees, who improved their occupational skills through on-the-job training with AIMS researchers and technicians (Table 5).

Table 5: Number of occupational trainees

Trainee	2012–13	2013–14	2014–15	2015–16	2016–17
Occupational trainees	13	9	18	10	10

Awards to AIMS postgraduate students:

- Kathryn Berry received the 2016 Glenn Almany Memorial Prize for her research on the potential effects of a major coal spill on tropical coral-reef organisms.
- Bettina Glasl was awarded the Great Barrier Reef Marine Park Authority's Science for Management Award for her research project "Microbial indicators for water quality and environmental stress assessment of coral-reef ecosystems".
- Cecilia Pascelli won the 'Best Microbiology Category' talk at the World Sponge Conference, Galway, June 2017.
- Brian Strehlow won the 'Best Organismal Biology' talk at the World Sponge Conference, Galway, June 2017. He presented his WAMSI dredging node project.

Exposing Indigenous high-school students to marine science

The Aboriginal and Torres Strait Islanders Marine Science (ATSIMS) Scholars' Initiative was established in 2013 by AIMS@JCU postgraduate student Joe Pollock. The initiative was designed to engage Indigenous high-school students in field-based science programs to bolster the interest, experience and hands-on skills needed to initiate, and succeed in, tertiary studies in marine science.

Each year, Indigenous high-school students from North Queensland engage in interactive workshops at AIMS under the guidance of marine researchers and Indigenous leaders. The program endeavours to foster links between western marine science and traditional ecological knowledge. In addition to the support it receives from AIMS, the ATSIMS program is supported by JCU (Australian Aboriginal and Torres Strait Islander Centre), the Coral CoE, AIMS@JCU, World Wildlife Fund, Gudjuda Reference Group Aboriginal Corporation, Girringun Aboriginal Corporation, GBRMPA, Department of Environment and Heritage Protection, and Glencore.

In 2016–17, the students were also exposed to the wide range of technical skills that are used to develop equipment for research projects and for gathering environmental data from innovative technology platforms.

AIMS also participated in CSIRO's Aboriginal Summer School for Excellence in Technology and Science program. During the residential summer school, students complete a group research project and present their findings at the closing ceremony. Scientists share their research, while Indigenous mentors help strengthen cultural connections.

After the summer school, the program assists students to develop leadership skills and access to work experience.

Robotics students compete at international challenge

AIMS supported QUT robotics students to compete at the 2016 Maritime RobotX Challenge in Hawaii in December. RobotX is a high-level international competition where an autonomous surface vessel (ASV) is required to complete a series of dynamic, complex missions. Core capabilities are tested during the competition, including collision avoidance, target recognition (including underwater targets), on-board decision-making, navigation and control.

RobotX was established in 2014 by the US Office of Naval Research and is part of RoboNation, a robotics community representing next-gen builders, creators and engineers. RoboNation was created by the Association for Unmanned Vehicle Systems International.

The co-sponsored TeamQUT successfully pitted 'Bruce' the ASV against international opponents, strong winds and a challenging series of missions to achieve an impressive second.

RobotX was a fantastic technical and networking experience for these students, an opportunity to gain exposure and showcase the team's robotics capability on the world stage.

Research collaboration

AIMS has a strong culture of collaborating with external organisations worldwide (Figure 5), which helps us expand our science capabilities and capacity. In 2016–17, AIMS scientists participated in collaborative projects with Australian and international scientists (Figure 6).

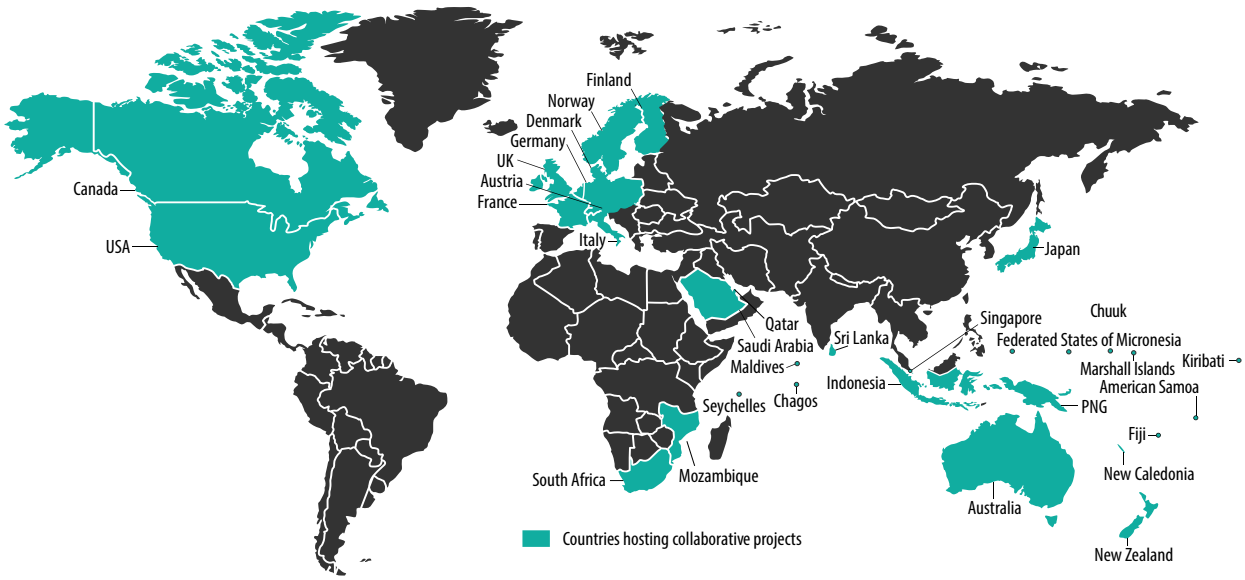


Figure 5: Location of AIMS' international collaborations.

The statistics are impressive. In 2016, AIMS scientists were involved in 176 collaborative projects conducted in 30 countries, involving 215 Australian scientists from 56 Australian organisations with 98 overseas colleagues from 65 overseas organisations involving scientists from 24 countries.

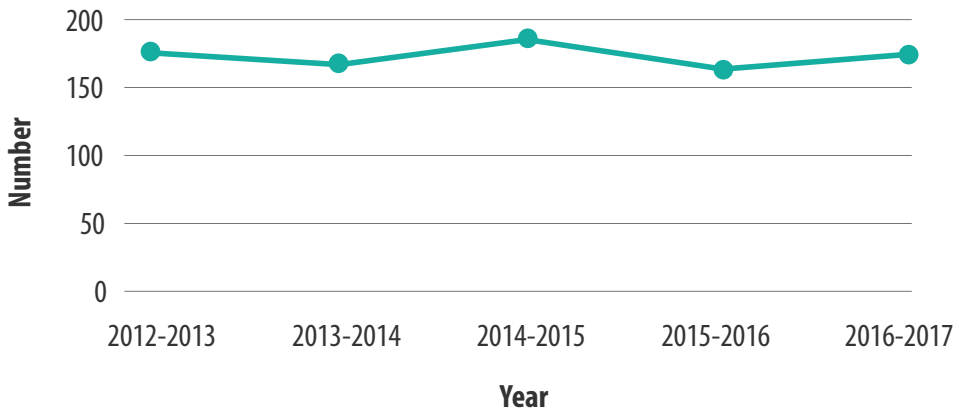


Figure 6: Number of AIMS collaborative projects by year.

Figure 7: Proportion of collaborative publishing.

Collaborative research accounts for a high proportion of our scientific publications: of the 237 journal articles published by AIMS scientists, 118 (50%) had co-authors from other Australian research organisations and 99 (42%) involved international colleagues. Only 20 articles (8%) were solely authored by AIMS staff (Figure 7).

In addition to these research collaborations, in 2016–17 AIMS signed memorandums of understanding with:

- National Oceanic and Atmospheric Administration, US Department of Commerce—cooperation in research projects
- World Wide Fund for Nature (WWF) Pacific—cooperate in WWF's Pacific Shark Heritage Program and the development of a rapid assessment tool-kit for sharks
- Defence Science and Technology Group of the Department of Defence—combine skills and expertise to collaborate.

Science quality assurance

AIMS uses a centralised project database and a rigorous internal review and approval system to ensure projects deliver high-quality research outputs to stakeholders and end users on time.

Data management and dissemination

A Data and Technology Innovations Research Program underpins AIMS' other three research programs, and is home to the AIMS Research Data Centre, a team dedicated to managing and securing the Institute's data and making it globally discoverable and accessible via the internet and other means. Our metadata and data holdings are also delivered via the Australian Ocean Data Network (AODN) portal and the Research Data Australia data catalogue, increasing their accessibility and allowing integration into national datasets.

AIMS deploys environmental sensors on extensive in-sea infrastructure including oceanographic moorings and permanent reef platforms, as well supporting surveys using robotic gliders and autonomous underwater vehicles. Environmental measurements from space are delivered via our satellite receiving station and we take advantage of our vessels being in locations no other research provider visits to automatically sample and analyse seawater. An array of acoustic receivers tracks mobile animals like apex predators (e.g. sharks), megafauna (e.g. turtles) and high-value reef fish (e.g. coral trout). Together, these tools help to provide a picture of the variations in temperature, salinity, water quality and ocean acidity of Australia's coastal seas, largely as part of our role as a major operator of facilities within IMOS.

Our landmark datasets critical to national and international stakeholders in marine science include:

- the AIMS Long-Term Monitoring Program database which houses data from a multi-decadal (>30 years), GBR-wide environmental health surveillance program covering 292 reefs
- data for the Reef 2050 Plan Marine Monitoring Program (MMP) (page 58), an initiative within the Reef 2050 Plan.

Some of the most substantial data holdings at end of 2016 are shown in Table 6.

Table 6: Number of data sampling sites and records

Measurements	Number of sites	Number of records at end 2016	Increase on previous year
Chlorophyll, turbidity and temperature	23	6,420,291	12.7 %
MMP Samples	1518	9519	8.8 %

AIMS develops tools to visualise our datasets along with those from other Australian marine science providers. This allows stakeholders to interrogate and picture the state of Australia's tropical marine estate. For example, our eAtlas is a user-friendly interactive mapping tool that allows users to display and interrogate not just our marine data but also data from other organisations. Several eAtlas versions tailored to the needs of specific stakeholders have been deployed, with versions developed for the Torres Strait, Ningaloo, the Social and Economic Long-Term Monitoring Program of the GBR and north-west Australia. The eAtlas currently hosts over 3482 data layers produced from 44 projects involving 15 organisations.

eReefs, which commenced in January 2012, is a six-year $30 million collaborative project developed to revolutionise how we manage and protect the GBR. This dynamic three-dimensional model of the whole of the GBR from the seafloor to the sea surface produces very large datasets and model outputs (many terabytes) and routine access is difficult for managers and scientists. AIMS has developed new tools that convert these complex eReefs outputs into a manageable size so users can visualise them from their desktop and eventually, from mobile devices. This will extend the reach of eReefs into more government agencies, managers, policy-makers, researchers, industry and local communities.

AIMS' online data delivery is critical to our digital presence and that of Australian marine science. Some of our key data products are frequently used by a variety of stakeholders (Table 7).

Table 7: User access to AIMS' digital information, 2016–17 financial year

Purpose	**Number of visitor sessions (change from previous year)**	**Number page views (change from previous year)**
Data searches	17,700 (+1%)	24,000 (-1%)
Reef weather	195,800 (+9%)	929,300 (+24%)
Coral fact sheets	93,200 (-3%)	323,800 (-19%)

AIMS participates in national data initiatives to promote a nationally consistent approach to Australia's environmental data. This includes membership of data policy and technical advisory groups like the AODN Technical Advisory Group, and leading various quality control and assurance efforts in the IMOS consortium.

Stakeholder engagement

A suite of operating principles guide AIMS' research, internal and external relationships, and organisational ethos. They inform and underline the Institute's focus on supporting its key stakeholders.

Our guiding principles are:

- **Trust**—AIMS is a trusted adviser, delivering independent, evidence-based scientific advice to our stakeholders for the economic, environmental and social good of Australia.
- **Focused research**—AIMS executes focused research plans with identified pathways to impact.
- **Knowledge transfer**—AIMS documents and widely disseminates findings through a variety of mechanisms and formats to a wide range of stakeholders and collaborators.
- **Excellence and innovation**—AIMS undertakes high-calibre research.
- **Return on investment**—AIMS maximises the returns on investment in marine science through collaborations, co-investment and contracting of industry-funded research.
- **Health, safety and environment**—AIMS leads the way in providing safe working conditions and ensuring that our activities are planned to minimise any adverse environmental impacts.

AIMS works closely with stakeholders to identify their needs and to develop research programs with the highest possible value to stakeholders over both short and long timeframes. We achieve this by mapping how the research will be used and who will benefit, then reviewing outcomes and completed research programs. Within this process, AIMS takes a big-picture view of Australia's marine science challenges, asks questions, anticipates future needs and strategically invests in research targeted at reducing future uncertainty.

Stakeholders benefiting from AIMS' activities in 2016–17 are listed in Table 8.

Table 8: Stakeholders benefiting from AIMS activities in 2016–17

Stakeholder category	Sector/ organisation	Examples of AIMS' support
Industry	North-western Australia oil and gas industry	• Developing environmental baselines that help industry plan and manage their environmental risks and regulatory compliance • Providing a rapid response research capability to optimise management actions should a spill occur • Providing guidance on minimising the adverse environmental impacts of dredging operations as a member of industry expert panels • Supporting the development of collaborative industry sharing of marine environment data
Industry	Commodity ports/ Northern Territory Government, Darwin Ports Corporation, Port of Townsville	• Developing systems to improve Darwin Harbour operational efficiency, and environmental research to inform development decisions • Researching the impacts of dredging to develop better risk-based dredging protocols

Stakeholder category	Sector/ organisation	Examples of AIMS' support
Industry	Coastal industries	• Researching inputs to monitoring programs for regulatory compliance • Applying new technologies for in-situ monitoring to manage dredging operations and environmental regulatory compliance more effectively • Studying water quality to validate hydrodynamic modelling of effluent diffusion • Developing ecotoxicological assays and assessments to guide water quality guidelines and standards
Public and government	• Australian Government and public	• Developing a framework to assess the cumulative impact of natural and development stresses on the GBR • Researching coral health in a variable and changing marine environment to assess coral-reef resilience, and potential intervention and management options • Researching ecosystem processes and crown-of-thorns starfish outbreaks to increase our understanding of outbreak impacts and improve our ability to forecast and manage outbreaks • Developing a mapping system for presenting environmental research data in an accessible form that promotes greater information use • Educating the public and stakeholders via the AIMS website and with site tours, on the state of environmental knowledge and any gaps and risks • Supporting postgraduate students as a means of enhancing the marine research workforce in tropical Australia • Providing regular six-weekly briefs to Australian Government ministers responsible for science, identifying significant published and emerging AIMS research findings • Providing expert marine science advice and interpretation to Australian Government ministers and their science advisers on key marine science developments, such as the 2016 and 2017 coral bleaching events • Supporting the education and future employment potential of northern Australia's Indigenous youth through the Aboriginal and Torres Strait Islanders Marine Science and Aboriginal Summer School for Excellence in Technology and Science programs
Public and government	Queensland Government and public	• Researching the impact of changed land-use practices on water quality in the GBR Marine Park

Stakeholder category	Sector/ organisation	Examples of AIMS' support
Public and government	Western Australia Government and public	• Identifying and characterising biodiversity patterns and underlying processes in the Kimberley to aid effective management • Surveying sensitive seabed organisms to evaluate impacts of dredging operations • Researching the impacts of dredging to inform guidelines for marine dredging programs
Managers and regulators	Great Barrier Marine Park Authority	• Monitoring the health of the GBR in ongoing surveys • Providing specialist advice to, and peer review of, development activity impacts • Contributing to the planning for the development of RIMReP • Providing independent scientific advice on the implementation of the Reef 2050 Long-term Sustainability Plan

Public communication

AIMS continues to provide a highly valued perspective on current tropical marine science in the media. AIMS science has been featured in national and international media. This included research activities in the SeaSim, particularly coral spawning (Al Jazeera, PBS Nova), insights from the long-term monitoring program on the Great Barrier Reef and current monitoring of the 2016 bleaching event on the GBR (the ABC's Catalyst) and the role of coral cores in evidence for the Anthropocene geological epoch (Catalyst*)*.

AIMS scientists also engaged in local projects such as the Ningaloo Interpretive Centre, contributing written and video products for the centre, due to open in early 2018.

AIMS stakeholder engagement has been strongly supported by the publication of two sets of brochures. The Marine Science Updates box set covers issues facing tropical reefs and how AIMS' research is addressing them. The capability statements highlight our strengths and expertise to different audiences and will be a valuable addition to the Institute's external stakeholder initiatives.

AIMS participated in a number of public engagement events in 2016–17, the most significant of which was Street Science! at the World Science Festival in Brisbane. Australian science was placed centre stage during the two-day event, with over 62,000 people attending. AIMS science at the 'Measuring Our Changing Oceans' stall was hands-on—visitors could get close to a working remotely operated underwater vehicle, experience a dive beneath the waves using virtual reality headsets and touch a Slocum glider courtesy of IMOS. It was unfortunate that Cyclone Debbie limited our presence to just one day at the festival.

The AIMS communication group also had a key role in shaping the refurbished foyer and Hub, a central area that features strongly in our weekly public tours at the Cape Ferguson headquarters. A digital display was produced for the Hub to reflect the current research strategy, with emphasis on AIMS capabilities, solution-based science and our presence across three sites.

Research infrastructure

AIMS' research activities primarily focus on Australia's tropical marine environments, from the southern end of the GBR on the east coast to Shark Bay and the Abrolhos Islands in the west. Field activities are supported by laboratory and administrative facilities located at Townsville, Darwin and Perth.

AIMS' headquarters at Cape Ferguson, about 50 km from Townsville in North Queensland, is close to the centre of the GBR and surrounded by national park and marine reserve. AIMS' Darwin facility is the Arafura Timor Research Facility, located on a satellite campus of the Australian National University, immediately adjacent to the Charles Darwin University campus. In Western Australia, AIMS is co-located with the University of Western Australia and CSIRO in the new Indian Ocean Marine Research Centre (IOMRC) at the university's Crawley campus in Perth.

The IOMRC is a joint venture that unites the four leading Australian research organisations working in and around the Indian Ocean (AIMS, CSIRO, UWA and the Western Australian Department of Fisheries). Construction of the new IOMRC was completed in September 2016. The new building contains the largest research capability in marine research on the Indian Ocean rim.

The National Sea Simulator (SeaSim) is a world-leading experimental aquarium facility that provides researchers with unprecedented experimental control of a range of variables, allowing investigation of individual and combined effects on tropical marine ecosystems and organisms. It provides a step-change in capability compared with previous technologies, and is an essential element for the success of all of our research programs. AIMS has made up to 50% of the SeaSim's capability available to scientists and research institutions from around Australia and the world to work on marine science projects.

The SeaSim's capability has been applied to a range of high-priority research areas, including impacts and ocean acidification. Over 80% of all experiments undertaken in the SeaSim have involved collaboration; collaborators include researchers from 12 national and 17 international organisations. Projects have attracted funding from a range of sources including industry partners, universities, Australian Research Council, Western Australian Marine Science Institution, National Environmental Science Programme and the Paul G. Allen Foundation.

AIMS' major research infrastructure is subject to detailed capital planning and asset management programs to ensure that required reliability, availability and functional performance are achieved. Delivery against preventative maintenance and capital investment plans is monitored throughout the year to ensure that targeted outcomes are met.

Marine operations

AIMS' field activities are supported by a research fleet that provides access across Australia's tropical marine environments. Two large, purpose-built research vessels, the *RV Cape Ferguson* and the *RV Solander*, and a number of smaller vessels, take researchers to the diverse habitats in Australia's tropical waters.

AIMS' major vessels are equipped with a wide range of facilities essential for long research trips, such as:

- on-board dive compressors
- a moon pool for deploying sensitive hydrographic and oceanographic instruments through the deck of the *RV Solander*
- A-frame, hydrographic, and conductivity, temperature and depth winches
- wet and dry laboratories
- flow-through aquaria
- large deck spaces
- rigid inflatable tenders
- sophisticated navigation, satellite communication and computing facilities.

AIMS researchers took part in 150 field trips during the 2016–17 financial year. One hundred and three trips involved diving and snorkelling, with a total of 3723 scuba dives performed.

Research trips involving the two largest AIMS vessels (the *RV Solander* and *RV Cape Ferguson*) covered 32 047 nautical miles (Figure 8). Together, the entire fleet of AIMS research vessels was involved in 120 field trips conducted by 561 research personnel during 683 days in the field. Approximately half of all trips on the *Cape Ferguson* and *Solander* involved researchers from collaborating organisations.

The large vessels were used at close to 100% of available capacity. In addition, AIMS chartered a further 348 days on third-party vessels, primarily overseas and in the GBR, Torres Strait and Darwin areas, to meet our research commitments for the year.

Table 9 summarises the number of trips taken by each AIMS vessel during 2016–17.

Table 9: Research trips by AIMS vessels 2016–17

AIMS vessel	Research trips	Number of researchers involved	Time in the field (days)	Distance travelled (nautical miles)	Researcher days in field
RV Solander	26	154	249	18730	1783
RV Cape Ferguson	28	174	269	13317	1715
RV Apollo	35	135	35	N/A	135
RV Pisces	7	28	26	N/A	78
RV Aquarius	13	39	43	N/A	129
RV Capricornus	11	31	61	N/A	497
Total	***120***	***561***	***683***	**–**	***4337***

Figure 8: Activities of the major research vessels.

Revenue

AIMS' operations were supported by a mix of Australian Government appropriation funding and non-appropriation funding from state and territory governments, competitive research funds, environmental regulators and the private sector.

AIMS' total revenue for 2016–17 was $60 million, representing an increase of 2% on 2015–16 revenue (Figure 9). The $1.4 million increase was due to an increase in Australian Government appropriation revenue ($1.1 million) and other revenue ($0.3 million).

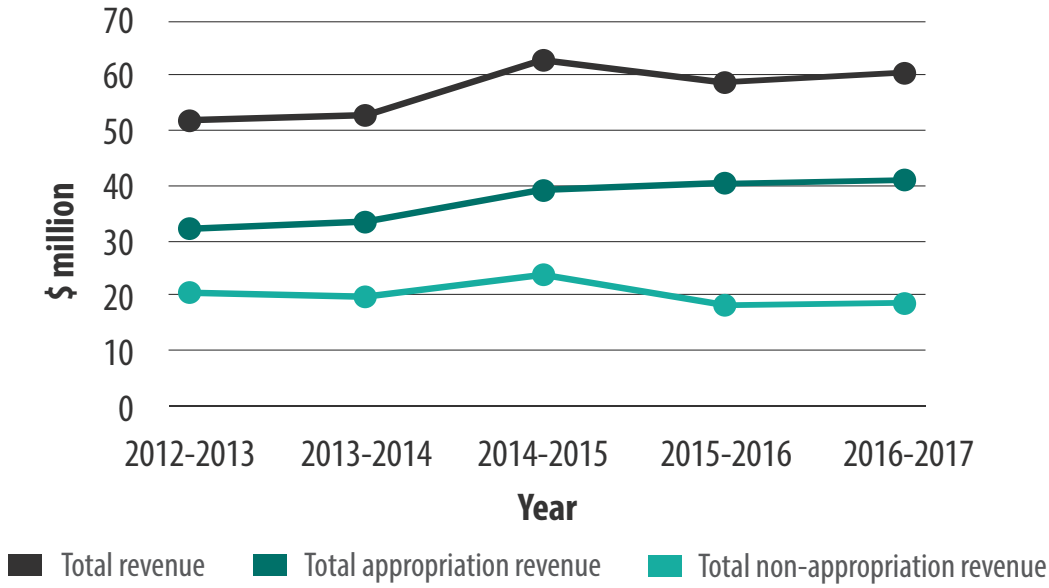


Figure 9: AIMS' revenue 2011–12 to 2016–17.

External revenue

External funding is critical for AIMS to maintain its present level of scientific research. In 2016–17, revenue from external sources was $16.318 million, which accounted for 27% of AIMS' total revenue (Figure 10).

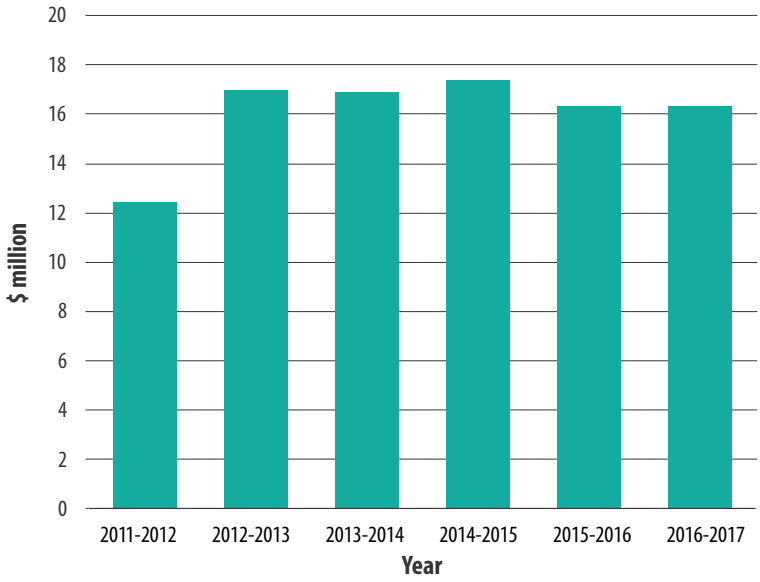


Figure 10: Total external revenue earned by AIMS during the last six financial years.

Sources of co-investment funding for 2016–17

Australian Government departments and agencies and Australian industry partners together provide 76% of AIMS' total external revenue (that is, funds earned on top of AIMS' appropriation allocation) through major grants and project contracts (Figure 11).

See Financial statements (starting on page 101) for detailed information on financial performance.

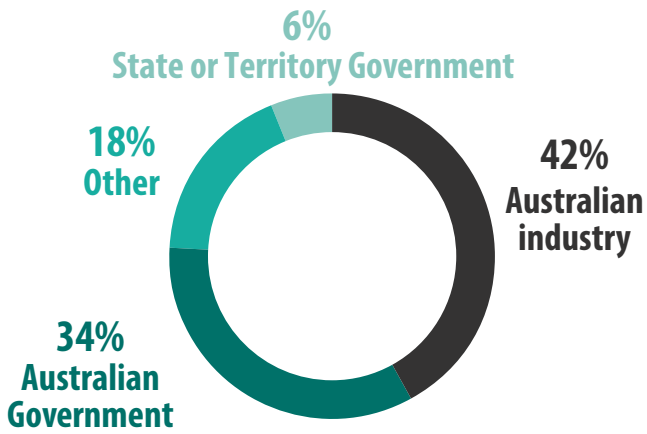


Figure 11: Major sources of external revenue in 2016–17.

OUR ORGANISATION

MANAGEMENT AND ACCOUNTABILITY

AIMS has in place a comprehensive system of corporate governance practices that provide control, disclosure and accountability of its activities.

Role and legislation

AIMS was established by the *Australian Institute of Marine Science Act 1972* (AIMS Act) and is a corporate Commonwealth entity under the *Public Governance, Performance and Accountability Act 2013* (PGPA Act).

The Institute's functions and powers are set out in ss. 9 and 10 of the AIMS Act (Appendix 3 on page 163). AIMS has two main roles under its governing legislation. They are to:

- carry out research and development in relation to
  - marine science and marine technology
  - the application and use of marine science and marine technology
- encourage and facilitate the non-commercial and commercial application of the results arising from such activities.

The PGPA Act sets out reporting, accountability and other requirements relating to AIMS' operations, management and governance. Section 39 of the PGPA Act requires corporate Commonwealth entities to prepare annual performance statements and to include them in an annual report to the Australian Parliament. Schedule 1, subdivision B, s. 17BE of the Public Governance, Performance and Accountability Rule 2014, sets out the requirements for annual reports produced in accordance with s. 46 of the PGPA Act. An index of annual report requirements (page 171) provides details of how this annual report meets those requirements.

Responsible minister

Senator the Hon Arthur Sinodinos AO, Minister for Industry, Innovation and Science

For the reporting period of this annual report (1 July 2016 to 30 June 2017), AIMS' responsible ministers were the Hon. Christopher Pyne, MP, Minister for Industry, Innovation and Science (1 July 2016 to 19 July 2016), the Hon. Greg Hunt, MP, Minister for Industry, Innovation and Science (19 July 2016 to 24 January 2017) and Senator the Hon. Arthur Sinodinos AO, Minister for Industry, Innovation and Science (24 January 2017 to 30 June 2017).

General policies of the Australian Government

Under s. 22 of the PGPA Act, the Finance Minister may make a government policy order that specifies a policy of the Australian Government that is to apply in relation to one or more corporate Commonwealth entities. No ministerial directions were received by the AIMS board during 2016–17.

AIMS did not form, or participate in the formation of, any new companies, trusts or partnerships.

In accordance with Senate Standing Order 25(20), AIMS' Annual Report 2015–16 was submitted to the Senate Economics Legislation Committee (the committee) for review. In its document, Annual Reports (No. 1 of 2017), dated 22 March 2017, the committee confirmed that AIMS's annual report was presented in Parliament in a timely manner (by 31 October 2016), and commended agencies (including AIMS) whose annual reports were presented in the Parliament prior to the Supplementary Budget Estimates hearings (which were held in the week beginning 17 October 2016). The committee also considered such aspects as timeliness of presentation and compliance with relevant reporting requirements and found that AIMS' Annual Report 2015–16 was 'apparently satisfactory'. AIMS' Annual Report 2015–16 was not selected by the committee for closer examination.

CORPORATE GOVERNANCE

AIMS Council

AIMS is governed by a Council that reports to the relevant minister. The CEO is responsible for the day-to-day affairs of the Institute.

Role of Council

The AIMS Council sets AIMS' key objectives and research strategies and oversees AIMS' management. The Council advises the minister and the Department of Industry, Innovation and Science of AIMS' progress against its research plans. The minister is also provided with advice on developments of significance, as appropriate.

The PGPA Act requires the AIMS Council, as the accountable authority of AIMS, to comply with the following specific duties:

- the duty to govern the Commonwealth entity
- the duty to establish and maintain systems relating to risk and control
- the duty to encourage cooperation with others
- the duty in relation to requirements imposed on others
- the duty to keep the responsible minister and the Finance Minister informed.

Council members

The AIMS Council consists of a Chairman, AIMS' CEO, a member nominated by James Cook University (JCU), and four other members. The AIMS Act requires that at least three members of Council have scientific qualifications. All members of Council, with the exception of the CEO, are non-executive appointments made by the Governor-General on the nomination of the minister. Appointments can be up to five years and re-appointment is permissible. The CEO is appointed by the Council for a period not exceeding five years and is eligible for re-appointment.

The Honourable Penelope Wensley AC FAIIA

Council Chairman: 01 January 2015 – 31 December 2019

Penny Wensley's appointment as Chairman of the AIMS Council continues a long and distinguished career of public service to Australia and Queensland.

An arts graduate from the University of Queensland (BA 1st Class Hons 1967), Penny chose diplomacy as a career, joining the Australian Department of External Affairs in 1968 and remaining in the diplomatic service for 40 years until 2008, when she returned to her home state to become Governor of Queensland. She served Queensland in this role for six years, from 2008 to 2014.

As a diplomat, Ms Wensley held many significant leadership positions in Australia and overseas, achieving national and international recognition for her contribution to foreign policy and international relations and to the United Nations (UN). Overseas, she served successively as Australia's Consul-General, Hong Kong, Ambassador to the UN in Geneva, Ambassador for the Environment, Ambassador to the UN, New York, High Commissioner to India and Ambassador to France. In all instances, she was the first woman to occupy these roles for Australia. In the Department of Foreign Affairs and Trade in Canberra, she led several major policy divisions, managing Australia's relations with North Asia and Europe and also headed the International Organisations and Legal Division.

As Australia's Ambassador to the UN and Ambassador for the Environment, Ms Wensley played a key role in the negotiation of several major international treaties, including the UN Framework Convention on Climate Change, the Convention on Biological Diversity and the UN Convention to Combat Desertification, and was instrumental in the launch of the International Coral Reef Initiative. She chaired or co-chaired a number of major UN conferences and processes, including the First UN Special Session on HIV/AIDS, the First UN Conference on the Sustainable Development of Small Island Developing States, and the UN Budget and Finance Committee. Although involved with many other areas of policy development and advice during her career, these experiences created an enduring interest in issues of sustainability and natural resource management, in the contribution of science and scientific research to the development of good public policy, and in the area of science communication and building better connections between science and decision-makers.

Ms Wensley applied those interests during her term as Governor, promoting the excellence of Queensland science and research institutions and serving as patron of a wide range of organisations and peak bodies involved with managing Queensland's environment and natural resources. She continues as the National Patron of Soil Science Australia.

Ms Wensley was made an Officer of the Order of Australia in 2001, a Grand Officer of the Order of Merit of France in 2009, and a Companion of the Order of Australia in 2011. She has been awarded honorary doctorates by the University of Queensland (1994), Griffith University (2008), the Queensland University of Technology (2011) and James Cook University (2013). She is a Fellow of the Australian Institute of International Affairs and an Honorary Fellow of the Environment Institute of Australia and New Zealand.

In addition to her role with the AIMS Council, Ms Wensley is a Director of the Lowy Institute for International Policy and Chairman of the Reef 2050 Advisory Committee, established jointly by the Australian and Queensland governments in 2015 to support implementation of the Reef 2050 Long-Term Sustainability Plan for the protection and management of the GBR.

Professor Sandra Harding, BSc (Hons), MPubAdmin, PhD, Hon Doc JIU, FACE, FQA, FAICD, FAIM

Council Member: 10 May 2007 – 27 May 2020

Professor Sandra Harding took up her appointment as Vice Chancellor and President of James Cook University in January 2007. In this role, she is responsible for ensuring clear and effective leadership and management of the University across all operating sites, including campuses in Cairns, Singapore and Townsville.

Professor Harding has extensive academic and academic leadership experience. An economic sociologist by training, her areas of enduring academic interest include work, organisation and markets and how they work. She also has a keen interest in public policy in two key areas: education policy and related areas; and the global tropics, northern Australia and economic development.

Professor Harding has undertaken a wide variety of external roles within the business community and the higher education sector, including Chair of the peak body representing all Australian universities, Universities Australia (2013–15); Member, Defence Science and Technology Organisation Advisory Board (2012–15); and Member, Northern Australia Advisory Group (advising Prime Minister Abbott, 2014–15).

In addition to her membership of the Council of AIMS, current roles include: Project Convener, State of the Tropics project; Chair, Australian Bureau of Statistics Independent Assurance Panel on 2016 Census of Population and Housing data; Commissioner, Australian Centre for International Agricultural Research; Member, Trade, Tourism and Investment Policy Advisory Council; Director, Australian American Education Leadership Foundation; Director, Westpac Bicentennial Foundation Board; Councillor, Queensland Futures Institute; Co-Vice Chair, the New Colombo Plan Reference Group; Director, North Queensland Cowboys NRL club; Director of Townsville Enterprise and of Advance Cairns (regional economic development bodies); and a Governor of the Committee for Economic Development of Australia.

Dr Brian Fisher AO, PSM, BScAgr (Hons), PhD, DScAgr (honoris causa), FASSA

Council Member: 26 September 2007 – 25 March 2017

Brian Fisher is a practised director and board member with wide experience in agricultural science and economics.

He has been Executive Director of the Australian Bureau of Agricultural and Resource Economics, Vice-President at CRA International and CEO of Concept Economics. He is Chairman and Managing Director of economic consulting firm BAEconomics Pty Ltd. Dr Fisher was previously Professor of Agricultural Economics and Dean of Agriculture and Adjunct Professor of Sustainable Resources Development at the University of Sydney. He has published over 290 articles and monographs. He has been an Associate Commissioner of the Productivity Commission and Chairman of the Prime Minister's Exports and Infrastructure Taskforce in 2005. He served as a member of the Australian Government's expert panel on renewable energy in 2014. Dr Fisher served as convening lead author or lead author in Working Group III of the UN Intergovernmental Panel on Climate Change for the Panel's 2nd, 3rd and 4th assessment reports.

Dr Fisher received the Farrer Memorial Medal for agricultural science in 1994, became a Fellow of the Academy of Social Sciences in Australia in 1995, was awarded the Public Service Medal in 2002, became a Distinguished Fellow of the Australian Agricultural and Resource Economics Society and received an Order of Australia in 2007. He holds a PhD in agricultural economics and a DScAgr (honoris causa) from the University of Sydney and is an Adjunct Professor in the Faculty of Science at the University.

Ms Diana Hoff, BSc Petroleum Engineering

Council Member: 16 December 2014 – 15 December 2019

Ms Diana Hoff is an executive in the oil and gas industry with more than 25 years of experience with major and independent companies, including Santos, Chevron and Amoco. She is currently the CEO for The Unconventional Group, which advises energy companies in Australasia, the United Kingdom and North America. Ms Hoff has held senior leadership and technical roles in Australia and the United States across offshore and onshore projects in both countries, as well as Indonesia, Vietnam and Bangladesh. Over her career, Ms Hoff has had responsibility for drilling and completions engineering and operations, production and facilities engineering, major projects, and safety and environment.

Ms Hoff holds a Bachelor of Science, Petroleum Engineering (magna cum laude) from Marietta College, Ohio, United States of America. Her career has included engineering and management, with a significant focus on performance improvement and regulatory processes, including environmental approvals, stakeholder engagement and mitigations to lessen impacts to air quality, water quality and surface disturbance.

Dr Stephen Morton, BSc (Hons), PhD, GAICD

Council Member: 16 December 2014 – 15 December 2019

Dr Stephen Morton has expertise in ecology, natural resource management and ecological sustainability. He is an Honorary Professorial Fellow with Charles Darwin University in Alice Springs. Dr Morton holds a Bachelor of Science (Honours) and a Doctor of Philosophy in animal ecology, both from the University of Melbourne, and has published more than 150 scientific articles, book chapters, books, refereed reports and popular articles.

In the final decade of his career at CSIRO, he held senior positions as Group Executive for Environment and Natural Resources (with responsibility for marine science), for Energy and Environment, and for Manufacturing, Materials and Minerals. In the latter role, Dr Morton oversaw the development of long-term research and development alliances with General Electric, Orica and BHP Billiton.

Since leaving CSIRO in 2011, Dr Morton has worked as an independent scholar and taken on many advisory roles, including Chair of the Scientific Advisory Panel to the Lake Eyre Basin Ministerial Forum, Deputy Chair of Territory Natural Resource Management, Chair of the Arid Recovery Board, member of the Board of the Western Australian Biodiversity Science Institute, Chair of the Steering Committee for the Threatened Species Recovery Hub, and membership of the Australian Heritage Council.

Mr Roy Peterson, BCom, FCA, FTI

Council member: 11 December 2014 – 10 December 2019

Roy Peterson holds a Bachelor of Commerce degree from the University of Queensland. He is a chartered accountant with strong governance and audit committee experience, including internal audit, risk management, process improvement and taxation. Mr Peterson has worked in audit and finance positions for more than 32 years, including 26 years as a Partner with PricewaterhouseCoopers.

Mr Peterson is currently the Chairman of the AIMS Audit Committee. He is a member of a number of audit and finance committees, government bodies and not-for-profit organisations, has chaired the North Queensland Committee for the Australian Institute of Company Directors, and was a member of the Taxation Institute National Taxation Liaison Committee. He is a Fellow of the Institute of Chartered Accountants and a Fellow of the Taxation Institute of Australia.

Ms Anna Matysek B.Ec (Hons), M.Env

Council Member: 15 June 2017 – 14 June 2022

Ms Matysek, an experienced economist and management consultant, is currently Strategy Executive, TransGrid, a position she has held since November 2016.

Ms Matysek offers skills in strategy, business development, consulting, and policy development in the resources, energy and infrastructure sectors from over 15 years' work in both the public and private sectors. She has worked with global mining companies, utilities, industry associations, agribusinesses, and government agencies including holding senior positions in economics consulting firms, the Australian Bureau of Agricultural and Resource Economics and Sciences (ABARES) and the Productivity Commission.

Prior to joining TransGrid, Ms Matysek was General Manager for Business Development and General Manager for Corporate Strategy at Rio Tinto for five years. These roles involved mining asset divestments and overall project design and goal setting for corporate cost cutting programs, productivity performance improvement and investment strategies.

During her time at ABARES, Ms Matysek was also a lead author on the Intergovernmental Panel on Climate Change Fourth Assessment Report on Mitigation, and on the International Assessment of Agricultural Knowledge, Science and Technology for Development.

Ms Matysek was awarded a Master of Environment at the University of Melbourne in 2006, and a Bachelor of Economics (First class honours) at the University of Tasmania in 1999.

Mr John Gunn, BSc (Hons), FTSE, MAICD

CEO and Council Member: 28 November 2011 – 23 July 2017

John Gunn was the CEO of AIMS until 23 July 2017. Mr Gunn has significant experience in leading development of strategy, scientific research and capability, and stakeholder engagement across a research portfolio encompassing marine ecology, fisheries, coastal systems, physical and chemical oceanography, atmospheric chemistry and climate science. Mr Gunn joined AIMS from the position of Chief Scientist of the Australian Antarctic Program, where he played a key role in developing the Australian Antarctic Science Strategy Plan: 2011–2021. Prior to this, he was Deputy Chief of CSIRO's Marine and Atmospheric Research Division.

Mr Gunn has broad experience on high-level advisory and policy development boards and advisory committees, including the UNESCO–IOC Global Ocean Observing System Steering Committee, the National Marine Science Committee, and Australia's Integrated Marine Observing System Board.

Alongside his executive experience, Mr Gunn has an extensive academic record. He has authored over 150 peer-reviewed publications, articles and technical reports, and presented at more than 100 conferences and symposiums, in many instances as the keynote speaker. He has an international reputation in pelagic fish ecology and in the development of marine biology observation technology and systems.

Council attendance

Table 10: Attendance at Council meetings 2016–17

Attendance	26 Aug 2016 (telecon)	19–20 Sep 2016	12 Dec 2016	20–21 Mar 2017	13–14 Jun 2017
The Hon. Penelope Wensley AC	Yes	Yes	Yes	Yes	Yes
Professor Sandra Harding	Yes	No	Yes	Yes	Yes
Dr Brian Fisher AO PSM	Yes	Yes	Yes	Yes	N/A
Dr Stephen Morton	Yes	Yes	Yes	Yes	Yes
Ms Diana Hoff	Yes	Yes	Yes	Yes	Yes
Mr Roy Peterson	Yes	Yes	Yes	Yes	Yes
Ms Anna Matysek B.Ec (Hons), M.Env	N/A	N/A	N/A	N/A	N/A
Mr John Gunn	Yes	Yes	Yes	Yes	Yes

Education and performance review processes for Council members

Council members are provided at their induction with a comprehensive set of documents including the AIMS Code of Conduct, the Australian Government's Corporate Governance Handbook for Company Directors and Committee Members, the PGPA Act, the AIMS Corporate Plan, Research Plan, Business Continuity Plan, Enterprise Agreement and Fraud Control Plan, AIMS Strategic Directions and the AIMS Act.

Council members are encouraged to maintain their membership with the Australian Institute of Company Directors (AICD).

Council members' performance is reviewed regularly, alternately by the Chair and by an external reviewer.

Ethics

Council members are briefed and required to sign the AIMS Code of Conduct. Council members must also abide by the Code of Conduct for Directors published by the AICD.

Disclosure of interest

Section 29 of the PGPA Act provides for the disclosure of material personal interests in a matter that is being considered by the Council, and prohibits participation, deliberation and decision-making by any member on such matters, unless so resolved by the Council or entitled by the minister. Details of such disclosure are recorded in the minutes of the meeting. All of these requirements are currently being met.

Audit Committee

The Audit Committee is a formal subcommittee of the Council that meets quarterly. The 2016–17 Audit Committee members were:

- Mr Roy Peterson (Council member and committee chair)
- Ms Diana Hoff (member)
- Ms Margaret Walker (independent member).

The AIMS CEO, Chief Operating Officer (COO) and Chief Finance Officer (CFO), representatives of the Australian National Audit Office (ANAO), and an internal auditor, attend all meetings or relevant parts of all meetings, by invitation.

In accordance with best practice, all Council members receive copies of Audit Committee agendas and meeting minutes, and can attend meetings as a right.

The Audit Committee is responsible for providing independent assurance and assistance to Council on:

- financial reporting
- performance reporting
- systems of risk oversight and management
- systems of internal control
- internal audit
- external audit.

Four full meetings of the committee were held during 2016–17.

Table 11: Audit Committee attendance 2016–17

Attendance	12 Aug 2016	28 Nov 2016	27 Feb 2017	22 May 2017
Members				
Mr Roy Peterson (Chair)	Yes	Yes	Yes	Yes
Ms Diana Hoff (Council member)	Yes	Yes	Yes	Yes
Ms Margaret Walker (independent member)	Yes	Yes	Yes	Yes
Invitees				
Mr John Gunn (AIMS CEO)—AIMS management representative	No	No	No	No
Mr David Mead (AIMS COO) —representing John Gunn	Yes	Yes	Yes	Yes
Mr Basil Ahyick (AIMS CFO)	Yes	Yes	Yes	Yes
Ms Pamela Giese (AIMS Finance Team Leader)	Yes	Yes	Yes	Yes
Mr Josh Chalmers (Pricewaterhouse Coopers [PwC], internal auditor)	Yes	No	Yes	No
Mr Will Fellowes (PwC, internal auditor)	Yes	Yes	No	Yes
Mr John Skilling (PwC, internal auditor)	No	No	Yes	Yes
Ms Serena Buchanan (ANAO signing officer 2016)	No	No	N/A	N/A
Mr Kristian Gage (ANAO signing officer 2017)	N/A	N/A	Yes	Yes
Mr Benjamin Nicholls (ANAO)	N/A	N/A	Yes	Yes
Mr John Zabala (Moore Stephens, ANAO external auditor to February 2017)	Yes	No	N/A	N/A
Mr Frederic Ferges (RSM Australia, external auditors from March 2017)	N/A	N/A	Yes	Yes
Mr Albert Loots (RSM Australia, external auditors)	N/A	N/A	Yes	Yes

Independent professional advice

The Council has the right to obtain, at AIMS' expense, relevant independent professional advice in connection with the discharge of its responsibilities. They did not seek such advice in 2016–17.

Fraud control

AIMS remains committed to mitigating incidences of fraud and managing risks. AIMS has developed a fraud control plan using the Commonwealth Fraud Control Framework 2014 and in adherence to s. 10 of the PGPA Rule 2014. AIMS reports its fraud data to the Australian Institute of Criminology by 30 September each year.

Financial reporting

AIMS' financial statements are prepared in accordance with:

- Public Governance, Performance and Accountability (Financial Reporting) Rule 2015 (FRR) for the reporting periods ending on or after 1 July 2015
- Australian Accounting Standards and Interpretations – Reduced Disclosure Requirements issued by theAustralian Accounting Standards Board that apply for the reporting period.

The financial statements are accompanied by a signed statement by the directors, CEO and CFO, declaring that the statements comply with the accounting standards and any other requirements prescribed by the FRR and present fairly the entity's financial position, financial performance and cash flows in accordance with s. 42 of the PGPA Act.

There were related entity transactions during 2016–17 (refer to Note 4.3 of the Financial statements).

Performance reporting

Section 39 of the PGPA Act requires an annual performance statement to be provided by corporate Commonwealth entities from 2015–16. AIMS' annual performance statement for 2016–17 starts on page 31 of this report.

Systems of risk oversight and management

Under s. 17(2) (c) of the PGPA Rule, the Audit Committee is responsible for reviewing AIMS' risk framework (and monitoring management's compliance with that framework) and making recommendations to Council to address any significant issues raised.

System of internal audit control

The Audit Committee's responsibilities include reviewing the Audit Plan and all the internal audit reports, and making recommendations to Council and management to address any significant issues raised. The committee also reviewed whether the internal audit coverage aligned with AIMS' key risks. The internal audit function was performed by Pricewaterhouse Coopers during the year. The internal auditor is responsible for independently reviewing risk in accordance with the AIMS Corporate Plan.

External audit

Under s. 43 of the PGPA Act, the Commonwealth Auditor-General, through the ANAO, is the external auditor for AIMS. The Audit Committee reviewed the ANAO Audit Plan and reported to, and met with, ANAO representatives prior to recommending to the Council that the annual financial statements be accepted, and the Statement by Council be signed.

Risk management

AIMS has a comprehensive corporate risk management strategy, which includes processes to identify and assess new risks to AIMS, and to refine existing control measures.

Operational risk management is established across the Institute, with processes, procedures and systems of work in place to manage workplace health and safety risks that may affect AIMS workers. AIMS participates in the annual Comcover risk management benchmarking survey.

Investing and financing activities

AIMS invested its surplus money in accordance with s. 59 of the PGPA Act and AIMS' policy on investments.

Indemnities and insurance premiums for officers

There were no liabilities to any current or former officials of AIMS during the reporting period. No premium was paid (or was agreed to be paid) against a current or former official's liability for legal costs. AIMS paid premiums for directors' and officers' insurances, as required.

Compliance

AIMS conducted its affairs in accordance with the requirements of all applicable laws and regulations, including the PGPA Act and prescribed rules, the applicable policies of the Australian Government, and the internal policies of AIMS. Any government policy orders notified as being applicable to AIMS would be duly complied with (s. 22(3), PGPA Act).

Duty to inform and Ministerial notifications

The AIMS Council is required to notify the responsible minister of any significant issue that has affected AIMS (s. 19(1)(e), PGPA Act). There were no significant issues requiring notification to the responsible minister during 2016–17.

Consultancy services

AIMS engages individuals and companies as external consultants from time to time where it lacks specialist expertise, or when independent research, review or assessment is required.

Consultants are engaged to investigate or diagnose a defined issue or problem, carry out defined reviews or evaluations, or provide independent advice, information or creative solutions to assist in AIMS' decision-making.

Decisions to engage consultants take into consideration the skills and resources required for the task, the skills and/or resources available internally and the cost-effectiveness of these options. Engagement of a consultant is made in accordance with AIMS' Procurement Policy and Procedures and other relevant internal policies.

AIMS spent $157,661 (excluding GST) on consultancies during 2016–17.

Public accountability

Judicial decisions and reviews by outside bodies

No judicial decisions relating to AIMS were handed down during the reporting period.

Ombudsman

No issues relating to AIMS were referred to the Commonwealth Ombudsman during 2016–17 other than the 2015–16 annual report and AIMS' submissions to the public enquiry into the *Public Interest Disclosure Act 2013*.

Industrial relations

No significant industrial relations issues arose during the reporting period.

The AIMS Enterprise Agreement 2015–18 was successfully negotiated and the Australian Institute of Marine Science Award 2001 was replaced by the Australian Government Industry Award 2016.

Customer service charter

AIMS has a formal service charter for dealing with clients, a copy of which is posted on the website. AIMS welcomes feedback on how well it is delivering services against the standards set in this charter. Both the charter and details about how to provide feedback may be found at www.aims.gov.au/docs/about/corporate/service-charter.html.

Parliamentary committees

No reports were produced on the operations of AIMS by a parliamentary committee during 2016–17.

Privacy Act 1988

To ensure the proper management, administration and safety of its officers, employees, visitors, volunteers and contractors, AIMS is required to collect personal, and occasionally sensitive, information. AIMS is committed to the Australian Privacy Principles contained within the *Privacy Act 1988* and has formal processes to manage privacy, as detailed in the AIMS Privacy Policy and Procedures. AIMS has a Privacy Officer (privacy@aims.gov.au) who is responsible for ensuring that AIMS' Privacy Policy and Procedures are adhered to and comply with all applicable statutory requirements.

Freedom of information

Freedom of information requests, reviews, decisions and statements

No requests for documents under the provisions of the *Freedom of Information Act 1982* (FOI Act) were received by AIMS during 2016–17.

In addition, no applications were received during 2016–17:

- for internal review of decisions made under the FOI Act
- for external review by the Administrative Appeals Tribunal of decisions made under the FOI Act
- to amend any records under the FOI Act.

FOI operations

Agencies subject to the FOI Act are required to make information available to the public as part of the Information Publication Scheme (IPS). This requirement is in Part II of the FOI Act and has replaced the former requirement to publish a Section 8 Statement in the annual report. Each agency must display on its website a plan showing what information it publishes in accordance with the IPS requirements.

The documents listed in AIMS' IPS Agency Plan are generally freely available to any person requesting them. The availability of other information is subject to assessment which is made on a case-by-case basis in accordance with the relevant provisions in the FOI Act, as supplemented and explained in the relevant fact sheets, guidelines and other materials published on the website of the Office of the Australian Information Commissioner (www.oaic.gov.au/freedom-of-information/foi-resources/all/). The grounds for assessment include considerations of commercial confidentiality, legal professional privilege and personal privacy. The FOI Act and the above website explain these, the other unconditional exemptions and the conditional exemptions contained in the current legislation.

Requests for any such information from AIMS must be made in writing, addressed to the relevant person, and must contain the information set out under 'How do I make an FOI request?' in FOI Fact Sheet 6 Freedom of information—How to apply on the above website. The request should be addressed to the FOI Officer at the address given below. There is no fee payable for the request. However, fees and charges may apply and if they do, will be set in accordance with Part 4 of the FOI Guidelines, which are available from the FOI website.

Information publication scheme

AIMS continues to undertake actions consistent with compliance requirements under the IPS introduced in May 2011 pursuant to the relevant provisions in the FOI Act. The IPS encourages governments and government agencies to provide open, accountable and transparent information in formats that are easy to understand and freely accessible.

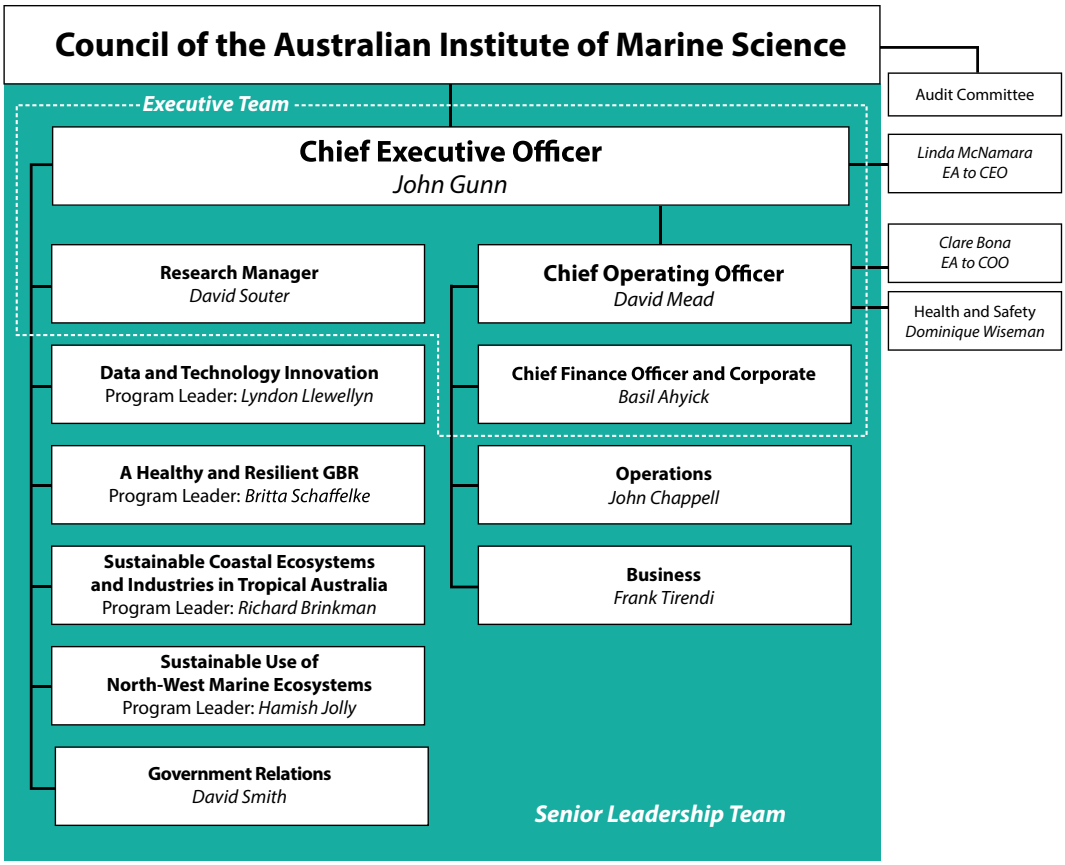
Contact

All enquiries and requests for information, or concerning access to documents or any other matters relating to FOI, should be directed to:

FOI Officer
Australian Institute of Marine Science
PMB No 3, Townsville Mail Centre MC, Qld 4810
Telephone: (07) 4753 4444
Facsimile: (07) 4772 5852
Email: privacy@aims.gov.au

OUR PEOPLE

Organisational structure



Organisational structure of the Australian Institute of Marine Science (June 2017).

Staff

AIMS employed an average core of 219 full-time equivalent (FTE) science and support staff during the 2016–17 financial year, including 4.54 FTE casuals,13.27 FTE temporary staff and 1.84 FTE seconded from the Department of Industry Innovation and Science. In addition, AIMS employed 42.0 FTE staff via outsourced functions (Figure 12).

Many of our scientists are world authorities in their field who have achieved international acclaim for their research. The work of the research scientists is supported by a variety of professional support staff skilled in research, laboratory services, data collection and data management. Technical and corporate support staff deliver commercial services, intellectual property portfolio management, engineering services, field operations, information technology, information services, science communication, and financial, human resource, supply, facility and general management services. Where appropriate, AIMS contracts services; currently contracted services are for catering, cleaning, site maintenance, security and crewing marine research vessels.

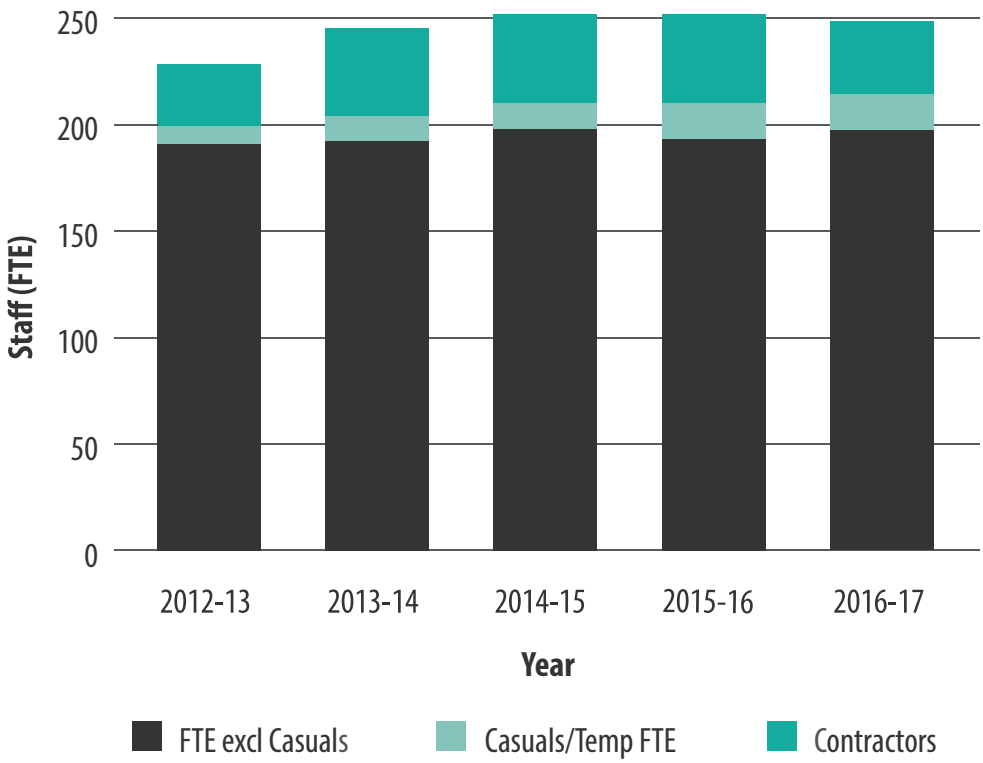


Figure 12: Total staff numbers

AIMS core staff numbers

Table 12: Core staff numbers 2012–13 to 2016–17

Staff category	**Number of staff (FTE)**				
	2012–13	**2013–14**	**2014–15**	**2015–16**	**2016–17**
Total (excluding casual and temporary)	191	192	198	193	199
Casual and temporary	7	11	12	17	20
Total	**198**	**203**	**210**	**210**	**219**
Postdoctoral researchers (included in total)	(13)	(11)	(11)	(4)	(7)

Number of contractors engaged

AIMS outsources a number of functions via competitive tendering. The subcontracted companies employ approximately 39 FTE of staff dedicated to these functions.

Staff consultation

Staff consultation and communication take place via a range of mediums, such as all-staff meetings, emails and newsletters. The Joint Consultative Committee, comprising AIMS CEO (Chair), a management representative (Chief Operating Officer), the Human Resources Manager, Community and Public Sector Union (CPSU) representatives (internal), a CPSU organiser (external), and a staff representative, met four times in 2016–17. This committee provides a forum for discussion and consultation between management and staff representatives on issues that may affect staff conditions and entitlements.

Equal employment opportunity and workplace diversity

AIMS' Workforce Diversity Policy acknowledges differences and adapts work practices to create an inclusive work environment in which diverse skills, perspectives and cultural backgrounds are valued.

AIMS' staffing policies and procedures align with the requirements of the *Equal Employment Opportunity (Commonwealth Authorities) Act 1987*. Designed to ensure that workplace diversity and equality of opportunity are fundamental operating principles for AIMS, they include:

- regularly reviewing employment policies and practices, and providing ongoing instruction for user groups
- promoting AIMS as an equal opportunity employer in all recruitment advertisements placed in online media and on the AIMS website
- supporting equity of access and providing amenities for people with disabilities in AIMS' public access facilities, such as conference rooms, theatre, library, canteen and display areas
- constructing new facilities that support equity of access
- catering to those with a disability, and providing a wheelchair, if required, on public tours of AIMS
- having mechanisms in place to handle complaints and grievances (formal and informal) to address issues and concerns raised by staff and visitors.

Staff numbers by gender

Table 13: Staff numbers by gender and occupation 2016–17

Category	**Number of core staff (FTE) 2016–17 (2015–16)**		
	Female	**Male**	**Total**
Research scientists	21 (19)	25 (28)	46 (47)
Research support	24 (23)	44 (45)	68 (68)
Technical and corporate support	37 (35)	68 (60)	105 (95)
Total staff	**82(77)**	**137 (133)**	**219 (210)**

Staff diversity

Table 14: Staff numbers in equal employment opportunity categories

Equal employment opportunity category	Proportion of total staff 2016–17 (2015–16)
Aboriginal and Torres Strait Islander	0.83% (0.5%)
Non-English speaking background	16.44% (15.3%)
Staff with disability	1.84% (1.5%)
Women	37.25% (36.8%)

Women in science

The objective of the Women@AIMS Reference Group is to promote diversity and equity within the organisation. The group, formed in 2009, seeks opportunities for creating a flexible and family-friendly work environment. In particular, it identifies issues and barriers that are specific to women in the workplace and aims to provide solutions.

During 2016–17 AIMS commenced development of a gender equity strategy; through its implementation we will further enhance our commitment to an inclusive, gender-diverse workplace.

Code of conduct

AIMS has a code of conduct to which the Council, management, staff and visitors are required to adhere. The code complies with the *Public Governance, Performance and Accountability Act 2014*. New Council members, staff and visitors are briefed on the code during induction. Council members abide by the Code of Conduct for Directors published by the Australian Institute of Company Directors.

Workplace behaviour

Management, staff and visitors at AIMS share the responsibility of providing and working in an environment free of harassment and other unacceptable forms of behaviour. In accordance with the AIMS Code of Conduct, staff are required to treat others with courtesy, respect, dignity, fairness and equity, and to have concern for their rights, freedoms and individual needs. A high standard of behaviour is expected and AIMS has a set of principles outlining the way staff are expected to behave towards others.

Workplace Harassment Contact Officers are available throughout AIMS to discuss, in confidence, matters of concern regarding harassment and associated issues raised by a staff member. AIMS had two formal reported cases of harassment in 2016–17.

Public interest disclosure (whistleblower policy)

AIMS has a whistleblower policy designed to facilitate effective notification, assessment and management of the disclosure of serious wrongdoings in accordance with the *Public Interest Disclosure Act 2013*.

AIMS strongly encourages reporting of serious wrongdoing, and will take appropriate and necessary action to uphold the integrity of the Institute and promote public interest. To achieve our goals and obligations in this regard, AIMS is committed to creating and maintaining an environment and culture in which the disclosure of serious wrongdoings is fully supported and protected. AIMS had one formal reported public interest disclosure case in 2016–17.

Disability strategy

AIMS is committed to ensuring that people with disabilities are given opportunities for independence, access and full participation. AIMS assesses cases individually and endeavours to implement the most appropriate measures to assist people with disabilities.

AIMS' physical resources continue to be upgraded to meet access needs for people with disabilities, which includes provision for people with a disability in building modifications and in the construction of new facilities.

Employee assistance program

Optum Health and Technology Pty Ltd is contracted by AIMS to provide an independent employee assistance program (EAP). The EAP is free to staff, their family members and authorised visitors, and provides for up to six sessions to assist with issues of:

- relationship and family problems
- maximising performance
- depression, anxiety and stress
- conflict and communication
- children or family member concerns
- grief and bereavement
- elder care issues
- addiction
- work–life balance
- career path issues
- retirement
- work stress.

Participants can refer themselves or be encouraged by a colleague, a supervisor, human resource staff or workplace health and safety staff to access the program. The use rate by staff during 2016–17 was 9.52%, an increase on the 2015–16 rate of 5.24%. Analysis reveals that staff accessed the service primarily for issues of a personal nature.

HEALTH AND SAFETY

AIMS understands its responsibilities under Part 2 of the *Work, Health and Safety Act 2011*, and is committed to complying with work health and safety legislation and standards of best practice (Australian Standards and national and other relevant codes of practice) and the ongoing implementation of the *Marine Safety (Domestic Commercial Vessel) National Law Act 2012* and National Standards for Commercial Vessels.

AIMS is committed to protecting the health and safety of its workers and other persons against harm to their health, safety and welfare by eliminating or minimising risks arising from work. AIMS recognises the importance of providing a safe work environment, a robust and accessible health and safety management system, and fostering a culture focused on awareness, open communication, safety education and supervision, risk management and safe working methods.

AIMS uses active communication and consultation processes to involve its workforce in safety discussions and decision-making processes. Workers are engaged and have input through safety meetings, targeted working groups, safety briefings, proactive hazard identification and incident reporting. AIMS workers belong to working groups represented by staff-appointed health and safety representatives (HSRs) who participate in routine Safety Committee meetings, audit and inspection routines and incident reporting notifications.

Hazards are identified and risks assessed in line with AIMS' Risk Management Framework and established operational risk management practices, allowing effective management of the complexities of the research work, activities and necessary supporting functions. The Institute fosters a reporting culture to ensure that all personnel feel able to delay or stop work where an unacceptable risk may be present or develop, and report hazards or incidents identified.

AIMS holds that 'safe science is good science' and that safety is a shared value embedded in everything we do. Management is committed to understanding and managing our health and safety risk profile, and dedicates significant resources towards continual improvement projects and strategies.

AIMS' strategic work health and safety pillars are:

- leadership
- policy and procedure
- risk management
- reporting and investigation
- training and communication
- health and wellbeing.

Our commitment to the ongoing health and safety of all of our workers is demonstrated by the number and diversity of roles, resources and training dedicated to health and safety management at AIMS. Roles include:

- three dedicated Health and Safety Officers
- eight HSRs and a Safety Committee
- Chief and Deputy Chief Emergency Wardens, Fire and Deputy Fire Wardens
- Diving Officer (safety focus)
- Boating Officer (safety focus)
- Laboratory Operations Manager and dedicated Laboratory Managers
- First Aid Officers
- Cyclone Officer
- Harassment Contact Officers
- Quarantine Officer (statutory position)
- Radiation Safety Officer (statutory position)
- Biosafety Officer (statutory position)
- Fire Safety Adviser (contracted)
- Return-to-Work and Rehabilitation Officer.

Recent training provided includes:

- Operational Risk Management
- Mental Health and Wellbeing
- Hazard and Incident Reporting and Investigation
- Fire Warden
- Health and Safety Representative
- Rehabilitation and Return to Work
- Participative Ergonomics for Manual Tasks program (PErforM)
- General Manual Task Training
- Crane Operations
- Working at Height
- Elevated Work Platform Operations
- First Aid and Advanced Resuscitation
- Elements of Shipboard Safety
- Coxswains training and assessment
- Rescue Diver
- ADAS commercial diving accreditation
- Site-specific inductions.

Continuous improvement

In 2016–17, AIMS continued to focus on manual task injury prevention, proving training, workplace adjustments, ergonomic assessments and fitness opportunities to staff. This focus will continue in 2017–18 with a strong focus on early intervention strategies. In addition, mental health and wellbeing was a focus area this year, with lectures and supervisor workshops made available to staff to promote awareness and develop competency in managing mental health issues in the workplace.

Continuous improvement was also driven through the AIMS health, safety and environment strategic plan, with improvement in all areas. In particular, AIMS has further developed safety leadership in all staff, promoting AIMS' safety values as part of the "Take AIM" informal risk management program, in addition to providing safety culture leadership sessions.

Additionally, AIMS' safety management system is continually refined and updated to ensure relevancy and effectiveness at managing organisational risk and compliance against AS/NZS 4801 and AS/NZS ISO 14001, while also ensuring information is readily accessible to staff. To this end, AIMS has published a safety handbook that summarises requirements of the AIMS safety management system.

System audits and inspections

Compliance with AIMS' health and safety management system policies and procedures is routinely assessed as part of AIMS' internal audit committee processes. AIMS workplace inspections remain on schedule, ensuring the provision of safe workplaces throughout AIMS. This process engages senior leaders, HSRs, area managers and staff in the identification of potentially unsafe conditions. Mobile technology is available to staff to facilitate recording in AIMS' health and safety reporting system.

Incidents and hazard reporting

During 2016–17, 395 potential safety matters, of which 84% were hazards, were formally recorded in our incident management system. Appropriate preventative actions were implemented, demonstrating a commitment to continuous improvement of safety at AIMS.

AIMS had ten recordable injuries (lost time injury, medical treatment case, and restricted work case) and a further seven minor injuries.

No incidents were notified to Comcare, the workplace health and safety regulator, under the requirements of Part 3, ss. 36 and 37 of the *Work Health and Safety Act 2011*, in relation to serious injury or illness, or dangerous incident.

No new workers' compensation claims were made under the Comcare workers' compensation scheme.

ENVIRONMENTAL PERFORMANCE

AIMS demonstrates an extensive commitment to environmental protection and biodiversity conservation. The Institute has worked with industry, government, the community and other scientific institutions and agencies on programs and projects dedicated to conserving and sustainably managing tropical marine resources. As a community leader in tropical Australia and a Commonwealth statutory authority, AIMS has both a moral obligation and a statutory obligation under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) to protect and maintain the biodiversity and heritage under its control.

In addition to our many activities contributing to environmental protection and biodiversity conservation, we are committed to minimising any adverse effects on the environment arising from our own activities.

Reducing AIMS' environmental impacts

In 2016–17, AIMS commenced refurbishment of the main complex at the Cape Ferguson facility. As part of the main complex upgrade AIMS has implemented measures to reduce our energy consumption, including the installation of Low-E glass to the external windows (to reduce air-conditioning loads) and replacement of existing lighting with controlled LED lighting systems to reduce electricity consumption throughout the facility.

In 2017–18 AIMS will start a project to install a 800-kW photovoltaic solar system at the Cape Ferguson facility reducing AIMS' energy consumption by approximately 15% dependent on weather conditions and final equipment selection.

As well as focusing on improvements in electricity consumption, AIMS continues to promote energy efficiency among the workforce.

AIMS operates a car-pooling program whereby staff, visitors and students travel to and from AIMS each day in a commuter vehicle. The vehicles AIMS selects for the commuter fleet must achieve a Green Vehicle Guide rating of 10.5 or higher. It is estimated that the commuter program reduces the number of vehicles travelling to and from AIMS each day by between 80 and 100 vehicles.

Water usage

AIMS used 37.85 ML of water in 2016–17, a reduction from 43.9 ML the previous year. The reduction is due to improved monitoring of the sites' water usage and increased water capacity in recycled water storage due to favourable weather conditions.

Recycling

AIMS operates an active recycling program for paper, cardboard, batteries, printer cartridges, lubricants and metals. In 2016–17, we recycled 9300 kg of paper, 34,450 kg of cardboard and diverted approximately 36 kg of printer cartridge waste from landfill.

Energy usage

AIMS' Cape Ferguson site electricity consumption for 2016–17 was 7820 GW for the year, compared with 8190 GW in 2015–16. The reduction in consumption resulted from optimising the charging process of the thermal energy storage tank that maintains environmental control for site buildings and experimental systems.

Radiation safety

AIMS continues to hold a source licence issued by the Australian Radiation Protection and Nuclear Safety Agency. This licence is subject to conditions including quarterly reporting, maintaining a source inventory and complying with relevant regulations, codes and standards.

Gene technology

One new proposal for dealing with genetically modified organisms (GMOs) and one project extension were assessed out-of-session by the AIMS Biosafety Committee this year. Two projects, defined by the Office of the Gene Technology Regulator as exempt dealings, were completed. AIMS now has six active GMO projects: one notifiable low-risk dealing and five exempt dealings.

FINANCIAL STATEMENTS

Australian National Audit Office

INDEPENDENT AUDITOR'S REPORT

To the Minister for Industry, Innovation and Science

Opinion

In my opinion, the financial statements of the Australian Institute of Marine Science for the year ended 30 June 2017:

(a) comply with Australian Accounting Standards – Reduced Disclosure Requirements and the *Public Governance, Performance and Accountability (Financial Reporting) Rule 2015*; and

(b) present fairly the financial position of the Australian Institute of Marine Science as at 30 June 2017 and its financial performance and cash flows for the year then ended.

The financial statements of the Australian Institute of Marine Science, which I have audited, comprise the following statements as at 30 June 2017 and for the year then ended:

- Statement by the Council Chairman, Chief Executive Officer and Chief Finance Officer;
- Statement of Comprehensive Income;
- Statement of Financial Position;
- Statement of Changes in Equity;
- Cash Flow Statement; and
- Notes to and Forming Part of the Financial Statements.

Basis for Opinion

I conducted my audit in accordance with the Australian National Audit Office Auditing Standards, which incorporate the Australian Auditing Standards. My responsibilities under those standards are further described in the *Auditor's Responsibilities for the Audit of the Financial Statements* section of my report. I am independent of the Australian Institute of Marine Science in accordance with the relevant ethical requirements for financial statement audits conducted by the Auditor-General and his delegates. These include the relevant independence requirements of the Accounting Professional and Ethical Standards Board's APES 110 *Code of Ethics for Professional Accountants* to the extent that they are not in conflict with the *Auditor-General Act 1997* (the Code). I have also fulfilled my other responsibilities in accordance with the Code. I believe that the audit evidence I have obtained is sufficient and appropriate to provide a basis for my opinion.

Council's Responsibility for the Financial Statements

As the Accountable Authority of the Australian Institute of Marine Science the Council is responsible under the *Public Governance, Performance and Accountability Act 2013* for the preparation and fair presentation of annual financial statements that comply with Australian Accounting Standards – Reduced Disclosure Requirements and the rules made under that Act. The Council is also responsible for such internal control as the Council determines is necessary to enable the preparation and fair presentation of financial statements that are free from material misstatement, whether due to fraud or error.

In preparing the financial statements, the Council is responsible for assessing the Australian Institute of Marine Science's ability to continue as a going concern, taking into account whether the entity's operations will cease as a result of an administrative restructure or for any other reason. The Council is also responsible for disclosing matters related to going concern as applicable and using the going concern basis of accounting unless the assessment indicates that it is not appropriate.

Auditor's Responsibilities for the Audit of the Financial Statements

My objective is to obtain reasonable assurance about whether the financial statements as a whole are free from material misstatement, whether due to fraud or error, and to issue an auditor's report that includes my opinion. Reasonable assurance is a high level of assurance, but is not a guarantee that an audit conducted in accordance with the Australian National Audit Office Auditing Standards will always detect a material misstatement when it exists. Misstatements can arise from fraud or error and are considered material if, individually or in the

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aggregate, they could reasonably be expected to influence the economic decisions of users taken on the basis of the financial statements.

As part of an audit in accordance with the Australian National Audit Office Auditing Standards, I exercise professional judgement and maintain professional scepticism throughout the audit. I also:

- identify and assess the risks of material misstatement of the financial statements, whether due to fraud or error, design and perform audit procedures responsive to those risks, and obtain audit evidence that is sufficient and appropriate to provide a basis for my opinion. The risk of not detecting a material misstatement resulting from fraud is higher than for one resulting from error, as fraud may involve collusion, forgery, intentional omissions, misrepresentations, or the override of internal control;
- obtain an understanding of internal control relevant to the audit in order to design audit procedures that are appropriate in the circumstances, but not for the purpose of expressing an opinion on the effectiveness of the entity's internal control;
- evaluate the appropriateness of accounting policies used and the reasonableness of accounting estimates and related disclosures made by the Council;
- conclude on the appropriateness of the Council's use of the going concern basis of accounting and, based on the audit evidence obtained, whether a material uncertainty exists related to events or conditions that may cast significant doubt on the entity's ability to continue as a going concern. If I conclude that a material uncertainty exists, I am required to draw attention in my auditor's report to the related disclosures in the financial statements or, if such disclosures are inadequate, to modify my opinion. My conclusions are based on the audit evidence obtained up to the date of my auditor's report. However, future events or conditions may cause the entity to cease to continue as a going concern; and
- evaluate the overall presentation, structure and content of the financial statements, including the disclosures, and whether the financial statements represent the underlying transactions and events in a manner that achieves fair presentation.

I communicate with those charged with governance regarding, among other matters, the planned scope and timing of the audit and significant audit findings, including any significant deficiencies in internal control that I identify during my audit.

Australian National Audit Office

Kristian Gage
Executive Director

Delegate of the Auditor-General

Canberra

25 August 2017

Australian Government | Australian Institute of Marine Science | TOWNSVILLE | DARWIN | PERTH

STATEMENT BY THE ACCOUNTABLE AUTHORITY, CHIEF EXECUTIVE OFFICER AND CHIEF FINANCIAL OFFICER

In our opinion, the attached Financial Statements for the year ended 30 June 2017 comply with subsection 42(2) of the *Public Governance, Performance and Accountability Act 2013* (PGPA Act), and are based on properly maintained financial records as per subsection 41(2) of the PGPA Act.

In our opinion, at the date of this statement, there are reasonable grounds to believe that the Australian Institute of Marine Science will be able to pay its debts as and when they fall due.

This statement is made in accordance with the resolution of the Directors.

Signed

The Hon Penelope Wensley AC
Chairman
25 August 2017

Signed

Dr. Paul Hardisty
Chief Executive Officer
25 August 2017

Signed

Mr. Basil Ahyick
Chief Financial Officer
25 August 2017

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Statement of Comprehensive Income

for the period ended 30 June 2017

	Notes	2017 $'000	2016 $'000	Original Budget 2017 $'000	Variance[1] Actual vs 2017 Original Budget $'000	
NET COST OF SERVICES						
Expenses						
Employee benefits	1.1A	**27,404**	26,832	27,551	147	
Suppliers	1.1B	**22,103**	23,372	25,283	3,180	2
Depreciation and amortisation	2.2A	**11,758**	12,184	12,138	380	
Foreign exchange loss		**26**	53	-	(26)	
Losses from asset sales		**146**	436	-	(146)	
Total expenses		**61,437**	62,877	64,972	3,535	
Own-source income						
Own-source revenue						
Rendering of services		**16,318**	16,324	17,953	(1,635)	3
Interest on deposit		**1,109**	1,283	1,200	(91)	
Other revenue	1.2	**885**	354	150	735	
Total own-source revenue		**18,312**	17,961	19,303	(991)	
Gains						
Gains from sale of assets		**99**	128	-	99	
Total gains		**99**	128	-	99	
Total own-source income		**18,411**	18,089	19,303	(892)	
Net cost of services		**(43,026)**	(44,788)	(45,669)	2,643	
Revenue from Government		**41,552**	40,483	41,552	-	
Surplus/(Deficit)		**(1,474)**	(4,305)	(4,117)	2,643	
OTHER COMPREHENSIVE INCOME						
Changes in asset revaluation surplus		**-**	(122)	-	-	
Total other comprehensive income/(loss)		**(1,474)**	(4,427)	(4,117)	2,643	

The above statement should be read in conjunction with the accompanying notes.

[1] *Variances in brackets represent unfavourable variances.*

[2,3] Budget variances commentary is contained in Budget Variance Commentary Note.

Statement of Financial Position

as at 30 June 2017

	Notes	2017 $'000	2016 $'000	Original Budget 2017 $'000	Variance[4] Actual vs 2017 Original Budget $'000	
ASSETS						
Financial assets						
Cash and cash equivalents	2.1A	**8,764**	8,338	250	8,514	5
Trade and other receivables	2.1B	**5,534**	5,211	4,700	834	6
Other investments	2.1C	**27,800**	28,100	34,514	(6,714)	7
Total financial assets		**42,098**	41,649	39,464	2,634	
Non-financial assets						
Buildings	2.2A	**90,005**	88,792	90,100	(95)	
Infrastructure, plant and equipment	2.2A	**32,994**	36,010	35,154	(2,160)	
Computer equipment	2.2A	**1,525**	1,597	1,787	(262)	
Computer software	2.2A	**2,305**	2,376	2,473	(168)	
Vehicles	2.2A	**1,296**	1,432	1,144	152	
Office equipment	2.2A	**28**	43	28	0	
Ships, launches & vessels	2.2A	**18,332**	19,367	18,916	(584)	
Library books	2.2A	**42**	60	42	(0)	
Inventories		**163**	174	185	(22)	
Other non-financial assets	2.2B	**2,719**	2,481	2,297	422	
Total non-financial assets		**149,409**	152,332	152,126	(2,717)	
Total assets		**191,507**	193,981	191,590	(83)	
LIABILITIES						
Payables						
Suppliers	2.3A	**1,813**	3,000	3,039	1,226	
Other payables	2.3B	**3,252**	3,547	3,598	346	
Total payables		**5,065**	6,547	6,637	1,572	
Provisions						
Employee provisions	4.1	**9,890**	9,408	10,297	407	
Total provisions		**9,890**	9,408	10,297	407	
Total liabilities		**14,955**	15,955	16,934	1,979	
Net assets		**176,552**	178,026	174,656	1,896	
EQUITY						
Contributed equity		**86,607**	86,607	86,607	-	
Reserves		**68,144**	68,144	68,266	(122)	
Retained surplus		**21,801**	23,275	19,783	2,018	
Total equity		**176,552**	178,026	174,656	1,896	

The above statement should be read in conjunction with the accompanying notes.

[4] *Variances in brackets represent unfavourable variances.*

[5,6,7] Budget variances commentary is contained in Budget Variance Commentary Note.

Statement of Changes in Equity

for the period ended 30 June 2017

	Notes	2017 $'000	2016 $'000	Original Budget 2017 $'000	Variance[8] Actual vs 2017 Original Budget $'000
CONTRIBUTED EQUITY					
Opening balance					
Balance carried forward from previous period		**86,607**	86,607	86,607	-
Adjusted opening balance		**86,607**	86,607	86,607	-
Closing balance as at 30 June		**86,607**	86,607	86,607	-
RETAINED EARNINGS					
Opening balance					
Balance carried forward from previous period		**23,275**	27,580	23,900	(625)
Adjusted opening balance		**23,275**	27,580	23,900	(625)
Comprehensive income					
Surplus/(Deficit) for the period		**(1,474)**	(4,305)	(4,117)	2,643
Total comprehensive income		**(1,474)**	(4,305)	(4,117)	2,643
Closing balance as at 30 June		**21,801**	23,275	19,783	2,018
ASSET REVALUATION RESERVE					
Opening balance					
Balance carried forward from previous period		**68,144**	68,266	68,266	(122)
Adjusted opening balance		**68,144**	68,266	68,266	(122)
Comprehensive income					
Other comprehensive income		**-**	(122)	-	-
Total comprehensive income		**-**	(122)	-	-
Closing balance as at 30 June		**68,144**	68,144	68,266	(122)
TOTAL EQUITY					
Opening balance					
Balance carried forward from previous period		**178,026**	182,453	178,773	(747)
Adjusted opening balance		**178,026**	182,453	178,773	(747)
Comprehensive income					
Surplus/(Deficit) for the period		**(1,474)**	(4,305)	(4,117)	2,643
Movement in reserves		**-**	(122)	-	-
Total comprehensive income		**(1,474)**	(4,427)	(4,117)	2,643
Closing balance as at 30 June		**176,552**	178,026	174,656	1,896

The above statement should be read in conjunction with the accompanying notes.

[8] *Variances in brackets represent unfavourable variances.*

Budget variances commentary is contained in Budget Variance Commentary Note.

Cash Flow Statement

for the period ended 30 June 2017

	Notes	2017 $'000	2016 $'000	Original Budget 2017 $'000	Variance[9] Actual vs 2017 Original Budget $'000	
OPERATING ACTIVITIES						
Cash received						
Receipts from Government		**41,552**	40,483	41,552	-	
Rendering of services		**16,623**	18,156	18,219	1,596	10
Interest		**1,272**	1,230	1,200	(72)	
Net GST received		**1,586**	1,140	-	(1,586)	
Other		**885**	310	150	(735)	
Total cash received		**61,918**	61,319	61,121	(797)	
Cash used						
Employees		**26,821**	27,590	26,801	(20)	
Suppliers		**26,315**	25,527	25,713	(602)	11
Total cash used		**53,136**	53,117	52,514	(622)	
Net cash from operating activities		**8,782**	8,202	8,607	175	
INVESTING ACTIVITIES						
Cash received						
Proceeds from sales of property, plant and equipment		**232**	440	475	(243)	
Transfer of funds from investments		**300**	-	1,077	(777)	12
Total cash received		**532**	440	1,552	(1,020)	
Cash used						
Purchase of property, plant and equipment		**8,888**	6,733	10,159	1,271	13
Transfer of funds to investments		**-**	1,400	-	-	
Total cash used		**8,888**	8,133	10,159	1,271	
Net cash used by investing activities		**(8,356)**	(7,693)	(8,607)	251	
FINANCING ACTIVITIES						
Net cash from/used by financing activities		**-**	-	-	-	
Net increase in cash held		**426**	509	**-**	426	
Cash and cash equivalents at the beginning of the reporting period		**8,338**	7,829	250	8,088	
Cash and cash equivalents at the end of the reporting period		**8,764**	8,338	250	8,514	

The above statement should be read in conjunction with the accompanying notes.

[9] *Variances in brackets represent unfavourable variances.*

[10,11,12,13] Budget Variances Commentary is contained in Budget Variance Commentary Note.

Budget Variances Commentary

The following tables provide a comparison between the 2016-17 Portfolio Budget Statement (PBS) budget and the final financial outcome in the 2016-17 financial statements. The PBS is not audited.

Variances are considered to be "major" based on the following criteria:

- the variance between budget and actual is greater than 10% and
- the variance between budget and actual is greater than 1% of the relevant category (Income, Expense and Equity totals); or
- an item below this threshold is considered important for the reader's understanding or is relevant to an assessment of the discharge of accountability and to an analysis of the performance of AIMS.

Affected line items	Explanations of major variances
Statement of Comprehensive Income	
[2]Suppliers	Variance of $3.180 million is due to supplier expenses reducing in parallel to reduced earnings from external funding of research projects as well as reduction in some operational costs. Fewer contracts were completed resulting in reduced expenses. In addition, the timing of several projects with related expenses has been moved from 2016-17 to 2017-18 and beyond.
[3]Rendering of services	Variance of $1.635 million in revenue from rendering of services is the result of some projects being deferred to 2017-18 and beyond and some of the budgeted projects not eventuating.
Statement of Financial Position	
[5]Cash and cash equivalents	Variance of $8.514 million is due to more cash being held on short term deposits of 3 months or less at reporting date. AIMS budgeted for longer term deposits which are classed as investments, not cash.
[6]Trade and other receivables	Variance of $0.834 million has resulted from contracts execution delays resulting in two large receivables being generated at year end.
[7] Other investments	Variance of $6.714 million is due to more cash being held on short term deposits of 3 months or less at reporting date. Total cash held at year end variance was $1.8 million.
Cashflow Statement	
[10]Rendering of services	Variance of $1.596 million is due to less cash received during the year as a reflection of reduced external revenue.
[11]Suppliers	Variance of $0.602 million is partly due to less payments being made during the year as a reflection of reduced expenditure in relation to external revenue earnings. This was offset by payment of invoices that were processed late in June 2016 and paid in this financial year.
[12]Transfer of funds from investment	Variance of $0.777 million is the result of transferring funds between short-term and long-term investments.
[13]Purchase of property plant and equipment	Variance of $1.271 million is mainly due to the delay in the refurbishment of the Administration building. The budget will be transferred to 2017-18.

Notes to the financial statements

Note to and Forming Part of the Financial Statements

Overview

Objective of Australian Institute of Marine Science

Australian Institute of Marine Science (AIMS) is an Australian Government controlled entity. It is a not-for-profit entity. The objective of AIMS is to undertake scientific research in support of the protection and sustainable development of Australia's marine resources.

AIMS is structured to meet one outcome:

Outcome 1: Growth of knowledge to support protection and sustainable development of Australia's marine resources through innovative marine science and technology.

The continued existence of AIMS in its present form and with its present programs is dependent on Government policy and on continuing funding by Parliament for AIMS administration and science research programs.

Basis of preparation of the financial statements

The Financial Statements are general purpose financial statements and are required by section 42 of the Public Governance, Performance and Accountability Act 2013 (PGPA Act).

The financial statements have been prepared in accordance with:

- *Public Governance, Performance and Accountability (Financial Reporting) Rule 2015* (FRR) for reporting periods ending on or after 1 July 2015; and
- Australian Accounting Standards and Interpretations - Reduced Disclosure Requirements issued by the Australian Accounting Standards Board (AASB) that apply for the reporting period.

The financial statements have been prepared on an accrual basis and in accordance with the historical cost convention, except for certain assets at fair value. Except where stated, no allowance is made for the effect of changing prices on the results or the financial position.

The financial statements are presented in Australian dollars and values are rounded to the nearest thousand dollars unless otherwise specified.

Accounting judgements and estimates

Recognition of revenue for rendering of services – *Refer Note 1.2: Own-Source Revenue and Gains*

Impairment of trade receivables – *Refer Note 2.1B: Trade and Other Receivables*

Fair value of buildings, plant and equipment – *Refer Note 2.2: Non-Financial Assets*

Remaining useful lives of buildings, infrastructure, plant and equipment - *Refer Note 2.2: Non-Financial Assets*

Employee entitlement provision – *Refer Note 4.1: Employee Provisions*

Contingent assets and contingent liabilities – *Refer Note 5.1: Contingent Assets and Liabilities*

No accounting assumptions or estimates have been identified that have a significant risk of causing a material adjustment to carrying amounts of assets and liabilities within the next accounting period.

New Australian accounting standards

Adoption of New Australian Accounting Standard Requirements

AASB 2015-7 was adopted in the prior accounting period. No other accounting standard has been adopted earlier than the application date.

The following new standards, revised standards, interpretations, amending standards were issued prior to the signing of the statements by the Chairman of Council, Chief Executive Officer and Chief Financial Officer, were applicable to the current reporting period and had impact as to disclosure on AIMS financial statements.

i) ***AASB 2015-6 Amendments to Australian Accounting Standards – Extending Related Party Disclosure to Not-for Profit Public Sector Entities (1 July 2016)***

The key impact of the amendments is to specify consistent related party disclosure requirements for the Australian Government and has had impact on the disclosures in AIMS' financial statements.

ii) ***AASB 2015-7 Amendments to Australian Accounting Standards – Fair Value Disclosures of Not-for-Profit Entities (1 July 2016)***

AASB 2015-7 relieves not-for-profit public sector entities from certain disclosures specified in AASB 13 for assets within the scope of AASB 116 that are held primarily for their current service potential rather than to generate future net cash inflows for recurring and non-recurring fair value measurements categorised within Level 3 of the fair value hierarchy.

Other new standards, revised standards, interpretations, amending standards that were issued prior to the sign-off date and are applicable to the current reporting period did not have a financial impact, and are not expected to have a future financial impact on AIMS' financial statements.

Future Australian Accounting Standard Requirements

i) ***AASB 9 Financial Instruments (1 January 2018)***

Key changes will be simplifying the general classification and measurement of financial assets and liabilities. This will have little impact to AIMS.

ii) ***AASB 15 Revenue from Contracts with Customers (1 January 2018)***

This standard provides a revised principle for recognising and measuring revenue arising from Contracts with customers. No assessment has been made to date as to the impact on AIMS.

iii) ***AASB 16 Leases (1 January 2019)***

Under this standard there will be no longer be any distinction between finance and operating leases. This will have moderate impact as this new accounting standard requires assessment of all operating leases and finances leases.

No other new standards, revised standards, interpretations, amending standards that were issued prior to the sign-off date and are applicable to future reporting periods are expected to have a future material impact on AIMS' financial statements.

Taxation

AIMS is exempt from all forms of taxation except Fringe Benefits Tax (FBT) and the Goods and Services Tax (GST).

Events after the reporting period

AIMS is not aware of any material events that have occurred since balance date.

Financial Performance

1.1 Expenses

	2017 $'000	2016 $'000
1.1A: Employee Benefits		
Wages and salaries	**20,298**	18,965
Superannuation:		
Defined contribution plans	**1,955**	1,795
Defined benefit plans	**1,701**	1,805
Leave and other entitlements	**3,325**	3,148
Redundancies	**125**	1,119
Total employee benefits	**27,404**	26,832

Accounting Policy
Accounting policies for employee related expenses are contained in the People and relationships section.

1.1B: Suppliers		
Goods and services supplied or rendered		
Audit fees	**53**	53
Consultants	**158**	19
Contractors	**1,653**	2,030
Consumables	**1,552**	1,599
Electricity	**1,524**	1,382
Fuel, oil and gas	**578**	664
Hire of equipment	**923**	836
Repairs and maintenance	**2,649**	3,559
Support for post-doctorate positions	**2,493**	2,610
Travel and accommodation	**1,529**	1,536
Vessel management and staffing	**3,550**	3,435
Other	**5,249**	5,602
Total goods and services supplied or rendered	**21,911**	23,325
Goods supplied	**5,158**	5,254
Services rendered	**16,753**	18,071
Total goods and services supplied or rendered	**21,911**	23,325
Other suppliers		
Operating lease rentals	**153**	4
Workers compensation expenses	**39**	43
Total other suppliers	**192**	47
Total suppliers	**22,103**	23,372

Accounting Policy
Operating lease payments are expensed on a straight-line basis which is reflective of the pattern of benefits derived from the leased assets.

Leasing commitments
AIMS in its capacity as lessor has significant leasing arrangements with Port of Townsville for berthing facilities and Australian National University for ATRF Darwin land. Both include GST and CPI annual inflator clauses.

Commitments for minimum lease payments in relation to non-cancellable operating leases are payable as follows:		
Within 1 year	**81**	74
Between 1 to 5 years	**337**	297
More than 5 years	**1,195**	1,116
Total operating lease commitments	**1,613**	1,487

1.2 Own-Source Revenue and Gains

Own-source revenue

Accounting Policy

Revenue from rendering of services is recognised by reference to the stage of completion of contracts at the reporting date. The revenue is recognised when:

a) the amount of revenue, stage of completion and transaction costs incurred can be reliably measured; and
b) the probable economic benefits associated with the transaction will flow to AIMS.

The stage of completion of contracts at the reporting date is determined by reference to the proportion that costs incurred to date bear to the estimated cost of the transaction.

Accounting Judgements and Estimates

Revenue recognition for rendering of services is accounted for on a percentage completed basis which determines the timing of revenue recognition and the amount of revenue recognition. The determination of the percentage of complete requires judgement in relation to determining the costs to date of the project, budgeted costs to complete the contract values including variations.

Interest Revenue

Interest Revenue is recognised using the effective interest method.

Revenue from Government

Funding received or receivable from agencies (appropriated to AIMS as a corporate body payment item) is recognised as revenue from Government unless they are in the nature of an equity injection or loan.

	2017	2016
	$'000	$'000
1.2: Other Revenue		
Insurance claims	**865**	288
Other	**20**	66
Total other revenue	**885**	354

Financial Position

This section analyses AIMS assets used to conduct its operations and the operating liabilities incurred as a result.
Employee related information is disclosed in the People and Relationships section.

2.1 Financial Assets

	2017 $'000	2016 $'000
2.1A: Cash and Cash Equivalents		
Cash on hand	**6**	6
Cash on deposit	**8,758**	8,332
Total cash and cash equivalents	**8,764**	8,338

Accounting Policy
Cash is recognised at its nominal amount. Cash and cash equivalents include:
a) cash on hand; and
b) demand deposits in bank accounts with an original maturity of 3 months or less that are readily convertible to known amounts of cash and subject to insignificant risk or changes in value.

2.1B: Trade and Other Receivables		
Services receivables		
Services	**5,060**	4,467
Total services receivables	**5,060**	4,467
Other receivables		
Interest	**328**	491
GST receivable from Australian Taxation Office	**146**	253
Total other receivables	**474**	744
Total trade and other receivables (gross)	**5,534**	5,211

Accounting Policy
Receivables include trade receivables and contract works in progress based on stage of completion.
Receivables for services, which have 30 day terms, are recognised at the nominal amounts less any impairment allowance. Collectability of debts is reviewed as at the end of reporting period. Allowances are made when collectability of the debt is no longer probable.

Accounting Judgements and Estimates
Impairment of trade receivables
Collectability of trade receivables is reviewed on an ongoing basis. Debts which are known to be uncollectible are written off as an expense. An allowance account (provision for impairment of trade receivables) is used when there is objective evidence that AIMS will not be able to collect all amounts due, according to the original terms of the receivables.

2.1C: Other Investments		
Deposits	**27,800**	28,100
Total other investments	**27,800**	28,100

Accounting Policy
Held-to-maturity investments
Non-derivative financial assets with fixed determinable payments and fixed maturity dates that AIMS has the positive intent and ability to hold to maturity are classified as held-to-maturity investments.
Held -to-maturity investments are recorded at amortised cost.

2.2 Non-Financial Assets

2.2A: Reconciliation of the Opening and Closing Balances of Property, Plant and Equipment and Intangibles

	Buildings $'000	Infrastructure Plant and Equipment $'000	Computer Equipment $'000	Computer Software $'000	Vehicles $'000	Office Equipment $'000	Ships, Launches & Vessels $'000	Library Books $'000	Total $'000
As at 1 July 2016									
Gross book value	94,058	41,992	2,278	4,019	1,894	98	21,034	114	165,487
Accumulated depreciation, amortisation and impairment	(5,266)	(5,982)	(681)	(1,643)	(462)	(55)	(1,667)	(54)	(15,810)
Total as at 1 July 2016	88,792	36,010	1,597	2,376	1,432	43	19,367	60	149,677
Additions									
Purchase	5,346	1,624	560	314	503	-	330	-	8,677
Internally developed	-	-	-	211	-	-	-	-	211
Depreciation and amortisation	(4,129)	(4,517)	(627)	(596)	(491)	(15)	(1,365)	(18)	(11,758)
Disposals	(4)	(123)	(5)	-	(148)	-	-	-	(280)
Total as at 30 June 2017	90,005	32,994	1,525	2,305	1,296	28	18,332	42	146,527
Total as at 30 June 2017 represented by									
Gross book value	99,397	43,346	2,809	4,538	2,028	98	21,364	114	173,694
Accumulated depreciation, amortisation and impairment	(9,392)	(10,352)	(1,284)	(2,233)	(732)	(70)	(3,032)	(72)	(27,167)
Total as at 30 June 2017	90,005	32,994	1,525	2,305	1,296	28	18,332	42	146,527
Depreciation rates are based on the following useful lives:	5-72 yrs	2-42 yrs	4-23 yrs	2-10 yrs	4-12 yrs	5-30 yrs	3-25 yrs	10-20 yrs	

1. The carrying amount of computer software included $622,308 purchased software and $1,682,870 internally generated software.
2. No property, plant and equipment and intangibles are expected to be sold or disposed of within the next 12 months.

Revaluations of non-financial assets

All revaluations were conducted in accordance with the revaluation policy. On the 31 May 2017, an independent valuer, Pickles Valuation Services conducted the revaluations. No indicators of impairment were found for buildings, infrastructure, plant and equipment and other non-financial assets. The valuation process was reviewed in June 2017 and was in compliance with AASB13. The valuation was deemed reasonable; therefore no adjustments required.

Revaluation policy states that fair value of each class of asset is measured at open market value where such a market exists or current replacement cost. In the case of buildings, an open market does not exist therefore current replacement cost is used.

Contractual commitments for the acquisition of property, plant, equipment and intangible assets.	**2017 $'000**	2016 $'000
Contributions to the Indian Ocean Marine Research Centre at the University of Western Australia and purchase orders for the refurbishment of AIMS buildings.		
Within 1 year	**2,012**	1,627
Between 1 to 5 years	**-**	825
Total contractual commitments	**2,012**	2,452

NOTE 2.2A: Non-Financial Assets (cont'd)

Accounting Policy

Assets are recorded at cost on acquisition except as stated below. The cost of acquisition includes the fair value of assets transferred in exchange and liabilities undertaken. Financial assets are initially measured at their fair value plus transaction costs where appropriate.
Assets acquired at no cost, or for nominal consideration, are initially recognised as assets and income at their fair value at the date of acquisition, unless acquired as a consequence of restructuring of administrative arrangements. In the latter case, assets are initially recognised as contributions by owners at the amounts at which they were recognised in the transferor's accounts immediately prior to the restructuring.

Asset recognition threshold
Purchases of property, plant and equipment are recognised initially at cost in the statement of financial position, except for purchases costing less than $2,000, which are expensed in the year of acquisition (other than where they form part of a group of similar items which are significant in total).

Revaluations
Following initial recognition at cost, property, plant and equipment are carried at fair value less subsequent accumulated depreciation and accumulated impairment losses. Valuations are conducted with sufficient frequency to ensure that the carrying amounts of assets do not differ materially from the assets' fair values as at the reporting date. The regularity of independent valuations depends upon the volatility of movements in market values for the relevant assets but is carried out at least every three years.
Revaluation adjustments are made on a class basis. Any revaluation increments are credited to equity under the heading of asset revaluation reserve except to the extent that it reversed a previous revaluation decrement of the same asset class that was previously recognised in the surplus/deficit. Revaluation decrements for a class of assets are recognised directly in the surplus/deficit except to the extent that they reversed a previous revaluation increment for that class.
Any accumulated depreciation as at the revaluation date is eliminated against the gross carrying amount of the asset and the asset restated to the revalued amount.

Depreciation
Depreciable property, plant and equipment assets are written-off to their estimated residual values over their estimated useful lives to the entity using, in all cases, the straight-line method of depreciation. Depreciation rates (useful lives), residual values and methods are reviewed at each reporting date and necessary adjustments are recognised in the current and future reporting periods, as appropriate.

Impairment
All assets were assessed for impairment at 30 June 2017. Where indications of impairment exist, the asset's recoverable amount is estimated and an impairment adjustment made if the asset's recoverable amount is less than its carrying amount.
The recoverable amount of an asset is the higher of its fair value less costs to sell and its value in use. Value in use is the present value of the future cash flows expected to be derived from the asset. Where the future economic benefit of an asset is not primarily dependent on the asset's ability to generate future cash flows, and the asset would be replaced if AIMS was deprived of the asset, its value in use is taken to be its depreciated replacement cost.

Derecognition
An item of property, plant and equipment is derecognised upon disposal or when no further future economic benefits are expected from its use or disposal.

Intangibles
AIMS' intangibles comprise software. These assets are carried at cost less accumulated amortisation and accumulated impairment losses. Software is amortised on a straight-line basis over its anticipated useful life.
All software assets were assessed for indications of impairment as at 30 June 2017.

NOTE 2.2A: Non-Financial Assets (cont'd)

Accounting Judgements and Estimates

Fair value of property, plant and equipment
The property, plant and equipment have been valued at depreciated replacement cost by an independent valuer. The independent valuer deemed that the assets would seldom trade on the open market due to their specialised nature and have therefore adopted this revaluation approach.

Remaining useful lives of buildings, infrastructure, plant and equipment
The independent valuer has undertaken an assessment of the remaining useful lives of buildings, infrastructure, plant and equipment, computer equipment, computer software, vehicles, office equipment, library books, ships, launches and vessels based on their condition and expected usage. The remaining useful lives have been reviewed and utilised by AIMS.

2.2 Non-Financial Assets (cont'd)

	2017 $'000	2016 $'000
2.2B: Other Non-Financial Assets		
Prepayments	**2,719**	2,481
Total other non-financial assets	**2,719**	2,481

2.3 Payables

	2017 $'000	2016 $'000
2.3A: Suppliers		
Trade creditors and accruals	**1,813**	3,000
Total suppliers	**1,813**	3,000
2.3B: Other Payables		
Unearned revenue	**2,899**	3,299
Salaries and wages including oncosts	**353**	248
Total other payables	**3,252**	3,547

3: Cash Flow Reconciliation

	2,017 $'000	2,016 $'000
Reconciliation of cash and cash equivalents as per statement of financial position and cash flow statement		
Cash and cash equivalents as per		
Cash flow statement	**8,764**	8,338
Statement of financial position	**8,764**	8,338
Discrepancy	**-**	-
Reconciliation of net cost of services to net cash from operating activities		
Net cost of services	**(43,026)**	(44,788)
Revenue from Government	**41,552**	40,483
Adjustments for non-cash items		
Depreciation/amortisation	**11,758**	12,184
Gain on disposal of assets	**(99)**	(128)
Loss on disposal of assets	**146**	436
Loss on revaluation of an asset	**-**	-
Gain from donation of ATRF building	**-**	-
Other non-cash items	**-**	(41)
Movement in assets and liabilities		
Assets		
(Increase)/Decrease in net receivables	**(323)**	(752)
(Increase)/Decrease in inventories	**9**	(1)
(Increase)/Decrease in prepayments	**(238)**	(634)
Liabilities		
Increase/(Decrease) in employee provisions	**482**	(220)
Increase/(Decrease) in suppliers payables	**(1,479)**	1,663
Net cash from/(used by) operating activities	**8,782**	8,202

People and relationships

This section describes a range of employment and post employment benefits provided to our people and our relationships with other key people.

4.1 Employee Provisions

	2017 $'000	2016 $'000
Leave	**8,636**	8,213
Superannuation	**1,239**	1,184
Other	**15**	11
Total employee provisions	**9,890**	9,408

Accounting Policy

Liabilities for 'short-term employee benefits' and termination benefits expected within twelve months of the end of reporting period are measured at their nominal amounts.

Other long-term employee benefits are measured as net total of the present value of the defined benefit obligation at the end of the reporting period minus the fair value at the end of the reporting period of plan assets (if any) out of which the obligations are to be settled directly.

Leave

The liability for employee benefits includes provision for annual leave and long service leave.

The leave liabilities are calculated on the basis of employees' remuneration at the estimated salary rates that will be applied at the time the leave is taken, including AIMS' employer superannuation contribution rates to the extent that the leave is likely to be taken during service rather than paid out on termination.

The liability for long service leave has been determined by reference to the work of an actuary as at 30 June 2017. The estimate of the present value of the liability takes into account attrition rates and pay increases through promotion and inflation.

Superannuation

The entity's staff are members of the Commonwealth Superannuation Scheme (CSS), the Public Sector Superannuation Scheme (PSS), the PSS accumulation plan (PSSap), Uni Super, Australian Super (AUS) Australian Ethical and Sunsuper.

The CSS and PSS are defined benefit schemes for the Australian Government. The PSSap, Uni Super, AUS, Australian Ethical and Sunsuper are defined (accumulated funds) contribution schemes.

The liability for defined benefits is recognised in the financial statements of the Australian Government and is settled by the Australian Government in due course. This liability is reported in the Department of Finance's administered schedules and notes.

AIMS makes employer contributions to the employees' defined benefit superannuation scheme at rates determined by an actuary to be sufficient to meet the current cost to the Government. AIMS accounts for the contributions as if they were contributions to defined contribution plans.

The liability for superannuation recognised as at 30 June represents outstanding contributions for the final pay of the year.

4.2 Key Personnel Remuneration

Key Management personnel are those persons having authority and responsibility for planning, directing and controlling the activities of the entity, directly or indirectly, including any director (whether executive or otherwise) of that entity. AIMS has determined the key management personnel to be the Directors, Executive Officers and Senior Management. Key management personnel remuneration is reported in the table below.

	2,017	2,016
	$'000	$'000
Short-term employment benefits	**2,246**	2,253
Post-employment benefits	**351**	348
Other long-term employment benefits	**249**	241
Total key management personnel remuneration expenses	**2,846**	2,842

Key management personnel remuneration excludes the remuneration and other benefits of the Portfolio Minister. The Portfolio Minister's remuneration and other benefits are set by the Remuneration Tribunal and are not paid by AIMS.

The total number of key management personnel that are included in the above table are 20 senior individuals (2016: 19 individuals).

4.3 Related Party Disclosures

Related party relationships

AIMS is an Australian Government controlled entity. Related parties to AIMS are Directors, Key Management Personnel including the Executive and Senior Management, the Portfolio Minister and other Australian Government Entities.

Transactions with related parties.

Given the breadth of Government activities, related parties may transact with the government sector in the same capacity as ordinary citizens. Such transactions include the payment or refund of taxes, receipt of a Medicare rebate or higher education loans. These transactions have not been separately disclosed in this note.

Certain entities transacted with AIMS during the reporting period. The terms and conditions of these transactions with key management personel and their related parties were no more favourable than those activities which might reasonably be expected to be available on a similar transaction to non-related entities on an arms length basis.

Significant transactions with related parties during the year included the purchase and rendering of science services.

Details of transactions between directors and related parties during the year for the purchase of science services were:

	$'000
University of Tasmania	231
James Cook University	448
Total	679

Details of balances outstanding at year end were:

James Cook University	7
	7

Details of transactions between directors and related parties during the year for the rendering of science services were:

	$'000
Great Barrier Reef Foundation	681
Reef and Rainforest Research Centre	967
Great Barrier Reef Marine Park Authority	1,153
Western Australia Marine Science Institution (WAMSI)	1,153
University of Tasmania	2,806
Total	6,760

4.3 Related Party Disclosures (continued)

(Details of transactions between directors and related parties during the year for the rendering of science services continued)

	$'000
Details of balances outstanding at year end were:	
Great Barrier Reef Marine Park Authority (paid in full in July)	1
Great Barrier Reef Foundation (paid in full in July)	3
University of Tasmania (paid in full in July)	547
Total	551

There were no other transactions with Directors or Director-related entities during the year (2016-Nil).
There were no loans made to any Director or Director-related entities during the year (2016-Nil).

AIMS transacts with Australian Government related entities consistent with normal-day-to-day business operations provided under normal terms and conditions, including the purchase and rendering of science services.

Details of transactions with related entities of AIMS during the year for purchase of science services were:

	$'000
Department of Finance	505
Commonwealth Scientific and Industrial Research Organisation (CSIRO)	956
Total	1,461

There were no balances outstanding at year end.

Details of transaction with related entities of AIMs for the rendering of science services were:

	$'000
Great Barrier Reef Marine Park Authority	1,152
Total	1,152

There were no other transactions with related entities during the year.

Managing uncertainties

This section analyses how AIMS manages financial risks within its operating environment.

5.1 Contingent Assets and Liabilities

	Guarantees		Total	
	2017	2016	**2017**	2016
	$'000	$'000	**$'000**	$'000
Contingent assets				
Balance from previous period	**325**	322	**325**	322
New contingent assets recognised	**158**	65	**158**	65
Rights expired	**(396)**	(62)	**(396)**	(62)
Total contingent assets	**87**	325	**87**	325

Quantifiable Contingencies

AIMS holds performance guarantees of $87,000 (2016: $325,000). Performance guarantees include Bank guarantees in relation to the refurbishment of the AIMS's buildings.

Unquantifiable Contingencies

At 30 June 2017, AIMS had a 22 year lease on a berthing facility with Port of Townsville. At the expiry of the lease AIMS is required to carry out at its own cost remediation work necessary to return the level of contamination in the leased land to a level as prescribed by Assessment and Management of Contaminated Land in Queensland (May 1998). AIMS is unable to reliably estimate the cost of any future remediation.

Accounting Judgements and Estimates

Contingent liabilities and contingent assets are not recognised in the statement of financial position but are reported in the notes. They may arise from uncertainty as to the existence of a liability or asset or represent an asset or liability in respect of which the amount cannot be reliably measured. Contingent assets are disclosed when settlement is probable but not virtually certain and contingent liabilities are disclosed when settlement is greater than remote.

5.2 Financial Instruments

	2017 $'000	2016 $'000
5.2A: Categories of Financial Instruments		
Financial Assets		
Held-to-maturity investments		
Investments	**27,800**	28,100
Total held-to-maturity investments	**27,800**	28,100
Loans and receivables		
Cash at bank	**8,764**	8,338
Services receivables	**5,060**	4,467
Other receivables	**328**	491
Total loans and receivables	**14,152**	13,296
Total financial assets	**41,952**	41,396
Financial Liabilities		
Financial liabilities measured at amortised cost		
Trade creditors	**1,813**	3,000
Unearned revenue	**2,899**	3,299
Total financial liabilities	**4,712**	6,299

Accounting Policy

Financial assets

AIMS classifies its financial assets in the following categories:

a) held-to-maturity investments and
b) loans and receivables.

The classification depends on the nature and purpose of the financial assets and is determined at the time of initial recognition.

Financial asets are recognised and derecognised upon trade date.

Held-to-maturity investments

Non-derivative financial assets with fixed or determinable payments and fixed maturity dates that AIMS has the positive intent and ability to hold to maturity are classified as held-to-maturity investments. Held-to-maturity investments are recorded at amortised cost.

Loans and receivables

Trade receivables, loans and other receivables that have fixed or determinable payments that are not quoted in an active market are classified as 'loans and receivables'. Loans and receivables are measured at amortised cost.

Impairment of financial assets

Financial assets are assessed for impairment at the end of each reporting period.

Financial assets held at amortised cost - if there is objective evidence that an impairment loss has been incurred for loans and receivables or held-to-maturity investments held at amortised cost, the amount of the loss is measured as the difference between the asset's carrying amount and the present value of estimated future cash flows discounted at the asset's original effective interest rate. The carrying amount is reduced by way of an allowance account. The loss is recognised in the Statement of Comprehensive Income.

Financial liabilities

Financial liabilities are classified as either financial liabilities 'at fair value through profit or loss' or other financial liabilities. Financial liabilities are recognised and derecognised upon 'trade date'.

Financial liabilities at fair value through profit or loss

Financial liabilities at fair value through profit or loss are initially measured at fair value. Subsequent fair value adjustments are recognised in profit or loss. The net gain or loss recognised in profit or loss incorporates any interest paid on the financial liability.

Other financial liabilities

Other financial liabilities, including borrowings, are initially measured at fair value, net of transaction costs.
Supplier and other payables are recognised at amortised cost. Liabilities are recognised to the extent that the goods or services have been received (and irrespective of having been invoiced).

5.2 Financial Instruments (cont'd)

	2017 $'000	2016 $'000
5.2B: Net Gains or Losses on Financial Assets		
Held-to-maturity investments		
Interest revenue	**1,109**	1,283
Net gains on financial assets	**1,109**	1,283

Note 5.3 Fair Value Measurements

The following tables provide an analysis of assets and liabilities that are measured at fair value.

5.3A: Fair Value Measurement

	Fair value measurement at the end of reporting period	
	2017 $'000	2016 $'000
	Total	Total
Non-financial assets		
Buildings	**90,005**	88,792
Plant and equipment	**32,994**	36,010
Ships, launches and vessels	**18,332**	19,367
Computer equipment	**1,525**	1,597
Vehicles	**1,296**	1,432
Office equipment	**28**	43
Library books	**42**	60
Total non-financial assets	**144,222**	147,301
Total fair value measurements of assets in the statement of financial position	**144,222**	147,301

AIMS does not measure any liabilities at fair value on a recurring basis.
The carrying amounts of trade receivables and trade payables are assumed to approximate their fair values due to their short term nature .

Supplementary Financial Information (Unaudited)

Note 1: Revenue Comparison

Note 2: Source of sale of goods and redering of services by sector

Note 3: Cost of output by Research Programs 2017

Note 4: Supplier Expenses

SUPPLEMENTARY FINANCIAL INFORMATION (UNAUDITED)

NOTE 1:

Revenue comparison

	2013 $'000	2014 $'000	2015 $'000	2016 $'000	**2017 $'000**
Appropriation revenue					
Operating	23,463	25,259	30,775	32,462	**33,531**
Asset replacement	8,021	8,021	8,021	8,021	**8,021**
Total appropriation revenue	31,484	33,280	38,796	40,483	**41,552**
Non-appropriation revenue					
Sale of goods and rendering of services[1]	16,971	16,909	17,396	16,324	**16,318**
Interest	2,623	1,612	1,367	1,283	**1,109**
Revenues from joint ventures		103	-	-	**-**
Other revenue	616	777	4,739	482	**964**
Total non-appropriation revenue	20,210	19,401	23,502	18,089	**18,391**
Total Revenue	**51,694**	**52,681**	**62,298**	**58,572**	**59,943**
Non-appropriation ratio[2]	**39%**	**37%**	**38%**	**31%**	**31%**

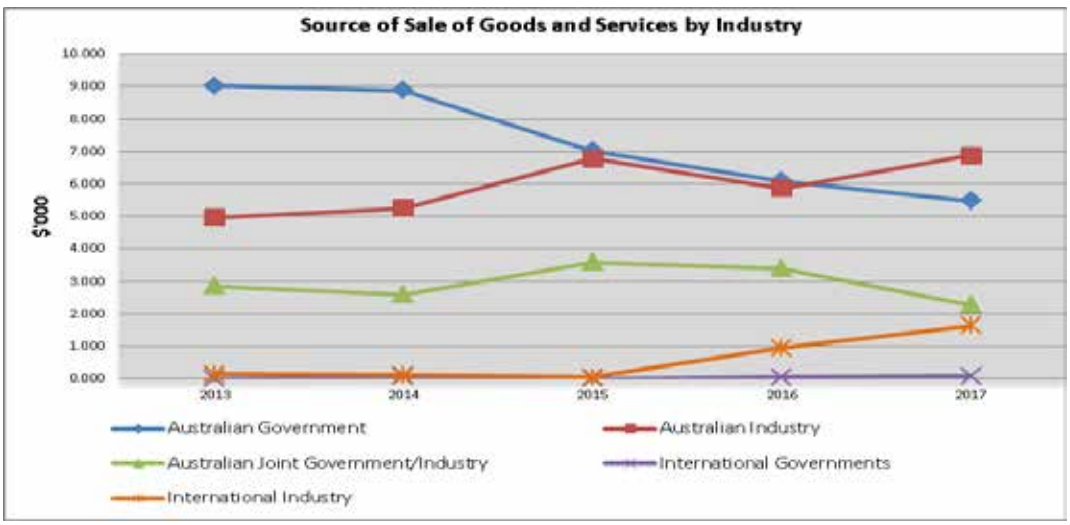
[1]Sale of goods and rendering of services includes consultancies, grants and contract collaborations.

[2]Non-appropriation ratio is percentage non-appropriation revenue of total revenue.

NOTE 2:

Source of sale of goods and rendering of services by sector

	2013 $'000	2014 $'000	2015 $'000	2016 $'000	**2017 $'000**
Australian Government	9,027	8,876	7,012	6,084	**5,478**
Australian joint Government/industry	2,844	2,592	3,579	3,401	**2,277**
International governments	2	74	-	36	**71**
Australian industry	4,965	5,259	6,769	5,867	**6,868**
International industry	133	108	36	936	**1,624**
Sale of goods	-	-	-	-	**-**
	16,971	**16,909**	**17,396**	**16,324**	**16,318**



NOTE 3:
Cost of output by research programs 2017

	Variable $'000	Salaries $'000	Depreciation $'000	Overheads $'000	**Total $'000**
Data and Technology Solutions	717	2,312	1,095	4,073	8,197
A Healthy and Resilient GBR	4,965	4,585	266	8,077	17,893
Sustainable Coastal Ecosystem & Industries in Tropical Australia	4,333	5,654	265	9,961	20,213
Sustainable Use of NW Marine Ecosystems	6,751	2,995	111	5,277	15,134
Total	**16,766**	**15,546**	**1,737**	**27,388**	**61,437**
Percentage of total expenses	27%	25%	3%	45%	100%

SUPPLEMENTARY FINANCIAL INFORMATION (UNAUDITED)

NOTE 4:

Supplier Expenses

	2017	2016
Consist of:	**$'000**	$'000
Appointment expenses	**80**	102
Auditing	**53**	53
Catering	**60**	80
Chemical and laboratory supplies	**170**	191
Cleaning and ground maintenance	**525**	455
Communications, telephone and postage	**621**	643
Consultancies	**158**	19
Contracting and servicing	**1,653**	2,030
Consumables	**1,552**	1,645
Electricity	**1,524**	1,382
Equipment and software purchases	**158**	172
Field costs	**438**	371
Freight	**376**	325
Fuel, oil and gas	**578**	664
Hire of equipment	**923**	833
Insurances	**511**	525
Lab Services	**4**	1
Legal	**1**	28
Licences and fees	**654**	587
Operating lease rentals	**153**	4
Publications, journals and subscriptions	**446**	355
Rent	**95**	169
Repairs and maintenance	**2,649**	3,730
Security	**427**	449
Stationery	**27**	27
Support for post-doctorate positions	**2,493**	2,610
Tenders and outboards	**23**	12
Training, seminars and conferences	**342**	521
Travel and accommodation	**1,529**	1,536
Vessels management and staffing	**3,591**	3,550
Victuals	**134**	139
Water	**113**	121
Workers compensation	**39**	43
Total supplier expenses	**22,103**	23,372

APPENDICES

APPENDIX 1 SCIENCE PUBLICATIONS

In 2016, AIMS scientists published:

- 237 journal articles
- 12 book chapters
- 35 client and technical reports
- 25 theses.

Journal articles

1 Abram NA, McGregor HV, Tierney JE, Evans MN, McKay NP, Kaufman DS, the PAGES 2k Consortium (2016) Early onset of industrial-era warming across the oceans and continents. Nature 536: 411–418
(*PAGES 2k Consortium: Thirumalai K, Martrat B, Goosse H, Phipps SJ, Steig EJ, Halimeda Kilbourne K, Saenger CP, Zinke J, Leduc G, Addison JA, Mortyn PG, Seidenkrantz M-S, Sicre M-A, Selvaraj K, Filipsson HL, Neukom R, Geris J, Curran MAJ, von Gunten L*)

2 Advani NK, Kenkel CD, Davies SW, Parmesan C, Singer MC, Matz MV (2016) Variation in heat shock protein expression at the latitudinal range limits of a widely-distributed species, the Glanville fritillary butterfly (*Melitaea cinxia*). Physiological Entomology 41(3): 241–248

3 Albright R, Anthony KRN, Baird M, Beeden R, Byrne M, Collier C, Dove S, Fabricius K, Hoegh-Guldberg O, Kelly RP, Lough J, Mongin M, Munday PL, Pears RJ, Russell BD, Tilbrook B, Abal E (2016) Ocean acidification: linking science to management solutions using the Great Barrier Reef as a case study. Journal of Environmental Management 182: 641–650

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Master of Science (MSc)

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APPENDIX 2 EXTERNAL COMMITTEES AND NON-GOVERNMENT ORGANISATIONS AND POSITIONS

International forums

Convention on Migratory Species—Sharks MOU Conservation Working Group Member

Global Environment Fund—Coral Disease Working Group

Global Ocean Observing System—Steering Committee Co-Chair

Great Barrier Reef Foundation—International Scientific Advisory Committee Member

Institute of Oceanology, Chinese Academy of Sciences—International Advisory Board Chair

International Union for Conservation of Nature Shark Specialist Group—Vice Chair for Strategy

International Union for Conservation of Nature Shark Specialist Group

International Congress on Fish Telemetry Committee—Member

International Oceanographic Commission Intergovernmental Panel on Harmful Algal Blooms—Australian representative

International Society for Microbial Ecology—International Board Member & Director of International Ambassadors Program

Marine Global Earth Observatories Advisory Board Member

United Nation's Convention on Biological Diversity—Ocean Acidification Expert Review Committee

Ocean Tracking Network (Canada)—Scientific Advisory Committee

Red Sea Research Centre—Advisory Board Committee Member

Scientific Committee on Oceanic Research—Australian delegate

Scientific Committee on Oceanic Research Changing Ocean Biological Systems Working Group

United Nations Oceans and Law of the Sea—Global Reporting and Assessment of the State of the Marine Environment (Regular Process), Member of the Pool of Experts

Wildlife Trust of India—Scientific Advisory Committee

National forums

AIMS@JCU—Management Committee

AIMS@JCU—Scientific Advisory Committee

Australian Meteorological and Oceanographic Society—Physical Oceanographic Expert Group

Antarctic Research Assessment Committee—Life Sciences Chair

ANZLIC—Marine Community Profile Metadata Standards Governance Committee

Australian Animal Tagging and Monitoring System—Scientific Committee

Australian Government Department of the Environment—Reef 2050 Plan Independent Expert Panel

Australian Government National Research Infrastructure Roadmap Capability Experts

Australian Hydrographic Office, Royal Australian Navy—Permanent Committee on Tides and Mean Sea Level

Australian Lions Foundation for Medical Research into Species of Medical Importance to Humans—Scientific Advisory Committee

Australian National Committee on the International Indian Ocean Expedition-2

Australia New Zealand Marine Biotechnology Society Management Committee

Australian Ocean Data Centre Joint Facility

Australian Research Council Centre of Excellence for Coral Reef Studies—Advisory Board

Australian Research Council Centre of Excellence for Coral Reef Studies—Scientific Management Committee

Australian Research Council Centre of Excellence for Mathematical and Statistical Frontiers: Big Data, Big Models, New Insights—Governance Advisory Board

Chevron Australia Pty Ltd Commonwealth Expert Panel—Dredging Technical Advisory Panel

Chevron Australia Pty Ltd—Independent expert on the Gorgon Marine Turtle Expert Panel (Ministerial appointment)

Citizens of the Great Barrier Reef Foundation Limited—Management Committee

Darwin Harbour Advisory Committee

Darwin Harbour Integrated Monitoring & Research Program Coordination Committee

Darwin Marine Supply Base—Taskforce Advisory Group

eReefs—Operations Committee

eReefs—Advisory Board Member

eReefs—User Reference Group

Fitzroy Partnership for River Health—Science Panel

Forum for Operational Oceanography—Surface Waves Working Group

Forum for Operational Oceanography—Surface Currents Working Group

Gladstone Healthy Harbour Partnership—Science Panel

Great Australian Bight Research Program Management Committee—Independent Science Panel

Great Barrier Reef Foundation Coral Genomics Consortium—Coral Genomics Advisory Panel to the GBRF International Advisory Panel

Great Barrier Reef Foundation—Biophysical Technical Advisory Group

Marine Monitoring Program—Project Committee

Great Barrier Reef Marine Park Authority—Crown-of-Thorns Advisory Committee

Great Barrier Reef Marine Park Authority Reef and Queensland Government Integrated Monitoring and Reporting Network—Design Working Group

Great Barrier Reef Marine Park Authority and Queensland Government Reef Integrated Monitoring and Reporting Program—Steering Group Member

Healthy Rivers to Reef Partnership—Mackay–Whitsunday Report Card Technical Working Group

Healthy Waterways Alliance—Mackay–Whitsunday Ecosystem Water Quality Think Tank

Integrated Marine Observing System—Board Member

Integrated Marine Observing System—Steering Committee

Integrated Marine Observing System—Australian National Moorings Network Steering Committee (Chair and Leader)

Integrated Marine Observing System—Facility for Automated Intelligent Monitoring of Marine Systems

Integrated Marine Observing System—Advisory Committee for the Australian Animal Tracking Facility

Integrated Marine Observing System—Animal Tracking Facility Task Team (Chair and Leader)

Integrated Marine Observing System—Animal Tracking Facility and Biologging Committee

Integrated Marine Observing System—National Reference Station Scientific Steering Committee

Integrated Marine Observing System—Satellite Remote Sensing Facility

Indian Ocean Marine Research Centre—Executive Committee

Indian Ocean Marine Research Centre—Research Committee

Indian Ocean Marine Research Centre—Management Committee

INPEX Ichthys Project—Expert Panel for the Darwin Harbour LNG development

Kakadu Research Advisory Committee

Marine National Facility—Scientific Advisory Committee

Marine National Facility—Steering Committee Member

National Environmental Science Programme Marine Biodiversity Hub—Partners Committee Member

National Environmental Science Programme Marine Biodiversity—Theme Leader

National Environmental Science Programme Tropical Water Quality Hub—Steering Committee

National Environmental Science Programme Tropical Water Quality Hub—Science Advisory Committee

National Environmental Science Programme Tropical Water Quality Hub—Crown-of-Thorns Working Group

National Marine Science Committee—Executive Member

National Science, Technology and Research Committee Member

Northern Research Futures Collaborative Research Network—Partners' Management Committee

Northern Research Futures Collaborative Research Network—Scientific Advisory Committee

Organisation for Economic Co-operation and Development—Test Guideline Committee

Queensland Integrated Marine Observing System—Node Leader

Queensland Integrated Marine Observing System—Technical Reference Group

Queensland Government Pesticide Working Group

Reef 2050 Long-Term Sustainability Plan—Advisory Group Member

Reef 2050 Long-Term Sustainability Plan—Independent Expert Panel

Reef 2050 Indigenous Implementation Plan—Steering Committee

Reef 2050 Integrated Monitoring and Reporting Program—Expert Working Group on Marine Physico-Chemical Environment (Lead)

Reef 2050 Integrated Monitoring and Reporting Program—Expert Working Group on Coral Reefs (Lead)

Reef and Rainforest Research Centre Pty Ltd—Non-Executive Director

Reef Water Quality Protection Plan—Independent Science Panel

Western Australia Integrated Marine Observing System—Scientific Reference Group

Western Australian Marine Science Institution—Board

Western Australian Marine Science Institution—Governor

Western Australian Marine Science Institution—Research & Development Committee

Western Australian Marine Science Institution—Node Leader Science

Wet Tropics Healthy Waterways Partnership—Report Card Technical Working Group

APPENDIX 3 LEGISLATIVE FOUNDATION AND MINISTERIAL POWERS

Enabling legislation

The Australian Institute of Marine Science is a corporate Commonwealth entity, established on 9 June 1972 by the *Australian Institute of Marine Science Act 1972* (AIMS Act).

Functions of the Institute

(1) The functions of the Institute are:

(a) to carry out research and development in relation to:

i) marine science and marine technology; and

ii) the application and use of marine science and marine technology; and

(b) to encourage and facilitate the application and use of the results of research and development of that kind; and

(c) to arrange for carrying out research and development of that kind; and

(d) to cooperate with other institutions and persons in carrying out research and development of that kind; and

(e) to provide any other institution or person with facilities for carrying out research and development of that kind; and

(f) to collect and disseminate information relating to:

i) marine science and marine technology; and

ii) the application and use of marine science and marine technology; and, in particular, to publish reports and other papers; and

(g) to produce, acquire, provide and sell goods, and to provide services, in connection with:

i) marine science and marine technology; and

ii) the application and use of marine science and marine technology; and

(h) to make available to other persons, on a commercial basis, the knowledge, expertise, equipment, facilities, resources and property of the Institute; and

(i) to do anything incidental or conducive to the performance of any of the functions in paragraphs (a) to (h).

Powers of the Institute

Under section 10 of the AIMS Act, the Institute is empowered to do all things necessary or convenient to be done for, or in connection with, the performance of its functions, including power:

(a) to enter into contracts;

(b) to acquire, hold and dispose of personal property;

(ba) to take on hire, or to accept on loan, equipment (including vessels) or other goods needed for the purposes of the Institute;

(bb) to lend or to hire out equipment (including vessels) or other goods that are the property of the Institute;

(c) to purchase or take on lease land or buildings, and to erect buildings, necessary for the purposes of the Institute;

(d) to dispose of, or grant leases of, land or buildings vested in the Institute;

(e) to occupy, use and control any land or building owned or held under lease by the Commonwealth and made available for the purposes of the Institute;

(f) to participate in partnerships, trusts, unincorporated joint ventures and other arrangements for sharing profits;

(g) to subscribe for and to purchase shares in, and debentures and other securities of, companies;

(h) to form, and to participate in the formation of, companies;

(ha) to lend money to associated companies of the Institute;

(hb) with the written approval of the Finance Minister, to provide guarantees for the benefit of associated companies of the Institute;

(i) to appoint agents and attorneys, and to act as agents for other persons;

(j) to accept anything given or transmitted to the Institute whether on trust or otherwise, and to act as trustee of money or other property vested in the Institute on trust;

(k) to arrange for displaying material and giving lectures, to the public or otherwise, about:

(i) marine science and marine technology; and

(ii) the application and use of marine science and marine technology.

Ministerial powers of direction

Under section 10 (1) of the AIMS Act, the responsible minister (and Finance Minister) has power to direct the Institute in matters of a general or specific nature. These powers pertain particularly to the following:

1. Granting leave of absence to Council members (sections 13, 16(b));
4. Appointing (and terminating such appointment) a person to act as Chairperson (sections 17(1) and (3));
5. Appointing (and terminating such appointment) a person to act as a member of Council (sections 17(2) and (3));
6. Convening a meeting of Council (section 20(2));
7. The Finance Minister may give directions at any time as to amount and moneys to be paid to the Institute (section 36(2));
8. Out of money appropriated by the Parliament for the purpose, the Finance Minister has power to lend money to the Institute (section 42A);
9. The Finance Minister has the power to provide written approval for the Institute to borrow money from persons other than the Commonwealth (section 42B);
10. The Finance Minister has the power to guarantee borrowings of the Institute (section 42C);
11. Appointing a committee to assist Council and approving the terms and conditions of members (section 45);
12. Delegation of powers by Finance Minister (section 50).

(1) The Finance Minister may, by written instrument, delegate to an official (within the meaning of the *Public Governance, Performance and Accountability Act 2013*) of a non-corporate Commonwealth entity (within the meaning of that Act) the power:

(a) to approve the provision of guarantees as mentioned in paragraph 10(2)(hb); or

(b) to approve the borrowing of money on terms and conditions specified in, or consistent with, the approval as mentioned in subsection 42B(1); or

(c) to enter into contracts as mentioned in subsection 42C(1); or

(d) to make determinations as mentioned in subsection 42C(2).

(2) In exercising power under a delegation, the official must comply with any directions of the Finance Minister.

INDEXES

ABBREVIATIONS

To be updated in final production

Abbreviation	Description
AA	Accountable authority
ABARES	Australian Bureau of Agricultural and Resource Economics and Sciences
ACEMS	ARC Centre of Excellence for Mathematical and Statistical Frontiers of Big Data, Big Models, New Insights
AICD	Australian Institute of Company Directors
AIMS	Australian Institute of Marine Science
AIMS Act	*Australian Institute of Marine Science Act 1972*
ANAO	Australian National Audit Office
ANU	Australian National University
AODN	Australian Ocean Data Network
AR	Annual report
ARC	Australian Research Council
ASV	Autonomous surface vessel
ATRF	Arafura Timor Research Facility
ATSIMS	Aboriginal and Torres Strait Islanders Marine Science
BRUVS	Baited remote underwater video system
CCEAR Rule	Public Governance, Performance and Accountability Amendment (Corporate Commonwealth Entity Annual Reporting) Rule 2016
CDU	Charles Darwin University
CFO	Chief Finance Officer
CO_2	Carbon dioxide
COO	Chief Operating Officer
Coral CoE	ARC Centre of Excellence for Coral Reef Studies
COTS	Crown-of-thorns starfish
CPSU	Community and Public Sector Union
CSC	Commonwealth Science Council
CSIRO	Commonwealth Scientific and Industrial Research Organisation
EAP	Employee assistance program
ECR	Early career researcher
EEO	Equal employment opportunity
EPBC Act	*Environment Protection and Biodiversity Conservation Act 1999*
FAICD	Fellow of the Australian Institute of Company Directors
FAIM	Fellow of the Australian Institute of Management
FACE	Fellow of the Australian College of Educators

Abbreviation	Description
FASSA	Fellow of the Academy of the Social Sciences in Australia
FCA	Fellow of the Institute of Chartered Accountants in Australia
FOI	Freedom of information
FOI Act	*Freedom of Information Act 1982*
FQA	Fellow of the Queensland Academy of Arts and Sciences
FRR	Financial Reporting Rule
FS	Financial statement
FTE	Full-time equivalent
FTI	Fellow of The Tax Institute of Australia
FTSE	Fellow of the Australian Academy of Technological Sciences and Engineering
GAICD	Graduate of the Australian Institute of Company Directors
GBR	Great Barrier Reef
GBRF	Great Barrier Reef Foundation
GBRMPA	Great Barrier Reef Marine Park Authority
GHHP	Gladstone Healthy Harbour Partnership
GMO	Genetically modified organism
HDR	Higher degree by research
HSE	Health, safety and environment
IMOS	Integrated Marine Observing System
IOCAS	Institute of Oceanology, Chinese Academy of Sciences
IOMRC	Indian Ocean Marine Research Centre
IPA	Indigenous protected area
IPCC	Intergovernmental Panel on Climate Change
IPS	Information Publication Scheme
IUCN	International Union for Conservation of Nature
JCU	James Cook University
LNG	Liquefied natural gas
LTMP	Long-Term Monitoring Program
MMP	Marine Monitoring Program
NCRIS	National Collaborative Research Infrastructure Strategy
NESP	National Environmental Science Programme
NMSC	National Marine Science Committee
PBS	Portfolio Budget Statement
PGPA Act	*Public Governance, Performance and Accountability Act 2013*
PMC	Department of Prime Minister and Cabinet
PNG	Papua New Guinea
PS	Performance statement

Abbreviation	Description
PwC	Pricewaterhouse Coopers
QUT	Queensland University of Technology
RIMReP	Reef 2050 Integrated Monitoring and Reporting Program
RV	Research vessel
SRPs	Scientific Research Priorities
STEM	Science, technology, engineering and mathematics
TC	Tropical cyclone
UN	United Nations
UNESCO	United Nations Educational, Scientific and Cultural Organization
UQ	University of Queensland
UTAS	University of Tasmania
UWA	University of Western Australia
WA	Western Australia
WAMSI	Western Australian Marine Science Institution
WWF	World Wide Fund for Nature

INDEX OF ANNUAL REPORT REQUIREMENTS

AIMS' requirement for annual reporting is outlined under s. 7 (2) of the AIMS Act, which states that the *Public Governance, Performance and Accountability Act 2013* applies to the Institute. That Act deals with matters relating to corporate Commonwealth entities, including reporting and the use and management of public resources.

The index below shows AIMS' compliance with annual report information requirements for corporate Commonwealth entities as stipulated under s. 46 of the *Public Governance, Performance and Accountability Act 2013* (PGPA Act).

The annual financial statements (page 101) were prepared in accordance with ss. 42 and 43 of the PGPA Act and the Public Governance, Performance and Accountability (Financial Reporting) Rule 2015.

This annual report complies with parliamentary standards of presentation and printing, and uses plain English and clear design.

Annual report (AR) content requirements	Source(s)	Where in AIMS annual report
General		
The accountable authority (AA) of an entity must prepare and give an annual report to the responsible minister.	S 46(1) PGPA Act	AIMS Annual Report 2016–17
Public Governance, Performance and Accountability Amendment (Corporate Commonwealth Entity Annual Reporting) Rule 2016 (CCEAR Rule)		
The AR must be approved and signed by the AA, and include details of how and when approval was given. It must state that the AA is responsible for preparing and delivering the AR in accordance with the section 46 of the PGPA Act.	S 17BB CCEAR Rule	Letter of transmittal: page v
The AR must comply with the guidelines for presenting documents to the Parliament.	S 17BC CCEAR Rule	AIMS Annual Report 2016–17
The AR must be prepared having regard to the interests of the Parliament and any other persons who may be interested in it.	S 17BD CCEAR Rule	AIMS Annual Report 2016–17
The AR must specify the entity's enabling legislation, including a summary of the entity's objects and functions and the purposes of the entity as included in the entity's CP.	SS 17BE(a)–(b) CCEAR Rule	Role and legislation: page 79 Entity purpose: page 32 Intended outcomes: page 32 Appendix 3 Legislative foundation and ministerial powers: page 163 Objects, functions and purpose are also described on page 6 of AIMS' Corporate Plan 2016–17

Annual report (AR) content requirements	Source(s)	Where in AIMS annual report
The AR must specify the name and title of the responsible minister(s).	S 17BE(c) CCEAR Rule	Responsible minister: page 79
The AR must provide details of: • any directions issued by any minister under an Act or instrument during the period; • any government policy orders that applied to the entity under section 22 of the PGPA Act; and • particulars of non-compliance with any of the above directions or orders.	SS 17BE(d)–(f) CCEAR Rule	No government policy orders were issued under s.22 of the PGPA Act General policies of the Australian Government: page 80 Particulars of non-compliance: n/a
The AR must include annual performance statements in accordance with paragraph 39(1)(b) of the PGPA Act and section 16F of the PGPA Rule.	S 17BE(g) CCEAR Rule	Performance statement: starts page 31
The AR must include a statement of any significant issue reported to the responsible minister under paragraph 19(1)(e) of the PGPA Act that relates to non-compliance with the finance law in relation to the entity.	SS 17BE(h)–(i) CCEAR Rule	Fraud control: page 87 Duty to inform and Ministerial notifications: page 88
The AR must include information about the AA(s), including names, qualifications, experience, attendance of board meetings and executive status.	S 17BE(j) CCEAR Rule	Council members: page 81
The AR must include an outline of the: • organisational structure of the entity (including subsidiaries); and • location of major activities and facilities of the entity.	SS 17BE(k)–(l) CCEAR Rule	Organisational structure: page 91 Location of AIMS' major activities and facilities: page 2
The AR must include information on the main corporate governance practices used by the entity, including, for example, details of: • board committees and their main responsibilities; • education and performance review processes for the AA; and, • ethics and risk management policies.	S 17BE(m) CCEAR Rule	Corporate governance: starts page 80
The AR must disclose the decision-making process undertaken by the board in relation to transactions with other entities or if the transaction is more than $10 000 (inclusive of GST).	SS 17BE(n)–(o) CCEAR Rule	Financial reporting: page 87

Annual report (AR) content requirements	Source(s)	Where in AIMS annual report
The AR must detail any significant activities and changes that affected the operations or structure, for example: • significant events such as forming or participating in the formation of a company, partnership etc.; • operational and financial results; • key changes to its status of affairs or principal activities; or, • amendments to enabling legislation or any other legislation directly relevant to its operation(s).	S 17BE(p) CCEAR Rule	Significant events: n/a Operational results: Performance statement: starts page 31 Financial statements: starts page 101 Changes in status: n/a Amendments to legislation: n/a
The AR must include details of third-party reviews, including: • judicial decisions or decisions of administrative tribunals made during the period that have had, or may have, a significant effect of the operations of the entity; and • the particulars of any report on the entity given during the period by the Auditor-General (other than one made under section 43 of the PGPA Act), a Parliamentary Committee, Commonwealth Ombudsman or the Office of the Australian Information Commissioner.	SS 17BE(q)–(r) CCEAR Rule	Judicial decisions and reviews by outside bodies: page 88
The AR must include an explanation if information is missing from a subsidiary that is required to be included in the annual report, and state the effect of not having the information in the AR.	S 17BE(s) CCEAR Rule	n/a
The AR must include details of any indemnity that applied during the period to the AA, any member of the AA or officer of the entity against a liability (including premiums paid, or agreed to be paid, for insurance against the officer's liability for legal costs).	S 17BE(t) CCEAR Rule	Indemnities and insurance premiums for officers: page 88
The AR must provide an index of annual report requirements identifying where relevant information can be found in the annual report.	S 17BE(u) CCEAR Rule	Index of annual report requirements: page 171

Annual report (AR) content requirements	Source(s)	Where in AIMS annual report
Performance statement		
The AA must measure and assess the performance of an entity in achieving its purpose(s) in the single reporting period.	SS 38, 39(1) PGPA Act	Performance statement: starts page 31
Performance statement (PS)—Statement of preparation		
The PS must include a statement: • declaring that the PSs are prepared for s 39(1)(a) of the PGPA Act and any other applicable legislation; • specifying the reporting period for which the PSs are prepared; and • declaring that, in the opinion of the AA, the PSs accurately present the entity's performance and comply with s 39(2) of the PGPA Act.	S 16F(2) PGPA Rule	Statement of preparation: page 31
Performance statement—Results		
The PS must include the results of the measurement and assessment of performance.	S 16F(2) PGPA Rule	Performance statement: starts page 31 Overall performance summary: page 34 AIMS' performance against 2016–17 Research Goals: page 38
Performance statement—Analysis		
The PS must include an analysis of the facts that contributed to the entity's performance, including any changes to: • the entity's purpose, activities or organisational capacity; or • the environment in which the entity operated • that may have had a significant impact on performance.	S 16F(2) PGPA Rule	Performance statement: starts page 31

Annual report (AR) content requirements	Source(s)	Where in AIMS annual report
Financial statement (FS)		
The AA must prepare annual financial statements and given to the Auditor-General.	S 42(1) PGPA Act	Financial statements: page 101
The AA must ensure that all the subsidiaries' financial statements are audited by the Auditor-General.	S 44(2) PGPA Act	n/a
A copy of the FS and the Auditor-General's repost must be included in the AR.	S 43(4) PGPA Act	Financial statements: page 101 Independent Auditor's report: page 102
The FS must comply with the Public Governance, Performance and Accountability (Financial Reporting) Rule 2015.	S 42(2)(a) PGPA Act	Financial statements: page 101
Other requirements		
Statement of Expectations		
To reduce any reporting burden it may be useful for the AR to address any Statement of Expectations issued by the minister, with reference to any subsequent Statement of Intent.	Suggested practice	AIMS continued compliance with the Statement of (Ministerial) Expectations: page 44
Environment Protection and Biodiversity Conservation Act 1999		
The AR must include: • a report on how the activities accorded with the principles of ecologically sustainable development; • identify how the outcomes (if any) specified for the reporter in an Appropriations Act relating to the period contribute to ecologically sustainable development; • document the effect of the reporter's activities on the environment; • identify any measures the reporter is taking to minimise the impact of activities by the reporter on the environment; and, • identify the mechanisms (if any) for reviewing and increasing the effectiveness of those measures.	S 516A(6) EPBC Act; DEWHA *Guidelines for Section 516A reporting*	Environmental performance: page 98

Annual report (AR) content requirements	Source(s)	Where in AIMS annual report
Work Health and Safety Act 2011		
Corporate entities established for a public purpose must include, in their ARs: • initiatives taken during the year to ensure the health, safety and welfare of workers who carry out work for the entity; • health and safety outcomes (including the impact on injury rates of workers) achieved as a result of initiatives mentioned under paragraph (a) or previous initiatives; • statistics of any notifiable incidents of which the entity becomes aware during the year that arose out of the conduct of businesses or undertakings by the entity; • any investigations conducted during the year that relate to businesses or undertakings conducted by the entity, including details of all notices given to the entity during the year under Part 10 of this Act; and • such other matters as are required by guidelines approved on behalf of the Parliament by the Joint Committee of Public Accounts and Audit.	Sch 2, pt 4, s 4(1) WHS Act	Health and safety: page 95
National Disability Strategy 2010–2020		
The Department of Prime Minister and Cabinet (PMC) AR guidelines provide standard words to be included regarding disability reporting mechanisms.	PMC *Requirements for Annual Reports*	Disability strategy: page 95
Freedom of Information Act 1982—Information Publication Scheme		
The PMC guidelines provide guidance on words reiterating the purpose of the Information Publication Scheme to be included in the annual report.	PMC *Requirements for Annual Reports*	FOI operations: page 90
Equal Employment Opportunity (Commonwealth Authority) Act 1987		
Each entity is required to prepare a report on 'the development and implementation of its [equal employment opportunity] program'. This need not be included in the AR, but it may be.	S 9 EEO Act	Equal employment opportunity and workplace diversity: page 93

ALPHABETICAL INDEX

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