Australian Government

Australian Institute of Marine Science

ANNUAL REPORT

2017–18

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AUSTRALIAN INSTITUTE OF MARINE SCIENCE

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DISCLAIMER

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.

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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 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 the land on which our main laboratory and office bases are located: 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 might contain images of people who have passed away since publication.

Front cover: The RV Solander at Rowley Shoals, Western Australia. Image: N. Thake

Design: giraffe.com.au

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AIMS Townsville Headquarters.

AIMS Perth Office.

AIMS Darwin Office.

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

18 September 2018

Hon. Karen Andrews MP
Minister for Industry, Science and Technology
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 46th annual report, for the year ended 30 June 2018. 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 2017–18 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 2017–18 by a resolution on 13 September 2018.

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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www.aims.gov.au

Abbreviations

ABBREVIATION	TERM IN FULL
AIMS	Australian Institute of Marine Science
AIMS Act	*Australian Institute of Marine Science Act 1972*
ARC	Australian Research Council
ATSIMS	Aboriginal and Torres Strait Islanders Marine Science
CDU	Charles Darwin University
CSIRO	Commonwealth Scientific and Industrial Research Organisation
GBR	Great Barrier Reef
GBRMPA	Great Barrier Reef Marine Park Authority
IMOS	Integrated Marine Observing System
IOCAS	Institute of Oceanology, Chinese Academy of Sciences
IOMRC	Indian Ocean Marine Research Centre
IUCN	International Union for Conservation of Nature
JCU	James Cook University
LTMP	Long-Term Monitoring Program
NESP	National Environmental Science Program
NT	Northern Territory
NWSS	North West Shoals to Shore research program
PGPA Act	*Public Governance, Performance and Accountability Act 2013*
PMC	Department of the Prime Minister and Cabinet
QUT	Queensland University of Technology
RRAP	Reef Restoration and Adaptation Program
RIMReP	Reef 2050 Integrated Monitoring and Reporting Program
SeaSim	AIMS' National Sea Simulator
UQ	University of Queensland
UTAS	University of Tasmania
UWA	The University of Western Australia
WA	Western Australia
WAMSI	Western Australian Marine Science Institution

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

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 conduct 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 engages with government (ministers, policy makers, resource managers and environmental regulators), private industry (ports, oil and gas, mining, tourism and services), non-government organisations, scientific peers and the Australian public.

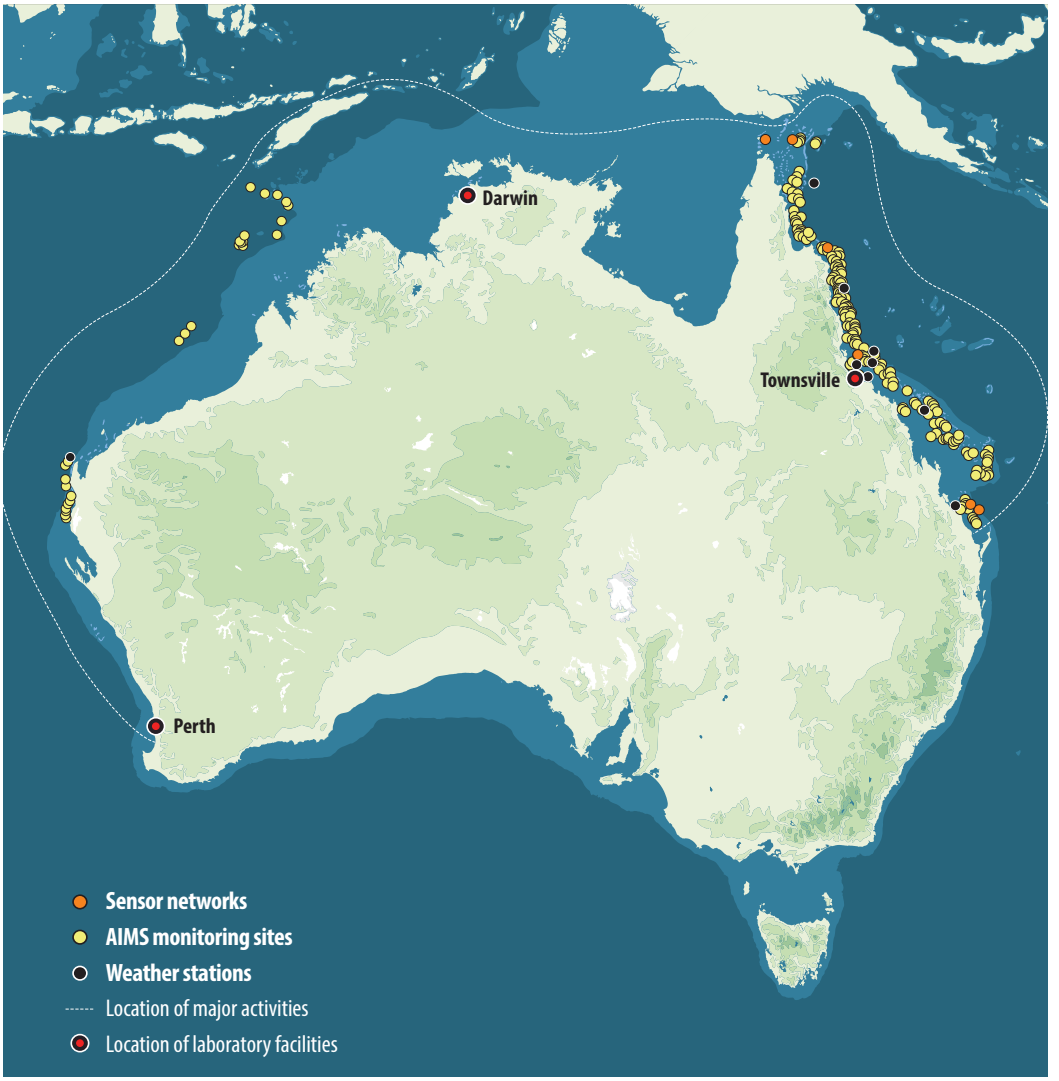
The Institute will deliver the science to help realise three key long-term impacts for the nation:

- improve the health and resilience of marine and coastal ecosystems across northern Australia
- create economic, social and environmental net benefits for marine industries and coastal communities
- protect coral reefs and other tropical marine environments from the effects of climate change.

Our research is focused on the priorities of the Australian and state governments and industry. During the year, the Institute's research 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 year, AIMS developed an Aboriginal and Torres Strait Islander partnership in collaboration with a number of Indigenous groups and individuals with an interest in sea country management. This builds on the strong historical relationships that AIMS has developed with Traditional Owners. AIMS' Indigenous partnership provides a corporate approach aligned with our updated AIMS Strategy 2025. Our goals are aligned with our strong belief in the importance of working hand-in-hand with Indigenous Australians—in a partnership that will foster better land and sea management based on rich traditions, excellent science, and local ecological knowledge. Through the partnership, AIMS set out to achieve the following goals:

- incorporate Indigenous partnerships in the governance of AIMS
- improve the cultural competency of AIMS staff, including ways to demonstrate respect and acknowledgement of Aboriginal and Torres Strait Island people and their culture
- establish and foster strong, mutually beneficial relationships with relevant Indigenous groups and individuals with an interest in sea country management
- improve marine science capacity and capability in AIMS and among Indigenous people by undertaking projects together
- increase the employment of Aboriginal and Torres Strait Islander people in marine science-related fields (including support for pathways to employment).

The Aboriginal and Torres Island flags were raised in March 2018 at our Cape Cleveland headquarters. Image: K Green

Penelope Wensley AC

The year in review: report from the Chairman

As Chairman of the Council of the Australian Institute of Marine Science, it is my privilege to introduce the annual report of the Institute, reviewing AIMS' activities and achievements from 1 July 2017 to 30 June 2018.

I am pleased once again to be able to report a strong performance by the Institute, delivering high-quality outcomes against all key performance measures and criteria, and confirming AIMS' position as one of the world's most highly regarded marine science research agencies.

This consistency of quality achievement and output across all areas—research products, project delivery for government and industry, negotiation of new contracts and contribution to the development of national policy—is even more pleasing for having been maintained through a period of considerable change for AIMS, change both within the organisation and in its external environment.

Internally, the change of CEO announced in last year's annual report, from Mr John Gunn to Dr Paul Hardisty, took effect in July 2017. As expected, the new CEO brought fresh perspectives, new ideas and different approaches to the management of AIMS, generating organisational change and a number of reviews of activities, plans and strategies in several key areas. Extensive consultation with staff, partners, stakeholders and clients were an important part of these review processes. Some of the reviews, including a new AIMS Communications Strategy and a revised International Engagement Strategy, are ongoing and will be priorities for the coming year. The most significant review, of AIMS' Strategic Plan 2015–25, was conducted over several months. Completed towards the end of the year, it will be an important guide for AIMS' work and priority-setting through the year ahead.

Externally, the most significant change related to one of AIMS' principal, most long standing areas of research focus and expertise—the Great Barrier Reef. A serious deterioration in the state of the GBR during 2017–18, beyond that already observed in 2014–16, raised government and community concern about the future of this precious national asset to new levels. Calls for urgent action to restore and protect the GBR naturally turned a

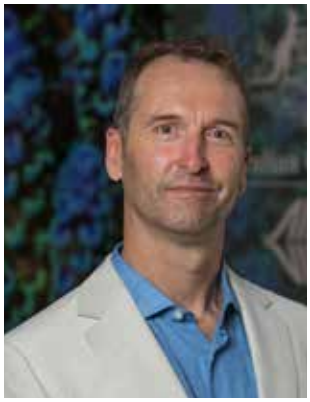
new spotlight onto AIMS' work and capabilities, and its capacity to contribute to the search for solutions.

AIMS responded confidently to these changes and calls to action. Drawing on its deep knowledge and long history of work on the GBR, it developed a reef restoration proposal for government consideration. At the midpoint of the financial year, the Institute's efforts were rewarded with the announcement by Minister Cash, alongside the Prime Minister and Assistant Minister Price, of a commitment of $6 million to AIMS for the conduct of a scoping phase for a Reef Restoration and Adaptation Program.

All at AIMS recognise the magnitude of this challenge and are keenly aware of what is at stake. We are committed to delivering good outcomes, consistent with the standards of excellence the Institute sets and seeks to achieve in all its activities.

During the year, AIMS managed to accommodate a substantial increase in GBR-related work while maintaining productive effort across all areas of its responsibilities for Australia's extensive marine estate and support for the nation's valuable marine industries and growing blue economy. This was an admirable achievement but may not be able to be sustained if work on the GBR continues to expand, as seems likely, given the importance of the Great Barrier Reef to Australia and the world and the central role AIMS is playing on reef research, restoration and adaptation. AIMS' capabilities and resources will need to be kept under close and continuing review during the year ahead.

Penelope Wensley AC



Paul Hardisty

The year in review: report from the CEO

It is my pleasure to present my first annual report as Chief Executive Officer of AIMS, Australia's national tropical marine research agency.

The Institute is in its 46th year of providing large-scale, long-term and world-class research that helps governments, industry and the wider community make informed decisions about the management of Australia's marine estate.

It has been a good year for AIMS by any measure. Our work has covered a significant portfolio of projects from supporting offshore and coastal industries to working with Traditional Owners in the north, and supporting policy development for the Australian and state governments. The launch and leadership of the scoping phase for the $6 million Reef Restoration and Adaptation Program (RRAP) was a major highlight. It will pave the way for major investment in research and development for preserving and rebuilding the GBR and other coral reefs around Australia and the world. Another highlight was the launch with industry partners of the three-year, $18 million North West Shoals to Shore program, which will inform the sustainable development of the area, including studies of the impact of noise on key marine ecosystems.

Our science output continues to place us in the top few marine science research institutions in the world, a testament to our fabulous people and excellent infrastructure. Our two purpose-built research vessels enjoy high use, supporting research along the Pacific and Indian Ocean coasts from Perth to Townsville. The National Sea Simulator, our unique advanced research aquarium complex, is growing in profile and attracts scientists from across Australia and around the world. We have maintained our financial stability and met (or exceeded) revenue targets.

Updating our strategic direction

Our marine estate is the third largest in the world and our blue economy makes a significant contribution to the nation's prosperity—over $74 billion a year. This contribution is expected to reach $100 billion before 2025. Despite its importance, too much of our marine estate remains virtually unexplored and poorly understood. At the same time, the oceans are

experiencing unprecedented change, epitomised by the back-to-back global coral bleaching events of 2016 and 2017. Accordingly, this year we undertook a comprehensive review of our existing 10-year strategy (AIMS Strategic Plan 2015–25). With the aid of our stakeholders, we have now developed an updated AIMS Strategy 2025, which we will start to implement in the year ahead.

Three key elements form the basis of the new strategy. The first is a focus on delivering measurable impacts for the nation. The second is a renewed commitment to research that supports solutions such as embracing the power of technology across the full life cycle of our activities, broadening our reach and helping us do more with less. The third element is a strong move into new areas such as reef restoration and adaptation, and the development of decision support systems to help management agencies evaluate and maintain the health and resilience of tropical marine ecosystems.

AIMS Strategy 2025 also reaffirms our dedication to key values, including being a partner and employer of choice, and to providing objective, transparent and high-quality marine science for the benefit of all.

AIMS leading the research: highlights of 2017–18

The strategic challenge is clear—manage our oceans sustainably so we can continue to enjoy the economic, environmental, social and spiritual benefits they provide for generations to come.

AIMS played a key part in efforts to secure new funding for the scoping phase of the RRAP. Thanks to Australian Government funding of $6 million, work on the first phase began this year through an AIMS-led consortium that includes the CSIRO, the Great Barrier Reef Foundation, the Great Barrier Reef Marine Park Authority (GBRMPA), James Cook University, Queensland University of Technology and the University of Queensland.

The Australian Government then followed up with an additional $444 million, the largest ever single contribution to GBR protection. Of this, $100 million has been earmarked for reef restoration science, and its deployment will be guided by the findings of the RRAP scoping phase.

Across the board, AIMS' industry partnerships have continued to strengthen and grow. This year marks 25 years of AIMS' collaboration with Woodside, ensuring ongoing sustainable development in Australia's north-west marine areas.

We also led the successful first year of the North West Shoals to Shore research program, a three-year study of the North West Shelf. Under this program, a multidisciplinary team of scientists, technical staff and industry experts will carry out regional environmental studies that enhance collaboration between the offshore petroleum industry, and science and research institutions.

In January, AIMS' Technology Development Team and the Defence Science and Technology's maritime division signed a five-year agreement to help solve mutual marine-based challenges. Experiments are already underway at our headquarters near Townsville. Here, researchers are exploring the use of technology such as UV light to help combat biofouling, the build-up of marine organisms on the surface of hulls and other equipment that costs marine and shipping industries millions of dollars each year. This collaborative research has the potential for major positive impacts on these industries.

In May, a delegation of eight AIMS researchers visited the Institute of Oceanology, Chinese Academy of Sciences (IOCAS) at Qingdao in the Shandong Province of China to continue our partnership in the Sino–Australian Centre for Healthy Coasts. The joint research centre was established with funding from the Australia–China Strategic Research Fund of the Department of Industry, Innovation and Science. Chinese marine scientists are applying the research capabilities of AIMS and IOCAS in the areas of monitoring, modelling, experimental science and the evaluation of management scenarios to create decision support tools for sustainable coastal development.

We continued to provide expert advice and solutions required to help preserve our rich and diverse marine estate and to underpin its sustainable use. Our scientists are among the best in the world in their disciplines and AIMS routinely ranks in the world's top three marine science organisations.

A new era in collaboration with Traditional Owners

Earlier this year, representatives of AIMS and our Aboriginal and Torres Strait Islander partners raised two new flags at our headquarters in Townsville, symbolising an exciting new chapter of understanding and a commitment to working together.

A natural alignment exists between AIMS' research, the management and protection of sea country, and the interests of Traditional Owners across the tropical waters of northern Australia—from Western Australia and the Northern Territory to the GBR. Our AIMS Strategy 2025 includes a specific objective to work with Traditional Owners to integrate traditional knowledge of sea country and conventional science to create new understanding and impact.

Despite the challenges facing our oceans, I remain a steadfast optimist. AIMS continues to provide the science with which to understand those challenges, develop effective solutions and help guide their implementation. I look forward to the coming years.

Paul Hardisty

Highlights

Woodside–AIMS collaboration marks 25 years

On the North West Shelf, science and industry meet amid spectacular beauty.

AIMS set up an office in WA in 1993 with the intention of working with the oil and gas industry to explore and conserve coral reefs on the remote North West Shelf. Twenty-five years ago, the Kimberley was indeed a wilderness—a vast and remote area in the wilds of WA. Working in such a remote region was expensive and had many logistical challenges. Overcoming these challenges required collaboration among organisations, science and industry.

Our first task was to establish a long-term monitoring program at Scott Reef in collaboration with resources company Woodside. That monitoring program and collaboration continues today—**one of the world's longest scientific partnerships**. The program has provided an unprecedented understanding of the natural resilience of reefs and the threat of climate change. It has since expanded to include reefs on other oceanic atolls in the north and to Shark Bay in the south, and to the deep-water communities of corals, sponges and algae on submerged banks and shoals. The collaboration between AIMS, Woodside and our associates has also expanded from mapping and monitoring into the biology, genetics and oceanography of coral reefs, and the array of organisms that depend on them, including fishes, sharks, turtles, whale sharks and whales. Over the years, we have documented the distribution of the reefs (emergent and submerged reefs widely distributed along the Kimberley coastline and its continental shelf); the biodiversity of the reefs; and the processes of change (from water quality to cyclones).

From beachside caravans in 1993 to the latest underwater monitoring tools in 2018 – celebrating 25 years of the partnership between AIMS and Woodside. Image: AIMS (left),T Foster (right)

Today, some reefs in the north-west remain among the healthiest in the world—spectacular examples of the natural biodiversity and cycles of change—while others provide alarming evidence of the rate at which climate change is degrading reefs around the world. WA reefs are comparable in size and diversity to the GBR and are just as impressive and in an even more diverse range of conditions—from continuous reef systems that span much of the inshore Kimberley in highly turbid water and massive tides to isolated oceanic reef in crystal clear water. The spectacular annual mass spawning by corals on the GBR occurs twice a year in the Kimberley—in both spring and autumn. The huge species diversity of corals may even surpass that on the GBR. Here, vast coral communities manage to survive in 50 m of water, where light is around one per cent of that at the surface.

Our quarter century with Woodside has provided insights into the past of the Kimberley coast and helped us to obtain the knowledge needed to manage the uncertain times ahead for coral reefs. Bringing together research, education, industry and policy advice, the collaboration helps Woodside make the right long-term decisions for business success, which is dependent on environmental understanding. It also enables ongoing discoveries related to the marine environment, and is a major achievement in eco-based management.

Woodside's use of AIMS' research enables them to better understand the marine environment in order to manage and mitigate any impacts and risks from their activities. The quality of Woodside's relationship has resulted in numerous internal and external awards, acknowledging the quality of our collaborative research outcomes. Such partnerships not only support industry to make the right decisions but make it possible for crucial knowledge on the environment to be made publicly available.

Findings from AIMS' 33rd year of monitoring the Great Barrier Reef

Severe disturbances, including coral bleaching, cyclones and crown-of-thorns starfish, take their toll.

The latest AIMS report on the state of the GBR shows significant coral loss due to coral bleaching and the continued southwards spread of outbreaks of the crown-of-thorns starfish (CoTS). The report from our Long-Term Monitoring Program (LTMP) summarises the findings from the 33rd year of surveys of the condition of reefs, including the latest surveys of the GBR carried out over 100 days between September 2017 and May 2018. These reports represent the longest continuous broad-scale record of change on the reef. The team is also involved in implementing the Reef Integrated Monitoring and Reporting Program (RIMReP), with the primary purpose of tracking progress towards the objectives set out in Australia's Reef 2050 Long-Term Sustainability Plan (the Reef 2050 Plan). The Reef 2050 Plan is a joint initiative of the Australian and Queensland governments to guide the management of the GBR. In order to assess the effectiveness of actions required by the plan, marine experts have convened to design a system that increases the efficiency and effectiveness of monitoring and provides a more holistic understanding of the health of the reef.

The 2018 report showed that coral cover on the reef has continued to decline due to the cumulative effects of multiple severe disturbances over the past four years, including coral bleaching, cyclones and CoTS outbreaks. Reefs in all regions of the GBR (northern, central and southern) were affected by a range of disturbances at different times. In all three regions, trends in mean hard coral cover now show an unprecedented decline. Such a steep decline has not been observed in the historical record.

The survey shows reefs in the **Northern GBR** have lost about half of their coral cover, reflecting the cumulative effects of two severe cyclones and two episodes of severe coral bleaching from 2014 to 2017. Reefs in the **Central GBR** sustained significant coral loss due to coral bleaching and the continued southwards spread of the current wave of CoTS outbreaks. Mean coral cover declined from 22 per cent in 2016 to 14 per cent in 2018. While some reefs in the **Southern GBR** continued to recover during the survey period, many of the southern Swain Reefs suffered intense CoTS outbreaks. Mean coral cover on reefs in the southern region declined for the first time in seven years, dropping from 33 per cent in 2017 to 25 per cent in 2018.

The report is based on information from reefs that have been surveyed using manta tow at least five times since 1985. The northern region and the Whitsunday area were not visited this year, which means that the impacts of Tropical Cyclone Debbie and coral bleaching in the northern region in 2017 are not yet fully represented in the results.

The manta tow method used by the Long-Term Monitoring Team provides estimates of coral cover and crown-of-thorns starfish populations around a reef. Image: LTMP

Saving the Great Barrier Reef through new science partnerships

Researchers explore global warming—and vanishing habitat.

In February 2018, Australia's leading research organisations united to begin designing ways to repair the GBR, the world's largest coral reef system. AIMS is leading a $6 million scoping phase with CSIRO and other partners, including the GBRMPA, the Great Barrier Reef Foundation, JCU, UQ and QUT, to develop a Reef Restoration and Adaptation Program (RRAP). This program will assess the benefits, risks and costs of existing and novel technologies to assist recovery and repair and build resilience of the reef.

Like many coral reefs around the world, the GBR (valued at $56 billion as an Australian economic, social and iconic asset) is under increasing pressure from a range of threats, particularly climate change. Boosting resilience so it can withstand the increasing pressures from climate change and other threats is more critical than ever.

We now have the brightest scientists and engineers investigating ways to help reefs adapt to warming temperatures. Rising ocean temperatures pose the greatest challenge to the survival of the GBR, compounded by poor water quality and outbreaks of the major predator of corals, the crown-of-thorns starfish.

The GBR has experienced major losses of corals over the past few years, with a serious decline due to back-to-back coral bleaching in 2016 and 2017. In spite of these setbacks, many areas of the GBR show resilience, which presents a window of opportunity to act now, while there is still enough diversity to preserve and restore.

Prime Minister Malcolm Turnbull with Dr Line Bay in January 2018 at the National Sea Simulator for the announcement of $6 million in funding for the Reef Restoration and Adaptation Program. Image: M Roman

The North West Shoals to Shore research program

Seismic surveys use sound waves to produce images of the geological layers beneath the Earth's surface, but what impact does this have on the marine environment?

A team of scientists, technical staff and industry experts have come together to study the impact of noise on pearl oysters and fish living on the North West Shelf of Australia.

Led by AIMS, the North West Shoals to Shore (NWSS) research program focuses on four main themes:

- marine noise
- benthic habitats and demersal biodiversity
- iconic and threatened species
- spatial dynamics of isolated reef atolls.

The program is one year into a three-year $20 million study of the North West Shelf. Funded by Quadrant Energy Pty Ltd to enable AIMS to carry out regional environmental studies that enhance the link and collaboration between the offshore petroleum industry, science and research institutions. The research is concentrated on regions of north-west Australia where significant petroleum activities and environmental sensitivities overlap.

Theme 1 Marine noise

Man-made noise is increasing rapidly in marine environments and is recognised as a pollutant of global importance. Management of this issue requires a better understanding of the effects of noise on organisms at all levels of the marine food chain.

AIMS is conducting experiments that will lead to a step change in our knowledge of the acute and chronic effects of noise in marine ecosystems. The focus is on the impacts of seismic surveys and vessel operations for oil and gas industries on selected key sensitive receptors (invertebrates and fishes) under real-world conditions. The experiments use standard marine seismic survey equipment and vessels to replicate surveys for the industry, so that the results can directly address stakeholder concerns.

Seismic vessel conducting a survey. Image: John Lawrence Photography / Alamy Stock Photo

Theme 2 Benthic habitats and demersal biodiversity

Soft coral and sponges seen by towed video offshore Eighty Mile Beach WA.

Past sea-level change has resulted in drowned coastlines around Australia's margin, one of which is the Ancient Coastline Key Ecological Feature (KEF) at 125-metre depth in the north-west marine region. This ancient submerged coastline is thought to provide areas of hard substrate that support higher diversity and enhanced species richness relative to surrounding areas of predominantly soft sediment.

Lack of knowledge on the diversity and importance of this feature, as well as adjacent shelf areas, has hampered regulatory and management decisions. By gathering biological data from video and other images and combining these with physical data from multi-beam and sediment samples, AIMS will describe the features and diversity of Ancient Coastline KEF and surrounding areas, and enable predictive models to be developed to describe benthic habitats more broadly. Alongside this, we will search for potential pearl oyster habitats in deep waters offshore from Eighty Mile Beach, and use a combination of physical and biological sampling to understand the likely extent of deep-water pearl populations, and their role as refugia and as a source of recruits into fisheries.

Pygmy blue whale. Image: Nature Picture Library / Alamy Stock Photo

Theme 3 Protected and iconic species movement, distribution and threats

A large number of Australia's iconic marine megafauna (whales, dugongs, sea turtles and sharks) are listed as threatened or endangered. These species typically have low rates of growth and reproduction, long lifespans and long times to maturity, which make them susceptible to impacts of human activities (e.g. shipping, seismic surveys, fishing, pollution and climate change). However, the frequency and extent of such anthropogenic impacts on the behaviour of marine megafauna are largely unknown, mainly because we have only limited understanding of the movement and distribution of these animals. The North West Shelf of WA has become a concentrated hub of industrial development and is an area that forms critical habitat for some of these species such as key breeding areas for marine turtles and migratory pathways and foraging grounds for pygmy blue whales.

For this project, AIMS is collecting robust, quantitative data and combining it with existing data to uncover the distribution and important areas for the rare and elusive pygmy blue whale, threatened hawksbill and green turtles. We will then quantify the level of spatial overlap between megafauna and the key threatening processes to understand the risk to these species. Our approach uses a combination of proven methods (satellite telemetry and collaboration and data synthesis) and innovative methods (passive acoustic surveys using slocum gliders, eDNA) to meet these objectives.

Theme 4 Spatial dynamics of isolated coral reef atolls

Off the north-west of WA, the Ashmore, Scott and the Rowley Shoals atoll systems sit near the edge of the continental shelf. These isolated atoll systems are hundreds of kilometres from the coastline and from each other. As the only emergent land masses along the shelf edge, their reefs and sandy spits are significant areas for breeding and migration for seabirds and marine megafauna. For many corals and demersal fish, however, there is likely little ecological exchange among the reef systems.

These isolated reef atolls have escaped many local pressures that have caused the degradation of other reefs, particularly pollution and overfishing of herbivores. Nonetheless, the region has seen rapid industrial growth and each of the reef systems sits within a potential zone of impact from multiple offshore petroleum operations. Additionally, regional-scale disturbances arising from climate change, such as severe cyclones and particularly coral bleaching, will increasingly impact these remote atolls in the future. Understanding the resilience of the atolls in an era of increasing human-induced disturbances is essential to managers and scientists.

Using the Rowley Shoals as a model system, our new coral reef project will integrate extensive AIMS data and new observations to develop predictive models of habitat distribution for reef atolls. The project will also explore the application of autonomous and automated approaches to data acquisition and processing for the adaptive monitoring of coral reefs throughout the region.

Bommie, Clerke Reef, Rowley Shoals. Image: J Gilmour

Designing a Reef Integrated Monitoring and Reporting Program (RIMReP) for the Great Barrier Reef

RIMReP aims to provide an up-to-date understanding of the reef, the values and processes that support it and the threats that affect it.

RIMReP, which is designed to give us a comprehensive view of the state of the GBR and adjacent communities and catchments, continues to bear fruit. During the year, AIMS worked closely with Australian and Queensland government agencies, research organisations and stakeholders to deliver the second design phase of the Reef 2050 program, which focused monitoring efforts on the management and objectives of the Reef 2050 Plan. Currently, monitoring is deployed across 108 individual programs.

AIMS contracted 68 experts from 16 institutions to develop recommendations for monitoring six GBR themes: coral reefs, seagrasses, megafauna, the marine physico-chemical environment, Indigenous heritage and the human dimension. Scientists in each thematic group completed desktop analyses to:

- consider the current status of values in each theme (e.g. coral, seagrass, dugongs and community wellbeing)
- evaluate the adequacy of existing monitoring programs
- identify gaps and potential improvements
- evaluate the potential introduction of new technologies for monitoring
- make recommendations to achieve an integrated program design
- assess the effort required to implement the recommended design.

Representatives of AIMS and partners attend a design meeting for the Reef 2050 Integrated Monitoring and Reporting Program held in March 2018. Image: E O'Regan

In addition to coordinating work across the six themes, AIMS led work within the coral reefs and marine physico-chemical environment themes, contributed to other groups when necessary, and led the overall integration process. In June 2018, draft recommendations for bringing together the monitoring programs currently operating in the GBR World Heritage Area and adjacent catchment were delivered to the RIMReP Steering Group.

RIMReP aims to provide an up-to-date understanding of the reef, the values and processes that support it and the threats that affect it. This knowledge is fundamental to informing actions required to protect and improve the condition of the reef, and to drive resilience-based management. RIMReP is also designed to track progress towards achieving the targets, objectives and outcomes articulated in the Reef 2050 Plan and to inform reporting products such as the *GBR Outlook Report* and regional report cards.

Unlocking snail secrets could help control crown-of-thorns starfish

Scientists begin a bizarre underwater battle for the future of the reef.

In an effort to protect the GBR and to build on our long-term, multi-million dollar investment to mitigate the impact of crown-of-thorns starfish (*Acanthaster planci*) on coral reef ecosystems, researchers have turned to the starfish's natural predator for help. Scientists are examining innovative approaches (beyond the use of divers) to cull individual starfish. They are examining whether the mere presence of certain CoTS predators on the reefs can disperse and inhibit future outbreaks. This research program intends to breed giant triton sea snail (*Charonia tritonis*) to develop alarm signals, and potentially to deploy the snail strategically in CoTS aggregations.

As part of its commitment under the Reef 2050 Plan, the Government has invested $568,000 towards research trials into breeding the predator at AIMS. The project, which started in June 2017 and will continue until June 2019, builds on the success of previous AIMS research that found CoTS will actively try to avoid an area where giant triton sea snails are present.

The study showed that exposing CoTS to triton secretomes produced a consistent alarm response—with the starfish attempting to flee from the perceived threat. There is potential for tritons eventually to be 'deployed' to prevent CoTS from closely aggregating during their spawning season. This could help prevent the starfish from reaching outbreak numbers. The chemicals that the tritons produce might be synthesised to create alarm-inducing 'baits' to agitate starfish on reefs and limit outbreaks. Giant tritons held at AIMS have laid numerous egg capsules, with more than 100,000 swimming larvae hatching in one month.

Little is known about the dietary requirements of the snails or the cues that trigger their metamorphosis into the adult snail. The research project focuses on helping triton larvae to transition to their juvenile and adult stages, providing the opportunity for further research into triton biology.

The triton-breeding project opens up exciting possibilities. If successful, this research will allow scientists to closely look at the impact of giant tritons on CoTS behaviour and test their potential as a management tool to help reduce coral lost to outbreaks. In the past 40 years, three waves of crown-of-thorns starfish outbreaks have had a major impact on the many reefs that make up the GBR. The starfish are marine invertebrates that feed on coral. They occur naturally on reefs throughout the Indo-Pacific region, and when conditions are right, they can reach plague proportions and devastate hard coral communities.

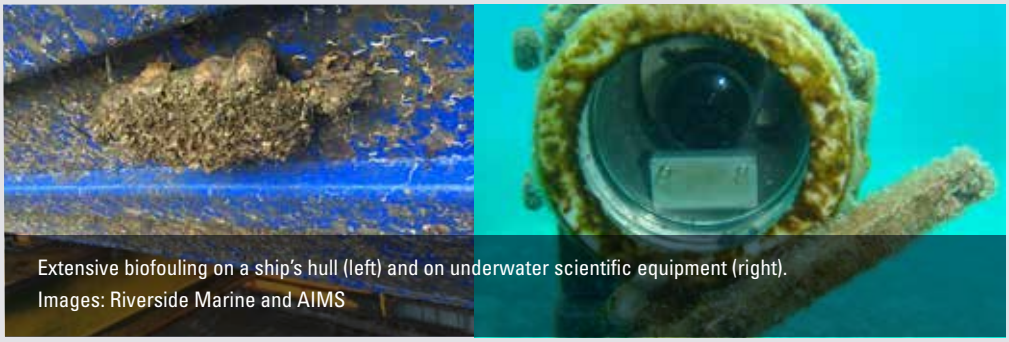
The native giant triton sea snail (Charonia tritonis) feasts on a crown-of-thorns starfish. Image: C Miller

Scientists combine forces to find solutions to marine biofouling

Biological 'glues' are a sticky problem for the Navy.

Biofouling not only affects large ocean-going vessels but also renders scientific marine instruments and underwater cameras useless until the accumulation of microorganisms, plants, algae or animals on the wet host surface can be cleaned off. It also speeds up corrosion in structures and materials, causing premature loss of equipment. These impacts can be catastrophic.

Science and technology experts from AIMS and the Australian Department of Defence Science and Technology (DST) division have begun working together to find answers to biofouling, which affects all marine industries. In January 2018, AIMS and the DST's maritime division signed a five-year memorandum of understanding to help solve mutual marine-based challenges such as biofouling.



Extensive biofouling on a ship's hull (left) and on underwater scientific equipment (right).
Images: Riverside Marine and AIMS

The economic impact of biofouling to the Royal Australian Navy includes loss of efficiency in ships by up to 15 per cent a year, and increased fuel consumption by as much as 40–50 per cent. This also means biofouling can see a vessel lose up to five nautical miles an hour.

A recent report estimated current chemical marine antifouling treatments save the international shipping industry $60 billion of fuel annually and reduce emissions of carbon dioxide (390 million tonnes) and sulphur dioxide (3.6 million tonnes) a year. However, traditional antifouling approaches, such as paints and coatings, have limited application in tropical waters. One of the methods the AIMS Technology Team is trialling at our facility near Townsville involves using ultraviolet (UV) technology as an antifoul for marine vessels. This experiment aims to assess the use of low-voltage UV-light emitting miniature LEDs to control biofouling. The overall aim is to establish definitive results of a variety of new technologies to manage the problem.

Many antifouling techniques have a strong chemical base but this research is looking to high-tech alternatives to ingredients that could be potentially harmful to marine environments. Reducing biofouling also reduces the risk of introducing marine pests to Australian waters on the hulls of ships, so it is also an opportunity to enhance biosecurity.

The research could have far-reaching benefits for the Navy, and a wider benefit to the marine industry. AIMS has begun conducting side-by-side experiments with DST scientists in Townsville to test how the technology works over time.

Measuring impacts of dredging on coral reefs

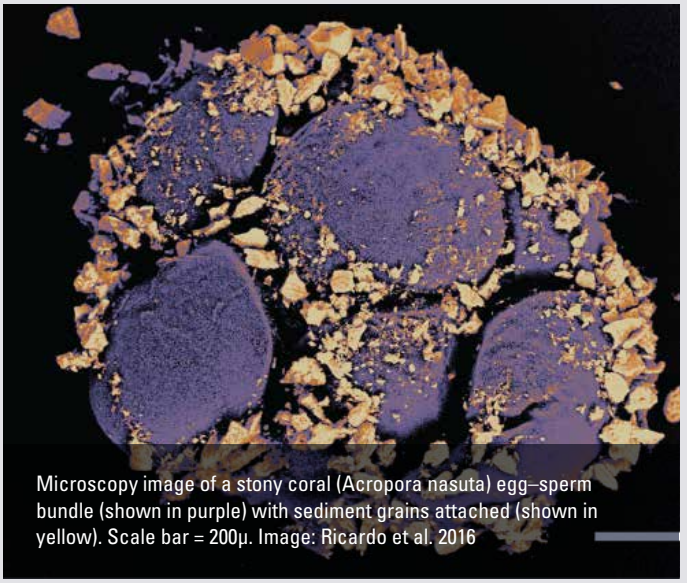
AIMS leads science to mitigate the harmful effects of marine dredging.

Dredging releases large amounts of sediments into the water and AIMS continues to research the adverse effects of sediment on corals and the ways in which they can be mitigated. Water quality guidelines to better predict and manage impacts provide some protection. A Western Australian Marine Science Institution (WAMSI) study, conducted by researchers from AIMS and The University of Western Australia, improved our understanding of the relative sensitivity of the reproductive and larval settlement stages of corals to pressures of elevated suspended sediment concentrations.

Experiments found a novel threat to the reproductive success in corals. Suspended sediments adhered to the mucous membrane of the egg–sperm bundles, reducing their ascent or preventing them from reaching the water surface. This was referred to as 'the ballasting effect'. Our observations of this mechanism were successfully modelled to predict the reduction in egg–sperm encounters as a function of suspended sediment concentration, particle grain size and depth of the adult colony. They were used to derive observable effects of concentrations. These concentrations and grain sizes can occur during dredging programs but are commonly associated with upper percentiles of sediment plumes from dredging or natural re-suspension events and occur close to dredging activities.

The results indicated that stoppages during coral spawning currently applied to dredging projects in north-western WA are likely to be too short to cover the sensitive larval settlement stage for many species. The timing of coral mass spawning is reasonably predictable; however, it varies between species and locations and so it is important to ensure any dredging stoppages coincide with the actual spawning event for all relevant species at that location for them to be most effective.

The temporary cessation of dredging can be costly and can delay the completion of projects. Studies of coral reproduction are therefore required to predict the appropriate window in which turbidity-generating activities should be suspended to reduce pressure and/or to satisfy ministerial conditions attached to environmental approvals while not restricting construction activities unnecessarily. Since 1993, dredging projects in WA that are



Microscopy image of a stony coral (Acropora nasuta) egg–sperm bundle (shown in purple) with sediment grains attached (shown in yellow). Scale bar = 200µ. Image: Ricardo et al. 2016

close to reefs have been required to temporarily stop five days before spawning and for up to seven days afterwards. This management approach has also been adopted in some dredging projects on the GBR. Given the new findings, the question remains whether extending shutdown periods to protect coral (before, during and after spawning) are reasonably practicable.

National Sea Simulator offers advances in controlled experiments

As part of the WAMSI Dredging and Kimberley Nodes program, AIMS conducted research on the effects of dredging on the early life history stages of corals, from fertilisation through to settlement. Experiments involved laboratory-based manipulation of suspended sediment concentrations, sedimentation and light levels conducted in the National Sea Simulator (SeaSim) with coral species found in the GBR and in the Pilbara region of north-western WA. The advantage of controlled conditions in the laboratory-based (aquarium) studies is that manipulative experiments can be conducted and variables can be isolated, allowing further examination of cause–effect pathways. Both in situ and ex situ approaches have different strengths and weaknesses, and conclusions drawn from a combination of the two have a greater weight of evidence and should be considered the most robust. The quantity and quality of the light required is fundamentally important for coral physiology and ecology, limiting reef-building corals to the photic zone (the surface layer of the ocean that receives sunlight) of tropical and subtropical seas primarily between 30° north and south of the equator.

Microplastics in tropical coastal and marine environments

Infrared light traces the source of plastic pollution—with surprising results.

Microplastics may be small in size but they are gigantic in terms of the problems they cause. They constitute a threat to creatures that ingest the tiny particles (less than 5 mm in size) and may cause reproductive complications in others. While marine plastic pollution has received increasing attention over recent years, microplastics have been identified as an issue of international concern. Over the past two years, AIMS has developed capability in microplastic field sampling, identification and chemical characterisation. Our researchers are now determining the presence, effects and sources of microplastic contamination in tropical waters around Australia. Field sampling procedures for sea surface samples have been established, with oceanographic field technicians, the Marine Monitoring Program Team and other AIMS field staff helping to ensure reproducibility and ease of collection.

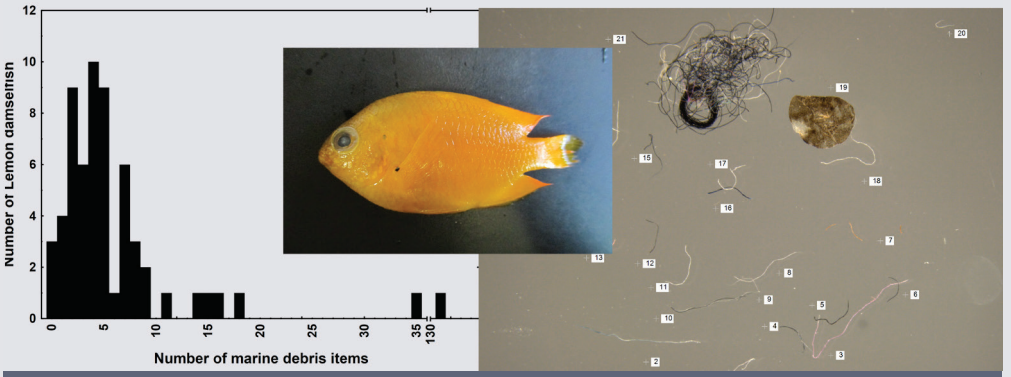
One aim is to demonstrate how field sampling for microplastics can become an integral and cost-effective component of monitoring programs such as the RIMReP and Australia's Integrated Marine Observing System (IMOS) monitoring at national reference station sites. Integration of microplastic sampling with regular sampling will enable the establishment of a nationwide monitoring program on the status and trends of microplastic contamination. To this effect, AIMS has collected seawater samples on a regular basis along coastal transects

with the Marine Monitoring Program – Water Quality and during monthly visits to the Yongala national reference station site since September 2016. We have conducted surveys at other locations repeatedly sampled as part of IMOS operations (e.g. the Palm Passage), the Central GBR, and from AIMS vessels RV *Solander* and RV *Cape Ferguson* as they traverse transects from Townsville – Cairns, Darwin – Groote Eylandt, Darwin – Broome, Broome – Scott Reef and Broome – Exmouth.

Our focus is on improving the efficiency and robustness of processing environmental samples for microplastics in the laboratory. Given their small size, separating, characterising and quantifying microplastics from environmental samples is labour-intensive and time-consuming. In 2017, AIMS purchased a new Fourier transform infrared imaging spectrometer to help. Infrared light is sent through the material and the amount of light absorbed via the material's vibrational response is measured. This information is converted into a chemical signature or fingerprint, which is then compared against a library of known plastic examples to help identify its source. Accurate characterisation of microplastic polymers will contribute to identifying source materials and inform mitigation of plastic pollution.

The team will also look at the potential lethal and sub-lethal effects of ingesting microplastics on coral reef organisms. Analyses of the gastrointestinal tract of juvenile coral trout and of lemon damselfish (*Pomacentrus moluccensis*) collected on the GBR demonstrate extensive uptake of anthropogenic microfibres by almost all fish. The concern is that these plastics and toxic chemicals could accumulate in food chains, eventually making their way into animals that eat ocean creatures—such as ourselves. Current work is looking into the uptake of microplastics by coral reef organisms more generally as part of an AIMS@JCU PhD and we are comparing the effects of microplastic contamination in seafood species in collaboration with IOCAS in China.

Finally, we used a high-resolution hydrodynamic model to identify potential sources, transport pathways and the fate of microplastic contamination in the Central GBR. Interestingly, microplastic contamination on outer reefs could not be linked with river run-off, suggesting oceanic sources. As worldwide research continues, eradicating the trillions of tiny particles that have already entered the oceans may be the next big challenge in ocean conservation.



Ingestion of microfibres by lemon damselfish, with number of fibres per fish (left), and an example of fibres encountered in the gastrointestinal tract (right).

Towards a marine science plan for the Northern Territory

Jobs and lifestyles depend on science—and we still don't know enough.

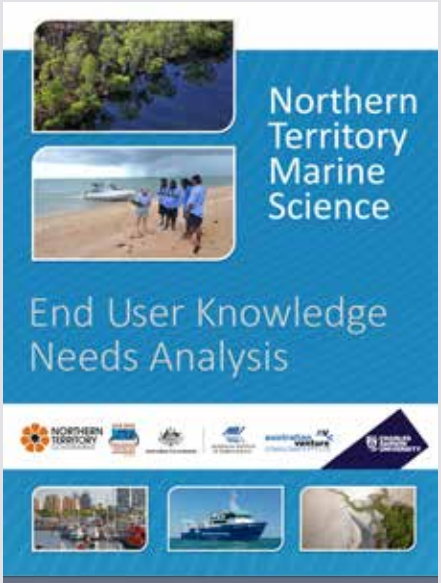
Coastal and marine environments in the north of Australia are worth more than $2 billion per year to the economy and support an estimated 6,500 jobs. Marine-based industries—wild-catch fishing, prawning, recreational fishing, aquaculture, pearling and crocodile farming—are critical components, along with oil, gas and petroleum.

In response to increasing pressures, AIMS and Charles Darwin University (CDU) jointly commissioned a report that investigated how the value of both marine ecosystems and industry could be maintained. The report—the NT Marine Science End User Knowledge Needs Analysis—identified 244 gaps in science knowledge, revealing the depth of marine research needs across the Territory. The 400-page report, presented to leaders at the Developing Northern Australia conference in June 2018, brought to light the sheer volume and range of marine science needed to ensure that the marine environment—and the economic, social and cultural values that it supports—are preserved.

Understanding the needs

The report provides a strong foundation to help plan the science behind the management and protection of the ecosystems of the Territory. It also aims to support economic development in a way that preserves and strengthens Indigenous cultural values and environmental attributes. Our future marine science research and investments in the Territory will be designed to reflect the following three principles:

- New marine science knowledge is needed to inform the way government promotes and regulates development and the decisions government, industry and communities take to protect the marine environment and marine-oriented Aboriginal cultural values.
- Government, industry and communities need to know more about the current and future cumulative impacts of pressures such as climate change, invasive species, marine noise and pollution in order to manage these impacts.
- Government, industry and communities need to better understand the economic, heritage, species, habitat and physical marine baselines, and to develop more effective ways of attaining those baselines.



The Northern Territory Marine Science End User Knowledge Needs Analysis was presented in June 2018 at the Developing Northern Australia conference.

Autonomous technology helps scientists put eyes on the Great Barrier Reef

Unmanned surface vehicles power marine conservation.

Much of AIMS' work involves technology that gives scientists a better understanding of how our oceans are changing, but a very new tool is now helping them with the job. In partnership with Boeing, AIMS has demonstrated how an autonomous unmanned surface vehicle (USV) can improve monitoring of the GBR and coastal waters, for a fraction of the cost.

A seven-day trial saw the vehicle cover 200 nautical miles of the central reef, in what is the first major milestone of a five-year joint research agreement between AIMS and the world's largest aerospace company. The Wave Glider, developed by Boeing subsidiary Liquid Robotics, was deployed at the Central GBR in September 2017 to help assess the health of the coral reefs and ecosystems. Powered by wave and solar energy, the vehicle delivers continuous, real-time data for up to a year with no fuel. The mobile data-gathering platform, with its 15 m operating depth, skims along the ocean's surface measuring weather, wave height, water salinity, pH levels, chlorophyll and more.

AIMS undertook a similar test deployment in WA around Browse Island to test the platform in open ocean conditions to support future work in the region.

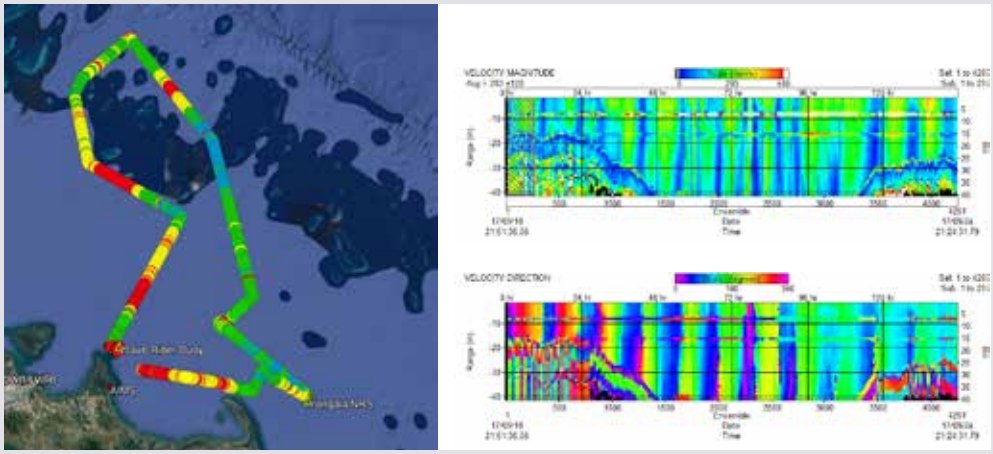
Wave Glider preparation at AIMS' Cape Cleveland marine operations facility (left) and working at sea (right). Images: S Bainbridge and M Roman

Liquid Robotics Wave Glider Platform

The USV is capable of taking scientific measurements over a long geographical range via missions that can extend for several months, without the need for research ships nearby. Measurements are stored on board with low-bandwidth datasets uploaded via real-time communications. Onboard sensors include an ADCP (measures current speed/direction), CTD (measures seawater temperature and conductivity), fluorometer (measures chlorophyll a, crude hydrocarbons and turbidity), a weather station and a GPS wave sensor, with datasets streamed online to a data portal accessible by AIMS' staff. While the unit is autonomous, the mission plan and path can be updated remotely, allowing for mission updates.

Over the seven-day trial, the Wave Glider collected data every 10 minutes. The mission took it past a series of buoys in the region, from AIMS to the Yongala Research Buoy, allowing the glider data to be validated against existing platforms. The analysis of this data is underway

but initial work shows that the Wave Glider is capable of collecting equivalent wave data as fixed moorings with the benefit of being easily re-tasked to study different areas or to collect differing data (e.g. to respond to flood or bleaching events).



Wave Glider mission path (left) showing changes in chlorophyll a concentrations. Right: Current velocity and direction in the top 40 metres below the Wave Glider for the first five days of the mission clearly show the effect of tides on currents.

Artificial intelligence engine for classification of benthic habitats

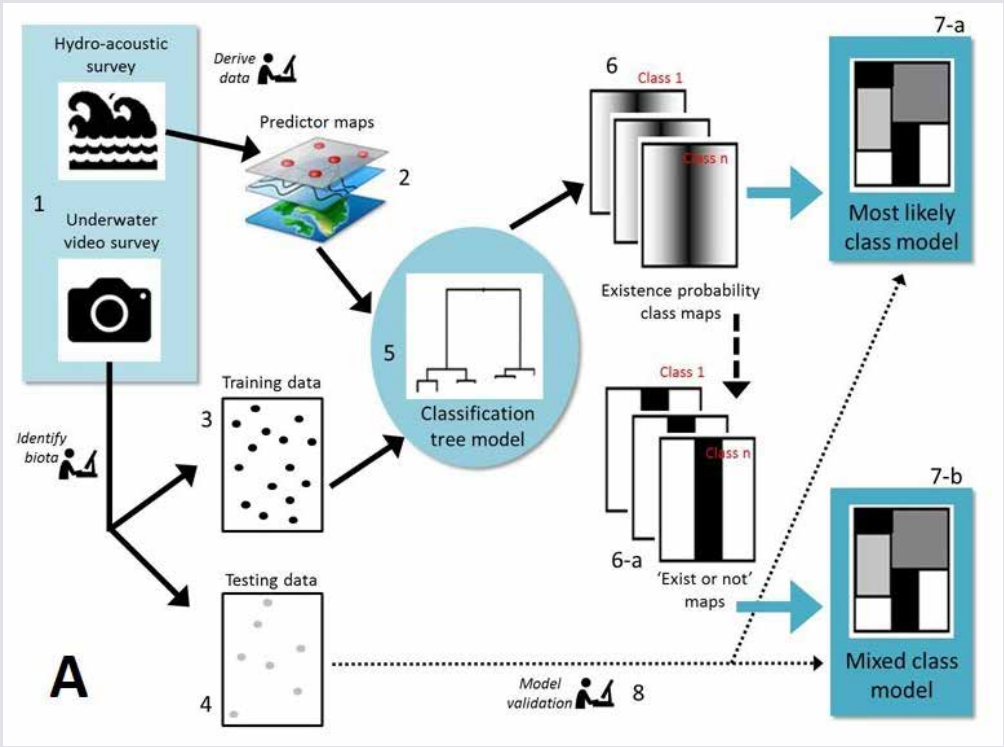
Computer vision science analyses coral images hundreds of times faster than humans.

Scientists from AIMS will use face-recognition technology in our annual surveys of coral reefs in Australia's tropical waters. The Reef Monitoring Team has stepped up its surveying efforts because of the intensity and scale of environmental disturbances, urging the need to monitor a larger proportion of the marine World Heritage Area.

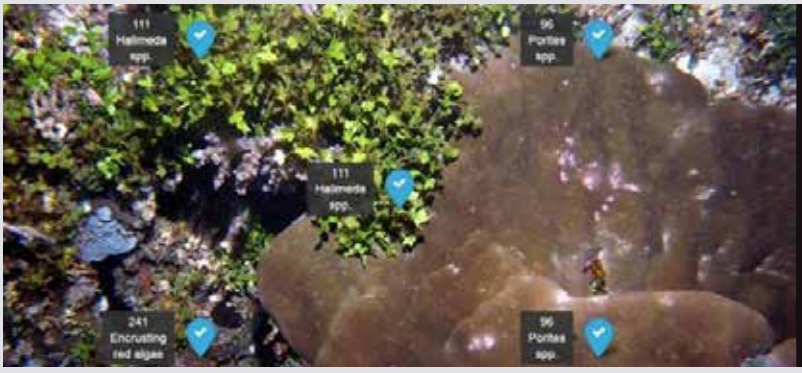
The researchers are also harnessing rapid advances in a range of technologies from artificial intelligence to underwater robotics. The implementation of these technologies allows AIMS to report on the state of the GBR in near real-time, and has the potential to save $1.9 million a year previously spent classifying images manually.

BenthoBox: machine learning speeds up identification process

Rapid advances in artificial intelligence allow machines to learn from AIMS' biologists how to distinguish corals from other marine life, and to recognise several types of coral. This is then used to measure the abundance of corals in images hundreds of times faster than humans are able to. This advanced technology includes the BenthoBox, an image annotation system for benthic ecology, which was developed by AIMS' researchers in WA. As well as using



face-recognition technology, BenthoBox also uses BenthoBot, an artificial intelligence engine that works inside the BenthoBox product. Its computer algorithm was developed to classify points on an image, based on the spectral properties extracted from each image. It has been developed specifically by AIMS to provide an efficient and consistent means of generating the point-based, broad-scale benthic classification data that underpins both the Offshore Shoals and Shallow Reef long-term monitoring programs. This application is able to produce reliable estimates of coral cover while processing more than 30,000 images per day, which has drastically reduced the delay between collecting images and reporting the results. See Table 1 for projects using this technology, indicating day equivalence.



Digital still from Tassie Shoal classified using the AIMS 5-point method with BenthoBox.

Table 1: Projects using BenthoBox identification

PROJECT	NUMBER OF IMAGES	EQUIVALENT ECOLOGIST WORK (AT 120 IMAGES PER DAY – 5 POINTS PER IMAGE)
PTTEP (PTT Exploration and Production Public Company Ltd) As part of the final report for PTTEP Australasia, the BenthoBox system was used to reclassify three years of historical data and classify a fourth year that had not been seen previously by BenthoBox. In total, 545,000+ points were labelled in 27,000+ images.	27,000	225 days
Groote Eylandt The first towed video survey of Groote Eylandt was processed using the AIMS 5-point method. In total 38,135 points were labelled in 7,600 images.	7,600	63 days
WAMSI Five towed video surveys spanning 2014–16 were processed using the AIMS 5-point method. In total 214,720 points were labelled in 42,944 images.	42,944	357 days
Total:	**77,544 images**	**645 days**

BenthoBox has been used on the following projects:

- Groote (Oct. 2017)
- Conoco (Oct. 2017)
- Quadrant Shoals to Shore project (2017–19)
- Woodside Ningaloo and Shark Bay monitoring (2018–19)
- Woodside Scott Reef and Rowley Shoals monitoring (2017)
- Parks Australia Ashmore Reef monitoring (2017)
- Shell Applied Research Program Reefs project (2017).

BenthoBox was 'trained' on over one million historical images from the archive of the LTMP and was deployed to a new server specifically purchased and housed in Townsville. It can currently predict with 90 per cent or more accuracy the presence of hard coral, soft coral and algae in LTM imagery. Work is underway to include BenthoBox hard coral cover predictions on the LTM webpage: http://apps.aims.gov.au/reef-monitoring/

A new Australian Marine Parks Science Atlas

All creatures great and small are accessible online.

Parks Australia manages a network of 60 marine parks in Commonwealth waters around Australia. In 2017, Parks Australia contracted AIMS to build a new 'Australian Marine Parks Science Atlas'.

The key goals were to communicate the values of each of the marine parks to the public and to identify what is known about each park, communicating the knowledge in an accessible way to managers and marine researchers. Australian marine parks protect a huge range of spectacular marine life and features like coral reefs, and underwater canyons and mountains.

The online Science Atlas provides those interested in marine science with a snapshot of the scientific research and information that underpinned the establishment of the parks. It also highlights the work Parks Australia and the Australian marine science community are doing to improve our understanding of, and ability to effectively manage, these parks.

The Atlas is based on AIMS' existing eAtlas technology. Our Townsville-based Data and Technology Team made extensive improvements to the software that enables the eAtlas to make the new Science Atlas easier for end users to navigate.

This meant our content team, made up of WA-based spatial ecological data scientists, were able to source and publish much more content to this first version of the Science Atlas than would otherwise have been possible.

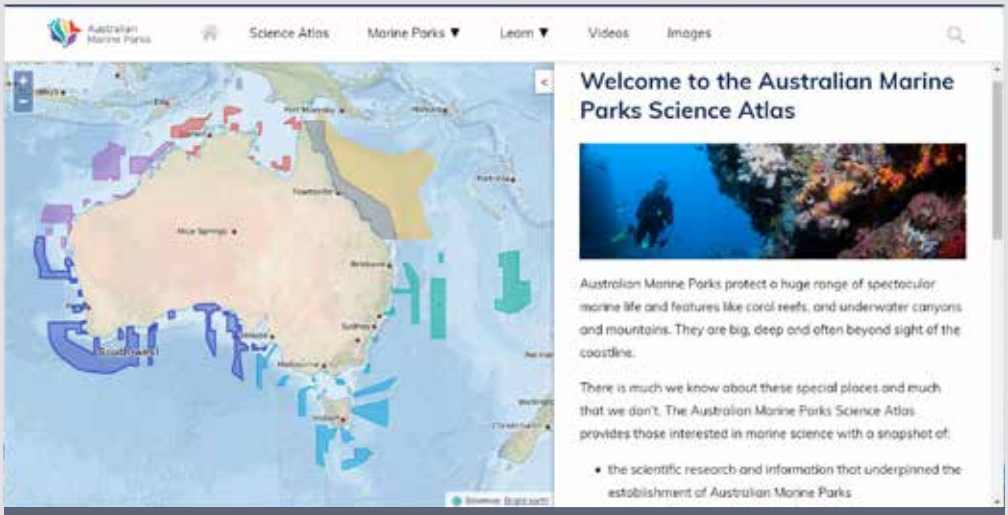
Both the content team and the technical team in AIMS worked closely with Parks Australia to develop and continually refine a vision for the Atlas.

People can navigate the Atlas either by clicking on a map to select a marine park of interest, or by selecting the name of a marine park from the 'Marine Parks' menu at the top of the screen. In both cases, the map automatically zooms to that park and gives the appropriate content in the side panel.

Potential users include: the public (to learn in general about the parks and what they contain); scientists (to see where gaps in knowledge exist and to showcase their recent relevant research); and Parks Australia (to assist them to see what we currently know about a given marine park).

The site includes interactive maps, photo galleries, videos, articles and a literature review of published studies relevant to each park. The maps also present some of the data used to design the parks originally, as well as data that will be used into the future for their management.

The Atlas currently includes 112 high-resolution images, 31 videos, and 6 general articles, 21 articles highlighting recent research and more than 150 interactive maps, as well as a list of published scientific research for each marine park. Scientists can submit articles describing their latest research relevant to a marine park for publication in the Atlas.



The Australian Marine Parks Atlas was due to be launched in August 2018 at: http://marineparks.eatlas.org.au/amps

Measuring the Reef in 3D

We can now measure things we could never measure before—and at minimal cost.

Structural complexity is a key habitat feature that influences ecological processes by providing a set of primary and secondary resources to organisms, such as shelter from predators and availability of food.

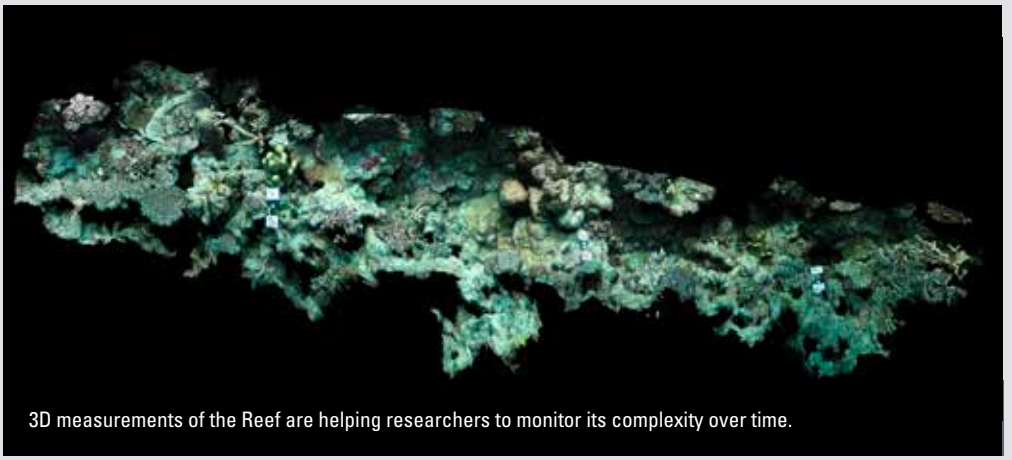
The spatial configuration and morphology of corals, the underlying substrate and other sessile organisms create complex structures that serve as habitats for a large number of species inhabiting coral reefs. As such, structural complexity of coral reefs drives numerous functions directly linked to the resilience of these ecosystems.

Despite the importance of reef structure in the long-term functioning of these systems, quantifying its complexity is a time-consuming exercise, limiting the extent of our observations. Therefore, advancing our understanding of how structural complexity influences reef dynamics requires improving our efficiency and ability to quantify multiple metrics of 3D structural complexity in a repeatable way, across spatial extents and maintaining high resolution.

AIMS researchers are making use of rapid advances in technology to monitor reef structural complexity by recreating and measuring reefs in 3D. Using off-the-shelf cameras, the 3D structure of the reef is accurately reconstructed by underwater images taken at high-speed across a reef transect. These images are aligned and referenced using a technique called photogrammetry, which allows the recovery of the exact position of each pixel in the images,

recreating the 3D structure of the reef. These 3D models are produced at scale, allowing scientists to measure different attributes associated with the structural complexity of coral reefs, such as rugosity (surface roughness), across large extents in a fraction of the time that takes to do it underwater. With the advances in photogrammetry software and high-performance computing hardware, automated analyses of structural complexity across all AIMS-monitored reefs in the GBR is now possible and at a minimal cost.

Characteristics of the reef surface are believed to play an important part in the early life of corals and subsequent reef recovery. We can now measure things we could never measure before, including being able to see how complex the surface of the reef is. Our surveys of juvenile corals are now being compared with 3D reconstructions of the underlying reef surface.



3D measurements of the Reef are helping researchers to monitor its complexity over time.

These innovations are ensuring more information can be gathered in a shorter time. Rapid automated processing means findings can be made available to managers and decision makers swiftly. In that way, management of the GBR will be guided by the most accurate and latest information.

AIMS' divers have monitored a large number of representative GBR reefs for more than 30 years, providing a substantial record of the changes that have occurred. These historic diver-based surveys and the most recent surveys using these new technologies will run side-by-side for several years to ensure the observations are compatible and the historical record is maintained.

Determining the status and movement of marine megafauna

To understand whether sharks, turtles and snakes need our protection, we must know where they go.

The status of many threatened or endangered species of marine megafauna (whales, dugongs, sea turtles and large sharks and rays) often acts as an ecological barometer, reflecting the health and diversity of marine habitats. AIMS is monitoring several species of megafauna to identify critical habitats, including breeding grounds, migration corridors and high-risk areas where human activities intersect with these environments. Another focus of our monitoring activities is the presence and distribution of critically endangered sea snakes in northern Australia.

Using a combination of satellite and acoustic tags, our researchers have followed creatures for months and even years. The knowledge we generate supports the management and conservation of iconic marine species. AIMS is leading research to define the distribution of species in the north in two separate projects. One includes analysis of a range of threatened species including sharks, turtles and shorebirds, and the other sea snakes.

Hammerhead sharks

AIMS is researching the status and connectivity of hammerhead shark (*Sphyrnidae*) populations in northern Australia. The two most common species (smooth and great hammerhead sharks) have been listed as endangered; the scalloped hammerhead is now listed as 'conservation dependent' under the *Environment Protection and Biodiversity Conservation Act* (1999). The IUCN—the international body that classifies the global threat status for species—lists the scalloped hammerhead and great hammerhead as endangered and the smooth hammerhead as vulnerable to extinction.

Scalloped hammerhead sharks, one of the world's most threatened shark species.
Image: Y Papastamatiou

One of the unresolved questions for fisheries management and conservation policy for hammerhead sharks is whether Australian populations are linked to those in Indonesia and Papua New Guinea. To address current questions about hammerheads, AIMS has been leading collaboration with the CSIRO and JCU, funded by the National Environmental Science Program (NESP) Marine Biodiversity Hub, which will help inform management trying to recover shark populations in the wild.

Preliminary results indicate Australian populations of these sharks have declined and may have limited connection to populations in Indonesia or Papua New Guinea. This information is essential for the Department of the Environment and Energy to negotiate plans to support population recovery with management agencies in the states and the Northern Territory, and to meet reporting requirements for international agreements to protect these species. In time, we hope to show whether, beyond supporting policy, the ultimate impact of the research will be a recovery in the numbers of these animals.

Whale sharks

At Ningaloo Reef in WA, the magnificent whale shark is the focus of a thriving ecotourism industry. The whale shark (*Rhincodon typus*) is a slow-moving, filter-feeding carpet shark and the largest known extant fish species. However, in 2016, whale sharks moved closer to extinction, with their conservation status officially upgraded from vulnerable to endangered on the IUCN Red List. Ongoing research by AIMS includes monitoring the status and health of these whale shark populations, and tracking their movements.

Turtles

For the first time, AIMS has tracked the early offshore movements of turtle hatchlings at Ningaloo using novel approaches in acoustic telemetry. This work shows that hatchlings are attracted to offshore artificial light, which may affect their survival by increasing their exposure to predators and wasting precious energy as they swim towards the lights. This newly discovered response to artificial light is being used to support the management of offshore development activities near nesting areas.

Sea snakes

During 2017–18, AIMS began a three-year study into the distribution of critically endangered sea snakes in the north-west of WA, based on strong population declines with no known cause. This project is designed to determine if other suitable habitats exist and to identify previously unknown populations that may help secure the future of these species.

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 2017–18 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 13 September 2018.

The Honourable Penelope Wensley AC
Chairman
Australian Institute of Marine Science

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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 C Legislative foundation and ministerial powers* on page 164. Our mission statement provides a contemporary overview of the Institute's research focus:

OUR MISSION

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

Intended outcomes

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

The 2017–18 PBS describes the outcome expected from government funding of AIMS programs.

- AIMS is funded to achieve Outcome 1: *Growth of knowledge to support protection and sustainable development of Australia's marine resources through innovative marine science and technology*.

Our updated Corporate Plan 2017–18 further identifies the dimensions of this outcome. Under this plan, AIMS' research efforts are focused on delivering:

- a healthy and resilient Great Barrier Reef
- sustainable coastal ecosystems and industries across northern Australia
- environmentally sustainable offshore oil and gas development.

Government funding for AIMS is delivered through Program 1: *Marine Research: Research services focused on supporting the sustainable development by industry of Australia's marine estate while ensuring the protection of high-value marine and coastal ecosystems through effective environmental management*.

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 addressing national needs and aspirations.

The 2017–18 Portfolio Budget Statement Table 2.1.3 identifies how AIMS is working to deliver research outcomes by:

- developing and contributing to integrated observing systems and conducting robust long-term monitoring of key components of Australia's tropical coastal and marine ecosystems
- conducting strategic and applied research investigating major gaps in our understanding of the impacts of natural and human pressures on these ecosystems
- enabling effective environmental risk assessment by government and industry through developing decision tools that drive efficiency gains in evidence-based regulatory regimes and marine industry development
- contributing to a growing body of publicly available data and information
- engaging in national and international research collaborations to leverage investment, harness capability, ensure uptake of knowledge, and promote outcomes enhancing Australia's role in supporting regional blue economies
- engaging meaningfully with Traditional Owners to integrate western and traditional knowledge systems for the sustainable use and effective management of Australia's tropical marine ecosystems
- optimising the use of world-class research infrastructure (vessels, aquaria, ocean monitoring equipment and laboratories) to support research conducted by AIMS and research collaborators
- developing, deploying and potentially marketing innovative data and underwater sensing technologies.

The success of AIMS' marine research program is assessed against a set of six high-level **performance criteria** designed to:

- maintain or increase scientific excellence, innovation and impact
- successfully deliver strategic and applied research and monitoring that is aligned with national research priorities and stakeholder needs. Key stakeholders include the Australian and state and territory governments, marine industries (oil and gas, ports sectors, coastal industries and tourism) and coastal communities
- ensure research advice and data/knowledge products are used by stakeholders to assess the impacts of natural and human pressures on sensitive marine ecosystems
- increase research capability, capacity, impact and science diplomacy through participation in formal national and international collaborations, joint ventures, partnerships and strategic alliances
- make optimal use of research infrastructure assets.

An assessment of our performance against these measures is provided in Table 2 on page 37.

In addition to the above high-level performance criteria, AIMS established a set of 15 **research priorities** to be achieved in 2017–18. Our performance against these annual research priorities is assessed and reported in Table 3 on page 42. Specific examples of our achievements against these criteria are provided throughout this annual report and are referenced in Table 2 (page 37).

Results and commentary on performance

AIMS successfully achieved all high priority research outcomes detailed in the AIMS Corporate Plan 2017–18.

At the start 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 that AIMS can retain and the associated research outputs it should target, are 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 (i.e. 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 which 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.

In 2017–18, the external revenue budget was set moderately to reflect an expectation that an observed market downturn in the resources sectors would persist, in particular in the offshore oil and gas sector. By Q3 2017, however, external revenue exceeded the budget as AIMS secured strategic long-term industry projects. The pressures of securing external revenue are anticipated to ease in the year ahead as a faster than expected recovery in investment by the offshore energy sector is taking place.

Tables 2 and 3 provide an assessment of outcomes against the specific objectives detailed in the AIMS Corporate Plan 2016–17.

Table 2: Overall performance summary

ASPECT AND OBJECTIVE	PERFORMANCE CRITERION	ACHIEVEMENT AND COMMENTARY	PORTFOLIO BUDGET STATEMENT PERFORMANCE CRITERIA
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	AIMS Strategic Plan 2015–25 articulates the Institute's strategic research objectives and goals. The goals and objectives of the Strategic Plan are deliberately aligned with national science and research priorities and the needs of our key stakeholders. The goals and objectives of the Strategic Plan are delivered through evolving annual research plans that are developed and implemented by each of our research teams. During the latter half of 2017–18, AIMS reviewed its Strategic Plan to address the significant environmental change (i.e. mass coral bleaching in 2016 and 2017) that has occurred since the release of the 2015–25 Strategic Plan, and to ensure the evolving needs of stakeholders remain central to our research program. The revised Strategic Plan will be implemented from 2018–19. 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 (page 76).	Successful delivery of strategic and applied research and monitoring that is aligned with national research priorities and stakeholder needs
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 our key stakeholders (page 76). During 2017–18, AIMS completed all high-priority research tasks and achieved its milestone delivery targets (page 42).	Successful delivery of strategic and applied research and monitoring that is aligned with national research priorities and stakeholder needs

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

Overall performance summary (cont.)

ASPECT AND OBJECTIVE	PERFORMANCE CRITERION	ACHIEVEMENT AND COMMENTARY	PORTFOLIO BUDGET STATEMENT PERFORMANCE CRITERIA
Research communication and extension *To ensure that AIMS research is communicated and provided to stakeholders in a range of forms such that they derive maximum possible value from the public investment in AIMS*	Stakeholder satisfaction assessed through stakeholder engagement Number of peer-reviewed scientific publications and client reports Participation in panels and advisory committees	As part of the Strategic Plan review process, AIMS engaged with more than 200 key stakeholders to ensure that future research priorities were clearly identified and that AIMS research outputs are delivered in such a way as to enhance adoption and promote impact. The results of this targeted engagement indicated that AIMS is a highly valued research provider well positioned to deliver stakeholder knowledge needs (page 76). AIMS works to maintain our position as a trusted adviser through co-design of research and close consultation with stakeholders (page 76). AIMS communicated its research findings via a wide range of mechanisms. These included peer-reviewed publications (page 137), reports, panels and advisory committees, presentations, conferences, websites, articles in news media and social media posts (page 78). During 2017–18, AIMS maintained a publication output that is within 10% of its record established in 2016 (page 55).	Successful delivery of strategic and applied research and monitoring that is aligned with national research priorities and stakeholder needs Research advice and data/knowledge products are used by stakeholders to assess the impacts of natural and human pressures on sensitive marine ecosystems Scientific excellence, innovation and impact is maintained or increased

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

Overall performance summary (cont.)

ASPECT AND OBJECTIVE	PERFORMANCE CRITERION	ACHIEVEMENT AND COMMENTARY	PORTFOLIO BUDGET STATEMENT PERFORMANCE CRITERIA
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 Number of jointly supervised Doctor of Philosophy (PhD) students and postdoctoral fellows Stakeholder surveys Mapping of completed research against stakeholder needs	AIMS maintained its scientific excellence as measured by its global rankings (page 55). AIMS continues to foster research capability through the establishment of formal collaborative programs, joint supervision of PhD students and support to postdoctoral fellows. (page 68). AIMS continued to deliver high-quality research aligned to national science and research priorities and the needs of AIMS' key stakeholders (page 76).	Scientific excellence, innovation and impact is maintained or increased Successful delivery of strategic and applied research and monitoring that is aligned with national research priorities and stakeholder needs Increased research capability, capacity, impact and science diplomacy through participation in formal national and international collaborations, joint ventures, partnerships and strategic alliances

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

Overall performance summary (cont.)

ASPECT AND OBJECTIVE	PERFORMANCE CRITERION	ACHIEVEMENT AND COMMENTARY	PORTFOLIO BUDGET STATEMENT PERFORMANCE CRITERIA
Health, safety and environment (HSE) performance *To provide a workplace where HSE risks are managed to be as low as reasonably practicable*	AIMS key performance indicators include: Total recordable injury frequency rates (TRIFR) Hazard and incident management measures Hazard inspection completion to schedule Core HSE training completion rates	AIMS continued to provide a healthy and safe workplace and to manage proactively its health, safety and environmental risks (page 103). As part of AIMS' continuous improvement focus, a holistic Injury Reduction Plan was implemented targeting the prevention of musculoskeletal injury arising from manual task work. This helped generate a reduction in TRIFR of more than 12.5% (page 106). Cultural advancement has also occurred from initiatives that sought to facilitate safety communication (e.g. 'The Safety Minute' is a process whereby a safety experience is shared at each AIMS-chaired meeting). AIMS' strong HSE performance is recognised by industry partners, particularly those involved in offshore oil and gas development, and is an important enabler of our 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.	

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

Overall performance summary (cont.)

ASPECT AND OBJECTIVE	PERFORMANCE CRITERION	ACHIEVEMENT AND COMMENTARY	PORTFOLIO BUDGET STATEMENT PERFORMANCE CRITERIA
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 our human resource capability. This includes research laboratories, the internationally significant SeaSim, coastal class research vessels and a large portfolio of field monitoring infrastructure (page 79). 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 (page 73). AIMS continued to extend its research capability and regional impact with institutional collaborations, partnerships and memorandums of understanding with more than 50 companies, institutions and government stakeholders (page 76).	Optimal use of research infrastructure assets Increased research capability, capacity, impact and science diplomacy through participation in formal national and international collaborations, joint ventures, partnerships and strategic alliances
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	About 37% of AIMS' operating expenditure (excluding depreciation) was funded through external revenue sources during 2017–18 (page 84). AIMS has made great progress with the installation of solar panels funded through an equity injection from government with completion in 2018/19 (page 106).	

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

Table 3: Summary of AIMS' performance against 2017–18 research goals

DELIVERABLE IDENTIFIED IN CORPORATE PLAN 2017–18	ACHIEVEMENT AND COMMENTARY	EXAMPLES OF ACHIEVEMENT
Working with Australian Government and state and territory 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 situational awareness of the condition of the GBR, and informs both the *GBR Outlook Report* and implementation of the Reef 2050 Plan	AIMS continued 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 element of the Reef 2050 Plan. Phase 2 of the design of RIMReP was completed during 2017–18. Draft recommendations were delivered at the end of 2017–18. The translation of design recommendations into implementation is planned for 2018–19.	AIMS involvement in the implementation of the Reef 2050 Plan (page 62)
Collaborating 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, including marine noise	With support from the oil and gas industry and government programs such as the National Environmental Science Program (NESP), 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 directly address industry and government priorities and are made available through a variety of innovative mechanisms including the industry-funded North West Atlas, and the Parks Australia-supported Australian Marine Parks Science Atlas.	BenthoBox (page 25) North West Shoals to Shore research program (NWSS) (page 14) Marine Parks Science Atlas (page 28)

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

Summary of AIMS' performance against 2017–18 research goals (cont.)

DELIVERABLE IDENTIFIED IN CORPORATE PLAN 2017–18	ACHIEVEMENT AND COMMENTARY	EXAMPLES OF ACHIEVEMENT
Investigating and developing potential mechanisms for assessing and controlling crown-of-thorns starfish (CoTS) outbreaks	AIMS continued to work closely with key partners (GBRMPA, University of Queensland, Association of Marine Park Tourism Operators and James Cook University) to inform the authority's CoTS response plan. We continued to build on earlier work examining the potential for secretomes released by the giant triton sea snail, a natural predator of CoTS, to disperse aggregated populations of the starfish in order to reduce reproductive success during the summer spawning season. With the support of the Department of the Environment and Energy, AIMS also began breeding trials of the triton to understand its life history and examine options for biocontrol of the starfish.	CoTS mitigation (page 18)
Using the state-of-the-art capability provided by AIMS' National Sea Simulator (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 in order to enhance our capability to predict and manage impacts	AIMS continued to conduct a range of ambitious, multigenerational experiments at 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 SeaSim has been used to reduce uncertainty regarding the impacts of dredging on key organisms such as corals, seagrasses and sponges, particularly on their early life history stages. The results of this work is informing the implementation of dredging programs to ensure that they satisfy environmental conditions of approval while not unnecessarily restricting dredging activities.	Western Australian Marine Science Institution (WAMSI) dredging (page 20)

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

Summary of AIMS' performance against 2017–18 research goals (cont.)

DELIVERABLE IDENTIFIED IN CORPORATE PLAN 2017–18	ACHIEVEMENT AND COMMENTARY	EXAMPLES OF ACHIEVEMENT
Systematically investigating the potential for, and the mechanisms underpinning, acclimation and adaptation in key coral reef taxa in order to develop potential tools for reef restoration and enhanced reef resilience	The GBR remains under pressure from a variety of sources, particularly climate change. Mass coral bleaching events caused by anomalously high sea temperatures caused substantial losses of coral in the northern and central sections of the GBR in both 2016 and 2017. Considering the mounting evidence that climate-related disturbances will become more frequent and more severe, there is growing agreement within the marine science community that options to restore reefs and enhance their resilience should be actively investigated. During 2017–18, AIMS received $6 million from the Australian Government to lead a consortium of research organisations to assess the benefits, risks and costs of existing and novel technologies to assist recovery and repair and to build the resilience of the reef. As part of this assessment, 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, with the intent of developing a set of tools that can be used to restore and enhance the resilience of the reef.	Reef Restoration and Adaptation Program (RRAP) (page 13)
Systematically examining the impacts and thresholds of dredging-related pressures on key tropical marine organisms and critical ecological processes in order 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 the oil and gas and ports industries and government, AIMS has 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 implementation of large-scale dredging programs.	WAMSI dredging (page 20)

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

Summary of AIMS' performance against 2017–18 research goals (cont.)

DELIVERABLE IDENTIFIED IN CORPORATE PLAN 2017–18	ACHIEVEMENT AND COMMENTARY	EXAMPLES OF ACHIEVEMENT
Building 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	In maintaining a unique ocean observing capability across northern Australia, AIMS, in collaboration with other research partners, has used its hydrodynamic modelling capability to develop a range of tools and operational models that can be used to investigate the influence of local and global pressures, and to understand patterns of exposure and risk to ecosystems within Australia's coastal waters.	Integrated Marine Observing System (IMOS) (page 64)
Developing and applying ecotoxicological methods to investigate the environmental risks and acute and chronic impacts of known and emerging contaminants entering the GBR and Australia's other tropical coastal marine ecosystems	Australia's coastal marine environments are exposed to a range of existing (pesticides, metals) and emerging (microplastics) pollutants. AIMS continues to develop best practices to assess the chronic and acute impacts of these contaminants. AIMS has conducted surveys to determine the extent and impacts of microplastic contamination in Australia's tropical waters.	Microplastics (page 21)
Determining 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 (e.g. shipping, seismic surveys, fishing, pollution) on the status, movement and habitat use of key megafauna species, particularly sharks, turtle hatchlings and sea snakes. The recently established NWSS research program will use a combination of proven methods (satellite tracking of megafauna) and innovative methods (passive acoustic surveys and remotely sensed data) to determine the distribution and biologically important areas of pygmy blue whales as well as endangered hawksbill and green turtles.	Theme 3, NWSS research program (page 15)

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

Summary of AIMS' performance against 2017–18 research goals (cont.)

DELIVERABLE IDENTIFIED IN CORPORATE PLAN 2017–18	ACHIEVEMENT AND COMMENTARY	EXAMPLES OF ACHIEVEMENT
Drawing on the outcomes of monitoring, field and experimental work to develop effective decision support tools to assist management agencies evaluate potential management options to maintain the health and resilience of tropical marine ecosystems	In July 2016, AIMS, in partnership with the Institute of Oceanology, Chinese Academy of Sciences (IOCAS), established the Sino–Australian Centre for Healthy Coasts. The centre was established with support from the Department of Industry, Innovation and Science under the Australia–China Strategic Research Fund. The centre is using novel approaches to integrate monitoring, models and research on ecological responses to coastal pollution to develop management products and tools to guide sustainable coastal use and development. To help decision makers evaluate the potential environmental impacts of development scenarios and to aid in trade-off assessment, AIMS has piloted an Environmental Health Report Card framework for Jiaozhou Bay in China. Acknowledgement by local authorities of the value of the centre's approach and outputs validates our research plans and activities, and reinforces the value of this international collaboration in addressing globally relevant challenges.	IOCAS (page 61)
Developing autonomous technologies and platforms to expand the type, geographic range and quality of marine observations	AIMS has entered into a five-year partnership with aerospace giant Boeing to develop autonomous platforms that enable the collection of a wide range of environmental data. During 2017–18, AIMS, in conjunction with Boeing subsidiary Liquid Robotics, trialled the solar- and wave-powered Wave Glider on both the east and west coasts to collect and transmit continuous real-time ocean data such as weather, wave heights, salinity, pH and chlorophyll using a set of onboard sensors and software.	Wave Glider (page 24)

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

Summary of AIMS' performance against 2017–18 research goals (cont.)

DELIVERABLE IDENTIFIED IN CORPORATE PLAN 2017–18	ACHIEVEMENT AND COMMENTARY	EXAMPLES OF ACHIEVEMENT
Developing 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 annually throughout Australia's tropical marine estate. 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 greatly increase the efficiency with which huge amounts of data are processed, delivering significant cost reductions.	BenthoBox (page 25)
Delivering the 33rd year of AIMS' Long-term Monitoring Program (LTMP), and leading the development and implementation of a comprehensive design for a RIMReP to support the Reef 2050 Plan	AIMS has continued to deliver the LTMP and the Reef 2050 Plan. These programs have been instrumental in documenting the impacts of disturbances such as the 2016 and 2017 mass coral bleaching events, tropical cyclones 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 Program (page 11)

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

Summary of AIMS' performance against 2017–18 research goals (cont.)

DELIVERABLE IDENTIFIED IN CORPORATE PLAN 2017–18	ACHIEVEMENT AND COMMENTARY	EXAMPLES OF ACHIEVEMENT
Servicing and maintaining marine research infrastructure (e.g. moorings array and shipboard instruments, sensor networks (IMOS) and AIMS' weather stations) 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	In collaboration with IMOS, AIMS has continued to maintain 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 is quality controlled and provided in near real-time to national and international partners, making a significant contribution to collaborative science planning and implementation of a national marine observing vision. The importance of sustained ocean observation for the nation's blue economy is recognised in the National Marine Science Plan 2015–2025 and the new National Research Infrastructure Roadmap.	IMOS (page 64)
Developing and enhancing information management systems, visualisation and reporting tools for Australia's tropical marine systems that directly informs 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 key stakeholder groups and applied to a range of geographic locations around Australia, most notably by: • the oil and gas sector in north-west Australia • the Torres Strait Regional Authority in Torres Strait • Parks Australia to deliver information describing the network of Australian marine reserves • 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.	Marine Parks Science Atlas (page 28)

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

Statement of (Ministerial) Expectations

In 2015, the 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 Statement is available at: https://www.aims.gov.au/docs/about/corporate/corporate-profile-governance/statement-of-expectations

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 2017–18, AIMS continued to achieve outcomes that directly support the Ministerial Statement of Expectations, as identified in Table 4.

Table 4: AIMS delivery against Minister's expectations

MINISTER'S EXPECTATION	AIMS DELIVERY AGAINST EXPECTATION
AIMS to actively engage in the specifications 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 in initiatives such as the National Collaborative Research Infrastructure Strategy.
The Government is finalising its first set of Science and Research Priorities developed by the Chief Scientist and considered by the Commonwealth Science Council (CSC), and I expect AIMS to give consideration as to how it can best contribute to these research areas of national priority.	AIMS' research program is aligned with Australia's science and research priorities—in particular, most strongly with the priorities soil and water, and environmental changes. AIMS is also active (in designing and leading) one of the Australian Government's most recent priorities—science for the restoration and (climate) adaptation of the GBR.
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. Further, AIMS works through the ATSIMS program (Aboriginal and Torres Strait Islanders in Marine Science) to encourage the uptake of marine science by high school students.

AIMS delivery against Minister's expectations (cont.)

MINISTER'S EXPECTATION	AIMS DELIVERY AGAINST EXPECTATION
The Government will respond to the Research Infrastructure Review. AIMS to provide input, through the Department of Industry, Innovation and Science 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 the Research Infrastructure Review, the development of the 2016 National Research Infrastructure Roadmap, and the National Collaborative Research Infrastructure Strategy.
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 GBR, 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 2012–2017, AIMS **ranked first nationally** and **second internationally in this field.**
AIMS to support the Minister for Industry in her role as Deputy Chair to the Prime Minister of the Commonwealth Science Council.	AIMS provides 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 takes appropriate opportunities to engage the Chief Scientist. AIMS Council Chairman and CEO have met the Chief Scientist a number of times. The Chief Scientist visited AIMS' head office in Townsville in January 2018.
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.	A significant proportion of our research continues to involve collaborations with other parties (universities and other publicly funded research agencies).

AIMS delivery against Minister's expectations (cont.)

MINISTER'S EXPECTATION	AIMS DELIVERY AGAINST EXPECTATION
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 delivered an extensive portfolio of research related to industry, particularly the WA offshore oil and gas sector. We also provide 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 continue to be used frequently by industry partners and other researchers, including international researchers, 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 delivers 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 in peer-reviewed journals.
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 website; 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 website.	AIMS publishes research papers in open-access journals and advises of 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.

AIMS delivery against Minister's expectations (cont.)

MINISTER'S EXPECTATION	AIMS DELIVERY AGAINST EXPECTATION
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. We support 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' discoveries and expertise.	AIMS keeps a close eye on potential commercial development opportunities arising from our research. We have a record of supporting companies in their efforts to realise commercial benefits of AIMS' discoveries and expertise. AIMS undertakes a range of technology development projects aimed at further leveraging its research investment.
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 2017–18 Corporate Plan update in August 2017 and is scheduled to provide the next update in August 2018.

AIMS delivery against Minister's expectations (cont.)

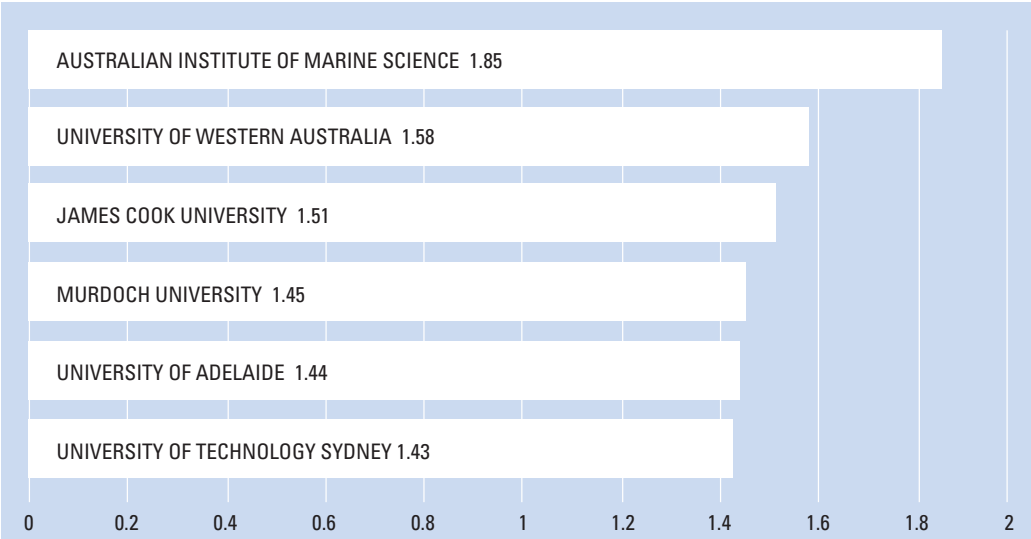
MINISTER'S EXPECTATION	AIMS DELIVERY AGAINST EXPECTATION
AIMS to provide Parliamentary Secretary Andrews and her office with the same level of communication, and timely, accurate advice and information, as to the Minister and the Department.	AIMS official briefs provided to the Minister for Jobs and Innovation are copied, where relevant, to the Assistant Minister for Science. All official 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.

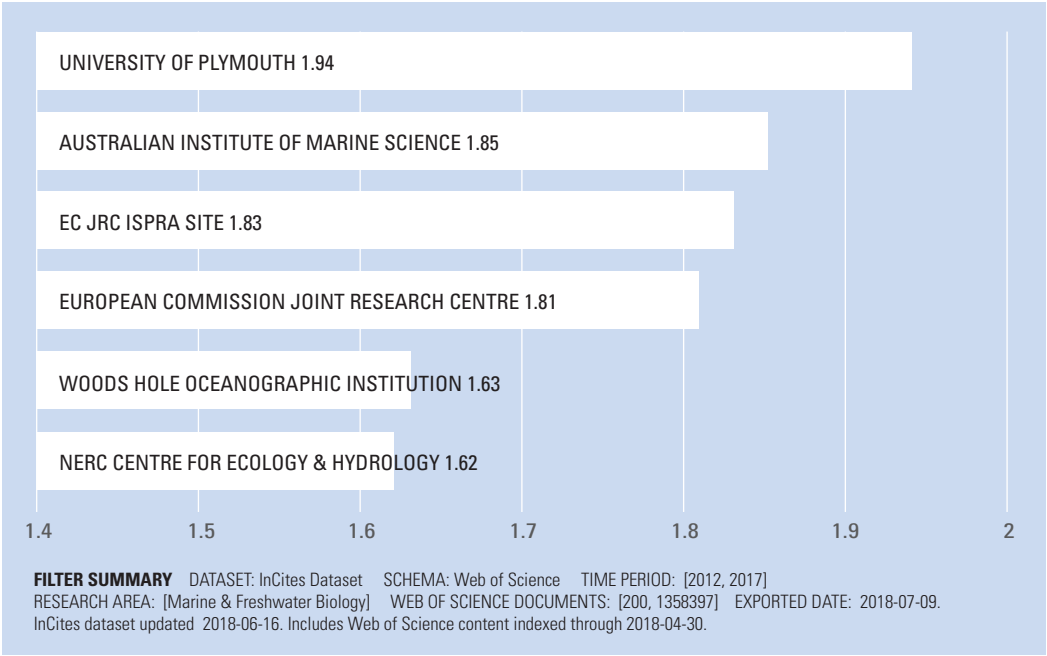
Recent benchmarking of AIMS' category normalised citation impact[1] demonstrated that in the field of marine and freshwater biology, AIMS was the **top-ranked research institution** in Australia (Figure 2) and **second in the world** (Figure 3) over the period 2012–17.[1]

Figure 2: Top six organisations in the field of marine and freshwater biology ranked by category normalised citation impact between 2012 and 2017 in Australia (InCites 2018).



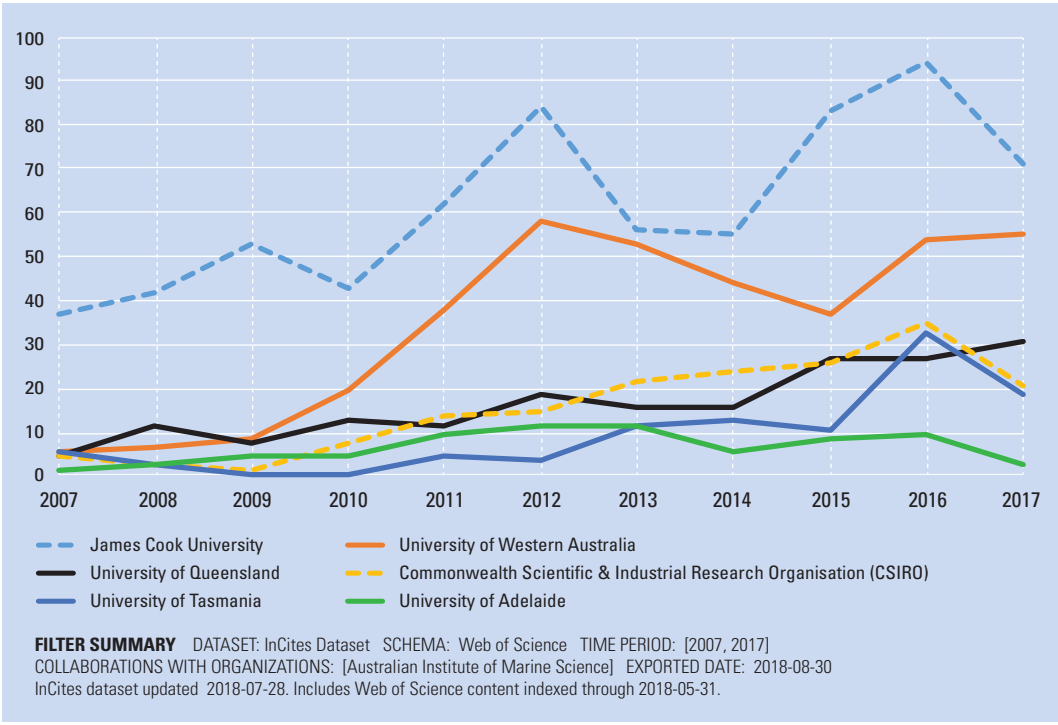
[1] Benchmarking was conducted using Clarivate Analytics InCites research analytical tool, which queries more than 12,000 journals comprising the Web of Science. The analysis assessed the category normalised citation impact (CNCI) of Australian and international research institutions that had published more than 200 peer-reviewed publications in the field of marine and freshwater biology between 2012 and 2017. The CNCI impact is calculated by dividing the actual count of citing items by the expected citation rate for documents with the same document type, year of publication and subject area. The CNCI of an institute is the average CNCI of all publications published by the institute published in a year.

Figure 3: Top six organisations globally in the field of marine and freshwater biology ranked by citation impact between 2012 and 2017 (InCites 2018).



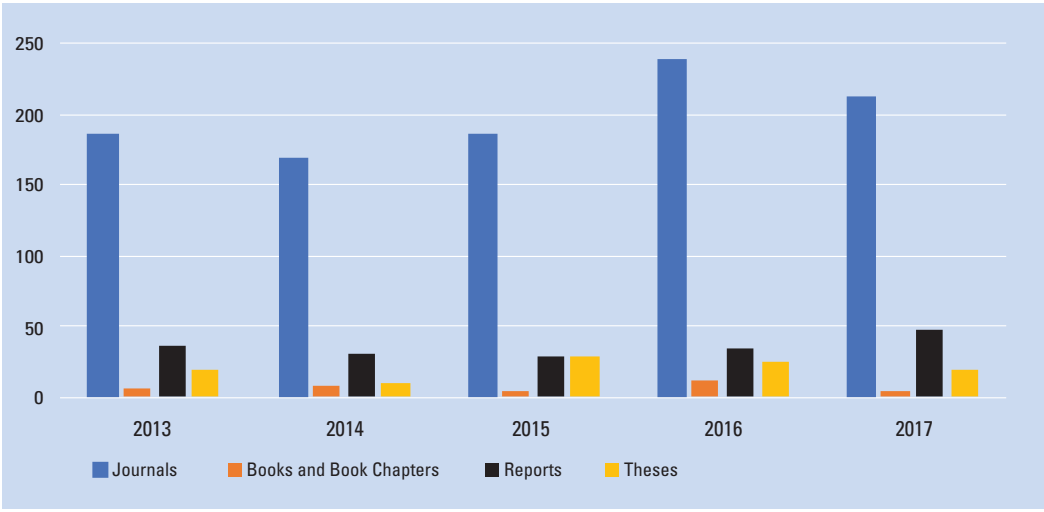
Given the close geographical proximity to our Townsville headquarters, and the alignment of research focusing on tropical marine environments, James Cook University remains AIMS' most frequent collaborator on publications (Figure 4). Similarly, The University of Western Australia is the second most frequent collaborator on publications due to the co-location of AIMS' Perth office on the UWA campus. Collaborations with the University of Queensland and University of Tasmania have steadily increased over the past 10 years.

Figure 4: Trends in collaborative publications (all research) illustrating the top six research institutions, 2007–17 (InCites 2018).



AIMS scientists produced 283 publications during 2017 (Figure 5) [2]. These publications comprised 212 journal articles, 4 book chapters, 48 reports and 19 theses. (For their titles, please see Appendix A: Science publications.)

Figure 5: Number of AIMS publications by type (2013–17).



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

Cover article

Torda G, Donelson JM, Aranda M, Barshis DJ, Bay L, Berumen ML, Bourne DG, Cantin N, Foret S, Matz M, Miller DJ, Moya A, Putnam HM, Ravasi T, van Oppen MJH, Thurber RV, Vidal-Dupiol J, Voolstra CR, Watson SA, Whitelaw E, Willis BL, Munday PL (2017) Rapid adaptive responses to climate change in corals. Nature Climate Change 7: 627–636

Cover article

van Oppen MJH, Gates RD, Blackall LL, Cantin N, Chakravarti LJ, Chan WY, Cormick C, Crean A, Damjanovic K, Epstein H, Harrison PL, Jones TA, Miller M, Pears RJ, Peplow LM, Raftos DA, Schaffelke B, Stewart K, Torda G, Wachenfeld D, Weeks AR, Putnam HM (2017) Shifting paradigms in restoration of the world's coral reefs. Global Change Biology 23(9): 3437–3448

Cover article

Pollock FJ, Wada N, Torda G, Willis BL, Bourne DG (2017) White syndrome-affected corals have a distinct microbiome at disease lesion fronts. Applied and Environmental Microbiology 83(2)

The most highly cited paper published in 2017 was:

Lamb JB; van de Water JAJM; Bourne DG; Altier C; Hein MY; Fiorenza EA; Abu N; Jompa J; Harvell CD (2017) Seagrass ecosystems reduce exposure to bacterial pathogens of humans, fishes, and invertebrates. Science 355(6326): 731-733 (DOI: 10.1126/science.aal1956).

Quote from Web of Science: "As of January/February 2018, this highly cited paper received enough citations to place it in the top 1% of the academic field of Environment/Ecology based on a highly cited threshold for the field and publication year."

Hall MR, Kocot KM, Baughman KW, Fernandez-Valverde SL, Gauthier MEA, Hatleberg WL, Krishnan A, McDougall C, Motti CA, Shoguchi E, Wang T, Xiang X, Zhao M, Bose U, Shinzato C, Hisata K, Fujie M, Kanda M, Cummins SF, Satoh N, Degnan SM, Degnan BM (2017) The crown-of-thorns starfish genome as a guide for biocontrol of this coral reef pest. Nature 543: 231–234 (IF: 38.138)

Anthony K, Bay LK, Costanza R, Firn J, Gunn J, Harrison P, Heyward A, Lundgren P, Mead D, Moore T, Mumby PJ, van Oppen MJH, Robertson J, Runge MC, Suggett DJ, Schaffelke B, Wachenfeld D, Walshe T (2017) New interventions are needed to save coral reefs. Nature Ecology & Evolution 1: 1420–1422

Bennett HM, Altenrath C, Woods L, Davy SK, Webster NS, Bell JJ (2017) Interactive effects of temperature and pCO2 on sponges: from the cradle to the grave. Global Change Biology 23(5): 2031–2046 (IF 8.444)

Cheal AJ, MacNeil MA, Emslie MJ, Sweatman H (2017) The threat to coral reefs from more intense cyclones under climate change. Global Change Biology 23(4): 1511–1524 (IF: 8.444)

Chin A, Simpfendorfer CA, White WT, Johnson GJ, McAuley RB, Heupel MR (2017) Crossing lines: a multidisciplinary framework for assessing connectivity of hammerhead sharks across jurisdictional boundaries. Scientific Reports 7: 46061 (IF: 5.228)

Gardner SG, Raina JB, Nitschke MR, Nielsen DA, Stat M, Motti CA, Ralph PJ, Petrou K (2017) A multi-trait systems approach reveals a response cascade to bleaching in corals. BMC Biology 15: 117 (IF: 6.779)

Hock K, Wolff NH, Ortiz JC, Condie SA, Anthony KRN, Blackwell PG, Mumby PJ (2017) Connectivity and systemic resilience of the Great Barrier Reef. PLoS Biology 15(11): e2003355 (IF: 9.797)

Humanes A, Ricardo GF, Willis BL, Fabricius KE, Negri AP (2017) Cumulative effects of suspended sediments, organic nutrients and temperature stress on early life history stages of the coral *Acropora tenuis*. Scientific Reports 7: 44101 (IF: 5.578)

Kenkel CD, Bay LK (2017) Novel transcriptome resources for three scleractinian coral species from the Indo-Pacific. GigaScience 6(9): 1–4 (IF: 7.463)

Levin RA, Voolstra CR, Weynberg KD, van Oppen MJH (2017) Evidence for a role of viruses in the thermal sensitivity of coral photosymbionts. The ISME Journal 11: 808–812 (IF: 9.328)

Moitinho-Silva L, Nielsen S, Amir A, González A, Ackermann GL, Cerrano C, Astudillo-Garcia C, Easson C, Sipkema D, Liu F, Steinert G, Kotoulas G, McCormack GP, Feng GF, Bell JJ, Vicente J, Bjork JR, Montoya JM, Olson JB, Reveillaud J, Steindler L, Pineda MC, Marra MV, Ilan M, Taylor MW, Polymenakou P, Erwin PM, Schupp PJ, Simister RL, Knight R, Thacker RW, Costa R, Hill RT, Lopez-Legentil S, Dailianis T, Ravasi T, Hentschel U, Li ZY, Webster NS, Thomas T (2017) The sponge microbiome project. GigaScience 6(10): 1–7 (IF: 7.463)

Meekan MG, Duarte CM, Fernández-Gracia J, Thums M, Sequeira AMM, Harcourt R, Eguiluz VM (2017) The ecology of human mobility. Trends in Ecology & Evolution 32(3): 198–210 (IF: 16.735)

Oliver ECJ, Benthuysen JA, Bindoff NL, Hobday AJ, Holbrook NJ, Mundy CN, Perkins-Kirkpatrick SE (2017) The unprecedented 2015/16 Tasman Sea marine heatwave. Nature Communications 8: 16101 (IF: 11.329)

Osborne K, Thompson AA, Cheal AJ, Emslie MJ, Johns KA, Jonker MJ, Logan M, Miller IR, Sweatman HPA (2017) Delayed coral recovery in a warming ocean. Global Change Biology 23(9): 3869–3881 (IF: 8.44)

Sunday JM, Fabricius KE, Kroeker KJ, Anderson KM, Brown NE, Barry JP, Connell SD, Dupont S, Gaylord B, Hall-Spencer JM, Klinger T, Milazzo M, Munday PL, Russell BD, Sanford E, Thiyagarajan V, Vaughan MLH, Widdicombe S, Harley CDG (2017) Ocean acidification can mediate biodiversity shifts by changing biogenic habitat. Nature Climate Change 7: 81–85 (IF 19.30)

Wilkinson AD, Collier CJ, Flores F, Langlois L, Ralph PJ, Negri AP (2017) Combined effects of temperature and the herbicide diuron on Photosystem II activity of the tropical seagrass *Halophila ovalis*. Scientific Reports 7: 45404 (IF 5.578)

Leadership

AIMS plays several important science leadership roles, including setting research agenda 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 some key leadership roles that AIMS has played during the year.

Contributing to issues of national importance

Great Barrier Reef Summit

AIMS senior staff (CEO John Gunn, Research Manager David Souter, and Program Leader Britta Schaffelke) attended the GBR Summit and contributed to the development of a new Reef Blueprint released in December 2017 by the GBRMPA. The Chairman of AIMS also participated in the summit.

2017 Scientific Consensus Statement

Land use impacts on Great Barrier Reef water quality and ecosystem condition. Reef Water Quality Protection Plan Secretariat, Brisbane, Australia

Chapter 1 by Schaffelke et al. (incl Kroon)
Chapter 2 by Bartley et al. (incl Kroon)
Chapter 3 by Waterhouse et al. (incl Kroon)
Chapter 4 by Eberhard et al. (incl Kroon)
Chapter 5 by Waterhouse et al. (incl Schaffelke & Kroon)

Indigenous collaboration in marine science – working together on sea country

Some Aboriginal people understand the nature and variability of the marine environment in the intimate way of the long-term observer and have strongly felt custodial responsibilities for its maintenance. AIMS is realising how important it is for this knowledge to be incorporated into our research and operations. AIMS is therefore taking greater account of the interests and knowledge of the Traditional Owners of sea country when planning research and operations. In May 2018, a full-time Indigenous Engagement Coordinator, who is a northern Australian Traditional Owner, was appointed to implement the new partnership. Developed in consultation with AIMS staff, this internal initiative provides more than 30 practical actions around the following goals:

- incorporate Indigenous perspectives into corporate governance and management
- improve the cultural competency of AIMS staff
- establish and foster strong mutually beneficial working relationships with Traditional Owners of sea country where AIMS has a research interest

- improve marine science outcomes for AIMS and Traditional Owners through building reciprocal capacity
- increase the employment of Aboriginal and Torres Strait Islander people in marine science-related careers at AIMS and elsewhere.

This approach positions AIMS to deliver improved research outcomes through Indigenous engagement in the planning and delivery of coastal research, with greater real-world impact in the tropical north. Enhanced Indigenous partnership will continue to build and expand significant Indigenous projects, including the following:

- 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, and to support the rangers to achieve the goals articulated in the Bardi-Jawi Indigenous Protected Area Management Plan 2013–2023.
- AIMS and the Anindilyakwa Land Council have collaborated to deliver seabed, benthos, fish biodiversity and cultural values maps of the Anindilyakwa Indigenous Protected Area. These maps will underpin multiple-use management plans for sea country that will be prepared by the Council.
- AIMS continues to work closely with the sea program of the Torres Strait Regional Authority (TSRA) to support their reef health and environmental monitoring program. AIMS supports a near real-time weather station and several logger sites in Torres Strait and continues to provide coral health monitoring advice. AIMS and TSRA have jointly submitted a funding proposal to collaborate on the development and pilot testing of new technology for the remote collection of reef health monitoring and data.
- AIMS is a core collaborator on the GBR Traditional Owner Aspirations Project. This project seeks to engage with more than 70 Traditional Owner groups with rights and interests in GBR sea country to document their aspirations for sea country decision making and management, including through implementation of the Reef 2050 Plan. The project also aims to identify suitable partnership and governance arrangements to facilitate ongoing meaningful engagement and to empower Traditional Owners to fulfil their sea country management aspirations.

National Marine Science Committee

The National Marine Science Committee, which comprises 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 challenges identified in the Marine Nation 2025 position paper. It works in tandem with the 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 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 to the subsidiary working groups established to help implement the Plan.

Reef 2050 Long-Term Sustainability Plan

The Reef 2050 Plan is a 35-year plan developed jointly by the Australian and Queensland governments to assist management of the GBR and the GBR World Heritage Area. It aims to maintain and enhance the health and resilience of the reef while allowing ecologically sustainable development. The vision is to ensure that the outstanding universal values of the GBR continue to improve each decade between now and 2050, which will guarantee that the reef remains a natural wonder for successive generations. The plan, which sets out objectives, outcomes, targets and actions, was developed in partnership with 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:

- The Chairman of the AIMS Council. The Hon. Penny Wensley AC is Chairman of the Reef Advisory Committee (RAC), one of the two principal advisory bodies overseeing implementation of the Reef 2050 Plan
- Dr Paul Hardisty, AIMS CEO; member of the RAC and member of the 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.

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 new data 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. The project uses baited remote underwater video stations (or BRUVS) as 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 conservation efforts of reef elasmobranch (sharks and rays).

The Global FinPrint project brings together experts from around the world, including researchers from Florida International University, JCU, Curtin University and AIMS. To date, over 400 coral reefs have been sampled through the assistance of scientists, non-governmental organisations and volunteers. Global and regional analyses of the data are currently underway to highlight the status of sharks and rays. 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 to highlight how reefs can be restored on a global scale. Communication of results is already underway, with Michelle Heupel representing AIMS at the Pacific Shark Symposium held in March in Samoa. At this forum, results were presented to ministers from 11 Pacific Island countries to convey the condition of reef shark populations in the region.

AIMS is responsible for surveying sites or acquiring existing data from:

- Indian Ocean: Sri Lanka, Seychelles, Maldives, Mozambique, Scott Reef and Rowley Shoals, South Africa, Qatar
- Pacific Ocean: Palau, American Samoa, Samoa, Guam, GBR (far north, central and southern sites), Kiritimati (Christmas) Island, Kiribati, Jarvis Island, Federated States of Micronesia, Niue, Northwestern Hawaiian Islands and Tonga.

Addressing globally relevant challenges

Much of AIMS' research has been conducted alongside Chinese partners, as we strengthen links with like-minded institutions working in tropical marine areas. Australia and China share similar challenges in managing multi-use coastal areas, with industrialisation, tourism, agriculture and aquaculture compounding pressures on coastal ecosystems.

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 aims to develop management products and tools to guide sustainable coastal use and development.

It is important to ensure that the work done is beneficial for, and used by, authorities and industries that govern and use the coastal zone. In order to bridge the gap between science and management, AIMS and IOCAS established a user reference group to provide advice on their science and information needs and to validate project outputs. Membership included representation from local and regional governments who have influence in assessing, approving, regulating and managing activities in the coastal zone, as well as representatives from industry.

As part of the centre's activities, the group developed an Environmental Health Report Card framework, which was then applied as a pilot for Jiaozhou Bay in eastern China. The report card was generated out of a need to present complex scientific information more effectively to regional managers and other stakeholders. The report card helps non-specialists to evaluate the potential environmental impacts of development scenarios and to assess trade-offs.

The IOCAS-run Jiaozhou Bay Marine Ecosystem Research Station has conducted extensive water quality monitoring and plankton community monitoring in the bay since 1999 to assess its overall health. However, data has primarily been delivered through technical reports in a form unlikely to be appreciated or accessed by local management and administrators.

In order to improve data delivery for management, IOCAS and AIMS scientists re-analysed the extensive dataset using new analytical and presentation methods developed by AIMS researcher Murray Logan. These methods are used successfully in Australia for the Gladstone Healthy Harbour Partnership and most recently in Darwin Harbour.

The resulting pilot Marine Health Report Card will now be further developed to include a broader range of environmental indicators available from the Jiaozhou Bay long-term dataset. Acknowledgement by local authorities of the worth of the approach and outputs from the joint centre validates the centre's research plans and activities, and reinforces the value of an international mindset in addressing globally relevant challenges.

Expert advice

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

- Intergovernmental Panel on Climate Change – Special Report on Global Warming of 1.5 °C (Lough)
- Queensland Department of the Premier and Cabinet – Queensland Drones Strategy
- Queensland Department of Environment and Science – Comments on proposed regulation of trans-shipping activities in Queensland waters and the GBR
- Queensland Department of Environment and Science – Comments on the draft Reef 2050 Water Quality Improvement Plan 2017–2022
- GBRMPA – Comments on Coastal Ecosystems Position Statement
- Queensland Department of Environment and Science – Comments on the Reef Regulation Consultation Regulatory Impact Statement.

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

- Drs Britta Schaffelke and Richard Brinkman are members of the Gladstone Healthy Harbour Partnership (GHHP) Independent Science Panel
- Dr David Souter is a member of the National Marine Science Committee, and the steering committee for the Australian Secretariat for the international Coral Reef initiative
- Dr Janice Lough is a member of the steering committee of the Australian Academy of Science commissioned by the Department of the Environment and Energy to report on domestic climate science capabilities and their vital linkages to international capabilities and collaboration
- Drs Ken Anthony and David Bourne contributed to the US National Academy of Science review on coral Interventions for reef resilience
- See also Reef 2050 Long-term Sustainability Plan on page 63.

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 skills base that can be applied to answer complex questions about the sustainable use, management and protection of marine resources. During the year, 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:

- ARC Centre of Excellence in Coral Reef Studies
- Reef 2050 Plan Marine Monitoring Program
- National Environmental Science Program (NESP) – Tropical Water Quality Hub
- NESP – Marine Biodiversity Hub
- IMOS

- WAMSI
- Indian Ocean Marine Research Centre
- AIMS@JCU
- ARC Centre of Excellence for Mathematical and Statistical Frontiers of Big Data, Big Models, New Insights.

A synopsis of each of these partnerships is given below.

The **ARC Centre of Excellence for Coral Reef Studies** (Coral CoE) was established in 2005. In 2013 the Coral CoE received an additional $28 million of ARC funding to continue for a further seven years. AIMS' Research Manager Dr David Souter 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 researches ecosystem goods and services of the world's coral reefs, building 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 10 organisations: JCU, AIMS, the University of Queensland, ANU, UWA, the GBRMPA, the WorldFish Center, Stanford University, 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 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 the GBRMPA in collaboration with science agencies and is funded under the Reef 2050 Plan. Managing water quality remains a strategic priority for the authority, to ensure the long-term protection of the coastal and inshore ecosystems of the reef. A key management tool is the Reef Water Quality Protection Plan, with 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 actions and targets of the Reef 2050 Plan. 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 continued to provide the MMP with data from monitoring inshore water quality and the condition of inshore coral reefs. We survey the health of 32 coastal and inshore coral reefs from the Wet Tropics to the Fitzroy Region on a two-yearly schedule. In addition, AIMS, in partnership with JCU, monitors the water quality of the receiving waters at 28 fixed sites along more than 700 km of coastline several times a year.

A summary of the goals and objectives of the MMP, and descriptions of the subprograms, is available at www.gbrmpa.gov.au/managing-the-reef/how-the-reefs-managed/reef-2050-marine-monitoring-program

The **NESP Tropical Water Quality Hub** is a collaboration of 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 Torres Strait and the GBR and its associated catchments. 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 four rounds of funding, with annual funding rounds expected to 2019.

Further details are available at https://nesptropical.edu.au/

In 2017–18 AIMS contributed research to the NESP Tropical Water Quality Hub on:

- understanding the cumulative impacts and pressures on coastal and marine ecosystems to inform better management (e.g. impacts from crown-of-thorns starfish, dredging activities, pesticides, reduced benthic light and increasing ocean temperatures)
- maximising the resilience of vulnerable species to the impacts of climate change (e.g. by predicting the oceanographic drivers of bleaching, quantifying linkages between water quality and the thermal tolerance of GBR coral reefs and understanding the traits of corals that survived recent bleaching events).

The **NESP Marine Biodiversity Hub** is a partnership supported by Australian Government NESP funding, which is administered by the Department of the Environment and Energy. The 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). It includes researchers from AIMS, UTAS, Charles Darwin University, CSIRO, Geoscience Australia, IMOS, Museum Victoria, the NSW Department of Primary Industries, the NSW Office of Environment and Heritage 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.

IMOS and the National Marine Science Plan 2015–2025

AIMS is a founding partner and operator of the Integrated Marine Observing System (IMOS) infrastructure across Australia's remote tropical marine estate. IMOS is a national marine observing capability established in 2006 by the Australian Government's National Collaborative Research Infrastructure Strategy (NCRIS).

Since 2006, IMOS has routinely operated a wide range of observing equipment throughout Australia's coastal and open oceans, making all of its data accessible to the marine and climate science community, international collaborators, users and other stakeholders. The data helps us to understand the role of the oceans in controlling the functioning and health of coastal ecosystems.

As a key collaborator, AIMS is responsible for facilities within two geographic nodes — Queensland (Q-IMOS) and WA (WA-IMOS). These AIMS-operated facilities consist of a satellite remote sensing receiving station, ocean surface radar, a series of instrumented ocean moorings, a National Reference Station, autonomous sea gliders, observations from AIMS' research vessels, on-reef data from wireless sensor networks, and animal tracking arrays.

The operational model of IMOS distributes responsibility for observation infrastructure across operating institutions comprising universities, state and Commonwealth agencies and publicly funded research agencies, including AIMS.

As the lead agency of the Queensland node and primary operator of a number of IMOS facilities with the dominant presence across tropical Australia, AIMS continues to make a significant contribution to collaborative science planning and operational implementation of a national marine observing vision.

The National Marine Science Plan 2015–2025 identifies the value of sustained ocean observation to Australia's blue economy and has recommended sustaining and expanding marine observation and modelling capability to address challenges across environmental change, energy security and improving predictions of the ocean.

The National Research Infrastructure Roadmap, including its Research Infrastructure Investment Plan, has recognised this need and through NCRIS, the commitment to IMOS will be extended to 2022–23, with an opportunity for IMOS to be sustained into a third decade (2028–29).

The **Western Australian Marine Science Institution (WAMSI)** was established to improve knowledge and understanding of WA's marine environment for better resource development, management and conservation outcomes.

WAMSI is a partnership of four WA universities (UWA, Murdoch University, Edith Cowan University and Curtin University), a major resource company (Woodside Energy Ltd), two Commonwealth organisations (CSIRO and AIMS), four WA government departments (Department of Biodiversity, Conservation and Attractions; Department of Jobs, Tourism, Science and Innovation; Department of Primary Industries and Regional Development; Department of Water and Environmental Regulation); the Western Australian Museum, the WA ChemCentre and a regional ocean observing network for the Indian Ocean (WA Global Ocean Observing System).

The Institution was launched in May 2007 with an initial investment from the WA Government of $21 million over five years. In 2011–12, the state government provided $12 million over six years for the WAMSI's continued development. In 2017–18, it provided a further $550,000 for 2018–21 and $2,616,000 to assist development of the Blueprint for Marine Science 2050. In each case, the funds generated matching investments from WAMSI research partners, providing substantial leverage of the government funds to target high-priority marine science needs in WA.

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. Traditional Owners and sea rangers took part in the field components of the WAMSI Kimberley Marine Research Program at Cygnet Bay, Cape Leveque and Sunday Islands, and Camden Sound.

WAMSI also partners with industry to deliver programs such as the $18 million Dredging Science Node (DSN). The DSN is an example of the strategic use of environmental offsets and is funded from environmental offset requirements associated with Woodside's Pluto Project, Chevron's Wheatstone Project and BHP's Outer Harbour Project. The node was established in 2011–12 to understand and mitigate the impacts of coastal dredging on the environment. This node will fill many of the knowledge gaps for managers relating to dredging and sedimentation issues and will improve the capability of scientists in WAMSI research organisations, such as AIMS and CSIRO, who will be able to apply it to their work in eastern Australia.

In November 2017, scientists from both research nodes presented their results at the annual WAMSI conference held at the State Library of WA. These results have greatly improved our knowledge of the WA marine estate and are already being used to assist environmental impact assessment and management by the Western Australian Government. In May 2018, Dr Luke Twomey, CEO of WAMSI, presented an abstract about the dredging node at the 34th PIANC World Congress in Panama. PIANC, the World Association for Waterborne Transport Infrastructure, facilitates the growth of waterborne transport.

The future focus of WAMSI is the Blueprint for Marine Science 2050—research directions to enhance industry competitiveness and government effectiveness in the marine environment off the WA coast.

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 WA Department of Primary Industries and Regional Development.The IOMRC was conceived to catalyse global knowledge of the Indian Ocean marine environment and its sustainable management.

The IOMRC collaboration has helped created new multidisciplinary research teams and a graduate training environment that will significantly advance WA's marine science capacity, capability and profile. In 2018, the IOMRC partnership will continue to support innovative and ambitious marine research. By investing more than $2 million over three years, the partnership will lead in its mission to reveal the least understood of the world's ocean basins.

AIMS@JCU is a strategic alliance that takes advantage of AIMS and James Cook University's collective expertise and infrastructure, and co-location in Townsville. It was established in 2004 as a joint venture with a special allocation of Australian Government funding. In 2010, AIMS@JCU refocused on collaborations that integrate joint higher degree research (HDR) training, and AIMS-based internships and work-integrated learning for students of marine science enrolled at JCU.

Since its establishment in 2004, more than 100 PhDs have been awarded to AIMS@JCU students, and the number of annual graduates continues to increase steadily. By facilitating the link between JCU's HDR program and AIMS' research strategy, AIMS@JCU delivers significant value beyond the dollar investment. This includes a higher PhD completion rate (compared to the JCU average), more research outputs with higher impact, and cohorts of work-ready graduates with skills and expertise in national marine science and experience within a publicly funded research agency. Such industry exposure integrated with HDR training continues to address key recommendations of the Australian Council of Learned Academies review of Australia's research training scheme.

A management committee and a scientific advisory committee that includes representatives from both organisations provides a relatively simple governance structure that allows AIMS@JCU to adapt flexibly and strategically to address skills gaps and meet national science priorities. For example, 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 three), with the extra year available for professional development in quantitative methods customised for each student and their advisory team. AIMS@JCU members also benefit from being well positioned within the combined peer networks of AIMS and JCU, and they can access special competitive funding awards for project costs, travel and science communication, and professional development opportunities.

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 high school programs include those focused on Indigenous participation (e.g. Aboriginals and Torres Strait Islanders in Marine Science (ATSIMS)) and the Aboriginal Summer School for Excellence in Technology and Science (ASSETS).

AIMS@JCU currently has 312 members, of which 49 are PhD candidates and 71 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 that they are difficult to process and analyse using traditional tools.

The new centre, led by the University of Melbourne, brings AIMS scientists together with world-class collaborators and partner organisations, including Monash University, QUT, University of Adelaide, University of Technology Sydney, CSIRO, Australian Bureau of Statistics, University of New South Wales, UQ, Mathematics of Information Technology and Complex Systems, Vic Roads, Sax Institute 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 enable AIMS (and others) to add value to the data collected on the GBR to increase our knowledge of the reef and its processes, and to improve reef management.

Further details at acems.org.au

Fostering research capability

Wing Chan in Antarctica on the 2018 Homeward Bound Program for women in STEM.

AIMS and the University of Melbourne supported postgraduate Wing Chan to join 80 women selected for the second Homeward Bound Program in 2018, culminating in a voyage to Antarctica. All have a background in science and were selected based on their potential to use scientific knowledge and methods to have an impact on decision making relating to the state of the planet.

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.

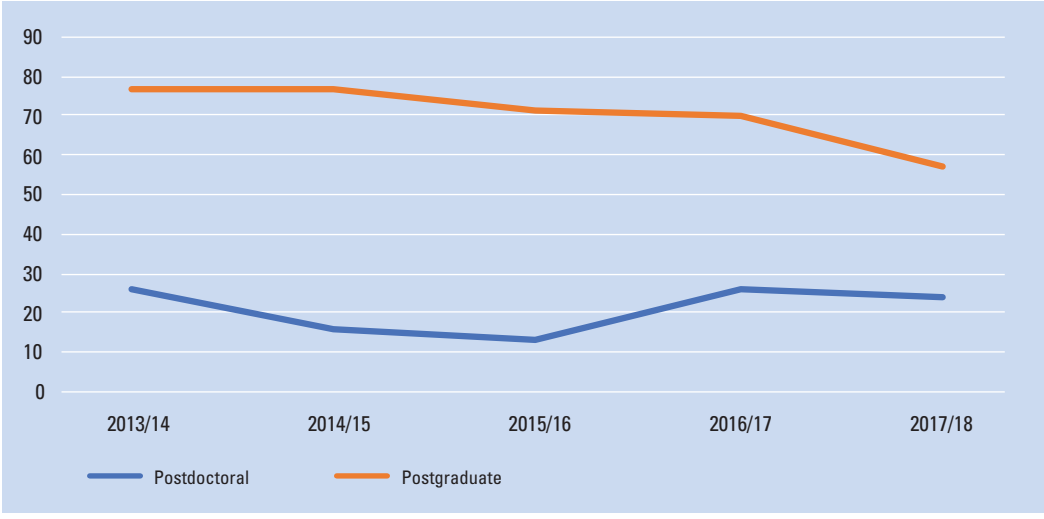
Postdoctoral research

As at 30 June 2018, AIMS co-funds or supports 24 postdoctoral fellows (Figure 6) under agreements with:

- ARC Centre of Excellence for Coral Reef Studies (2)
- AIMS–QUT Memorandum of Understanding (3)
- NESP Marine Biodiversity Hub (2)
- Vulcan Foundation within the Global FinPrint project (2)
- AIMS (6)
- Great Barrier Reef Foundation (1)
- Charles Darwin University (1)
- Woodside Energy Limited (1)
- Quadrant Energy (1)
- King Abdullah University of Science and Technology (Saudi Arabia) (1)
- Indian Ocean Marine Research Centre Partnership (4)

AIMS also supports two ARC Discovery Early Career Researcher Award fellows based at UWA and the University of Adelaide.

Figure 6: Number of AIMS postgraduate and postdoctoral researchers as at June 2018.



Postgraduate studies

AIMS' involvement in ECR training is reflected in the fact that 29 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
- 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 2017–18, nineteen AIMS-affiliated PhD degrees were awarded by Australian and international universities. AIMS staff also supervised 57 postgraduate students (Table 5) comprising:

- 22 at AIMS Townsville
- 7 at IOMRC
- 28 studying externally at their respective universities.

Table 5: Number of AIMS postgraduate students

POSTGRADUATE STUDENT	2013–14	2014–15	2015–16	2016–17	2017-18
Students working at AIMS supervised by AIMS staff	31	34	34	31	29
Students working externally supervised by AIMS staff	46	43	37	39	28

Occupational trainees

AIMS supported seven trainees who improved their occupational skills through on-the-job training with AIMS researchers and technicians (Table 6).

Table 6: Number of occupational trainees

TRAINEE	2013–14	2014–15	2015–16	2016–17	2017–18
Occupational trainees	9	18	10	10	7

Awards to AIMS postgraduate students:

- Molly Scott and Prashant Nair – GBRMPA's Science for Management Award
- Molly Scott – Sea World Research & Rescue Foundation
- Molly Scott, Samuel Matthews, Thomas Roberts and Prashant Nair were each awarded prestigious TropINTERN Scholarships, which supported five-month fully funded internships at the GBRMPA and the Museum of Tropical Queensland
- Tess Hempson – Virginia Chadwick Award for outstanding first authored publications by research students.

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 students from North Queensland engage in interactive workshops at AIMS under the guidance of marine researchers and Indigenous leaders. The program aims to foster links between western marine science and traditional ecological knowledge. In 2017–18, the students were 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.

ATSIMS is part of the Indigenous Education and Research Centre at James Cook University. In addition to the support the program receives from AIMS, the scholars' initiative is currently supported by the Indigenous Education and Research Centre, AIMS@JCU, the ARC Centre of Excellence for Coral Reef Studies, World Wildlife Fund, Gudjuda Reference Group Aboriginal Corporation, Girringun Aboriginal Corporation, the GBRMPA, the US Department of State, and Townsville Catholic Education. The program also receives in-kind support from SeaLink, Oregon State University, Reef HQ Aquarium, the Museum of Tropical Queensland and participating schools.

In 2017–18 AIMS 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 shared their research and Indigenous mentors helped strengthen cultural connections.

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

ASSETS students visiting the National Sea Simulator. Image: M Roman

Research collaboration

Collaboration is a core value of AIMS. Collaboration with domestic and international partners enables AIMS to draw on complementary skills to deliver our solution-focused research portfolio, and to share knowledge more broadly. During 2017/18 AIMS was involved in 180 collaborative projects conducted in 30 countries worldwide. These projects involved 250 Australian scientists from 67 Australian organisations, and 166 international colleagues from 70 overseas organisations (table 7).

Figure 7: Location of AIMS' international collaborations.

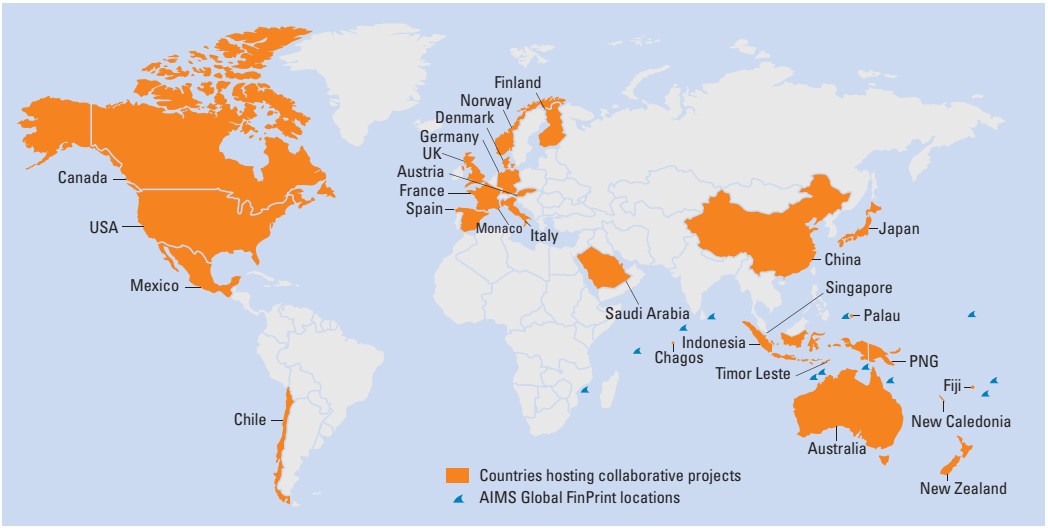


Table 7: Collaborator statistics 2017–18

CATEGORIES	NUMBER
Collaborative projects	180
Countries of operation	30
Australian collaborators	250
from number of Australian organisations	67
Overseas colleagues	116
from number of organisations	70
in number of countries	25

Figure 8: Number of AIMS collaborative projects by year.

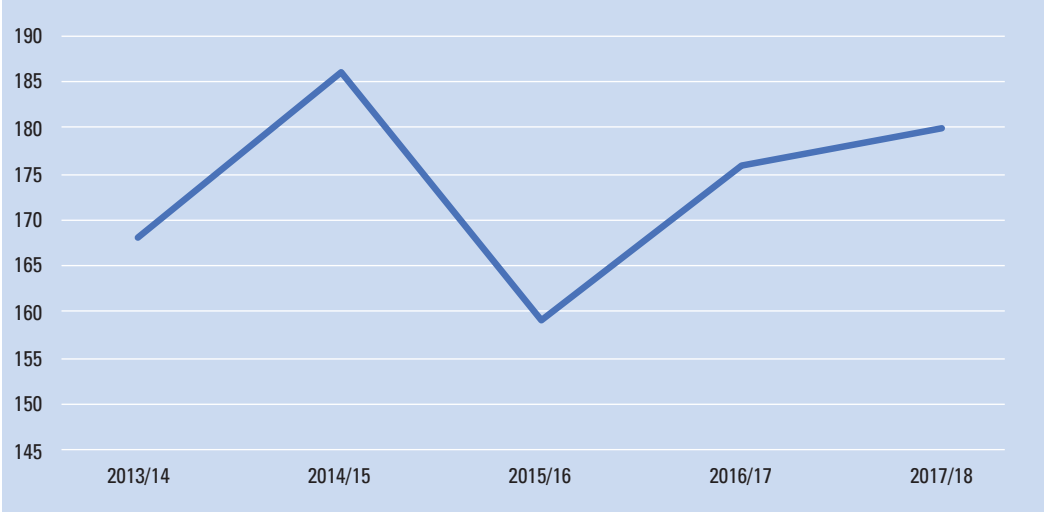
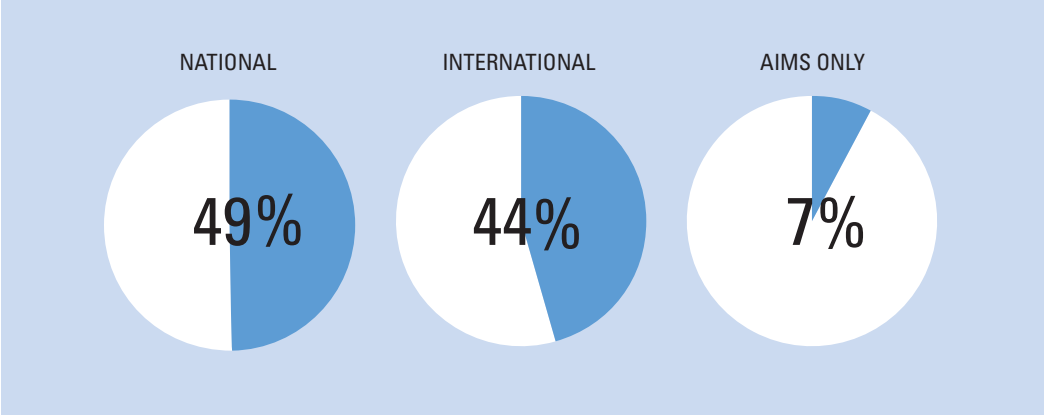


Figure 9: Proportion of collaborative publishing.



Collaborative research accounts for a high proportion of our scientific publications (Figure 8 and Figure 9). Of the 212 journal articles published by AIMS scientists, 103 (49%) had co-authors from other Australian research organisations and 94 (44%) involved international colleagues. Only 15 articles (7%) were solely authored by AIMS staff (Table 8).

Table 8: Publication statistics 2017–18

FIRST AUTHOR	NUMBER	%
Student	58	28
Postdoc	21	10
TOTALS	**NUMBER**	**%**
AIMS	15	7
National	103	49
International	94	44
Combined	212	100

In addition to these research collaborations, AIMS signed or renewed memorandums of understanding in 2017–18 with the:

- Prefecture of Okinawa, Japan, to collaborate on research to manage crown-of-thorns starfish and on reef restoration
- World Wide Fund for Nature (WWF) Pacific, to cooperate in WWF's Pacific Shark Heritage Program and the development of a rapid assessment toolkit for sharks.

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 our 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 direct delivery. Our metadata and data holdings are also submitted to 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 as 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 the IMOS.

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

- AIMS LTMP database, which houses data collected over more than 30 years from a GBR-wide environmental health surveillance program covering 292 reefs
- an online collection of reef-based observational data, including near real-time stations and in situ sea temperature logging sites
- data for the MMP, an element of the Reef 2050 Plan. Some of the most substantial data holdings at the end of 2017 are shown in Table 9.

Table 9: Number of data sampling sites and records

MEASUREMENTS	NUMBER OF SITES	NUMBER OF RECORDS AT DECEMBER 2017	INCREASE ON PREVIOUS YEAR
Chlorophyll, turbidity and temperature	23	7,161,000	11.1%
MMP samples	1,753	10,193	7.4%

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 themselves. 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 LTMP of the GBR and north-west Australia. The eAtlas currently hosts over 3,670 map layers produced from 45 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 3D 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 an online catalogue of animations and pre-rendered summary maps. 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 used frequently by a variety of stakeholders (Table 10).

Table 10: User access to AIMS' digital information, 2017 calendar year

PURPOSE	NUMBER OF VISITOR SESSIONS (CHANGE FROM PREVIOUS YEAR)	NUMBER OF PAGE VIEWS (CHANGE FROM PREVIOUS YEAR)
Data asset catalogue	19,000 (+10%)	26,100 (+5%)
Reef observations	206,900 (+26%)	904,000 (+8%)
Coral fact sheets	90,400 (–5%)	312,600 (–11%)
eAtlas (all sites)	128,000	243,000

AIMS participates in national data initiatives to promote a 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 set of operating principles guides 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 its 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 invests strategically in research targeted at reducing future uncertainty.

Stakeholders who benefited from AIMS' activities during the year are shown in Table 11.

Table 11: Stakeholders benefiting from AIMS activities in 2017–18

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

Stakeholders benefiting from AIMS activities in 2017–18 (cont.)

STAKEHOLDER CATEGORY	SECTOR/ ORGANISATION	EXAMPLES OF AIMS' SUPPORT
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
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 Great Barrier Reef Foundation	• 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 through RRAP • 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

Stakeholders benefiting from AIMS activities in 2017–18 (cont.)

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 Plan

Public communication

AIMS is committed to providing reliable, balanced information about the nation's northern marine estate to the Australian public. We communicate our science in a range of ways — through mainstream media, digital platforms, and stakeholder and public engagement. In addition, in partnership with the Australian Government and the not-for-profit sector, AIMS promoted 2018 as the International Year of the Reef.

Our leading role in reef recovery research was highlighted across Australian and international media in January 2018, when Prime Minister Malcolm Turnbull visited our Cape Ferguson headquarters to announce a $60 million package towards research and management of the GBR, alongside Minister Cash and Assistant Minister Price. This included $6 million for the AIMS-led RRAP program announced by Minister Cash. AIMS' novel giant triton sea snail breeding project also received significant media attention when it was funded through the Australian Government's Reef Programme in September 2017.

Concern about the health of the GBR following large-scale bleaching events in 2016 and 2017 has increased public interest in the search for innovative solutions. As leaders in this area, AIMS communicated new research findings and was regularly approached for comment by national media as a trusted authority in reef restoration and adaptation. During the year, our researchers provided scientific information and commentary on a range of issues affecting the tropical marine estate, including water quality, marine plastics, crown-of-thorns starfish and the health of the reef. Several international media outlets, including CNN, CNET and the BBC, visited AIMS this year as part of their reporting on the reef.

AIMS is proud to share its enthusiasm for—and capability in—marine sciences with students and teachers. This year, more than 300 students and teachers from North Queensland experienced hands-on activities in DNA extraction, mapping, emerging observation technologies and crown-of-thorns research at our Cape Ferguson site. About 250 students from eight Townsville schools participated in AIMS Science Days in September 2017, an initiative funded by an Advance Queensland Science grant. More than 60 Aboriginal and Torres Strait Islander students participated in the Aboriginal and Torres Strait Islanders in Marine Science (ATSIMS) program and the Aboriginal Summer School for Excellence in Technology and Science (ASSETS).

Online engagement included spectacular videos of corals and coral spawning produced with imagery provided by BioQuest Studios. These videos, filmed partially in the National Sea Simulator during the 2017 coral spawning season, reached a worldwide audience of half a million.

Our Townsville headquarters reopened its doors to the public for tours in August 2017, following a major refurbishment at the Cape Ferguson facility. The tours, hosted by emerging marine scientists from the AIMS@JCU partnership, provided visitors with an introduction to AIMS' research and included behind-the-scenes visits to the SeaSim and our engineering facilities. More than 360 members of the community visited in the past year.

Research infrastructure

AIMS' research activities focus primarily 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 CDU campus.

In WA, AIMS is co-located with The University of Western Australia and CSIRO in the new Indian Ocean Marine Research Centre at the university's Crawley campus in Perth.

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

Research Vessel Solander (Image: S Clarke); The National Sea Simulator and laboratory work at the Townsville headquarters (Images: C Miller).

National Sea Simulator

The 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.

The SeaSim provides a step change in capability compared with previous technologies, and is an essential element for the success of many of our research programs (Figure 10). AIMS has made up to 50 per cent of the SeaSim's capability available to scientists and research institutions from around Australia and the world to work on marine science projects. Our researchers work closely with national and international collaborators with over 80 per cent of all experiments undertaken to date in the SeaSim involving external collaborators. The researchers have come from 12 national and 23 international organisations

Figure 10: Statistics showing use of the National Sea Simulator (SeaSim) 2017–18.

Projects have attracted funding from a range of sources including industry partners, universities, the Australian Research Council, WAMSI, the National Environmental Science Program, the Great Barrier Reef Foundation and the Paul G. Allen Foundation.

Collaborating organisations include the following:

National – CSIRO, University of Wollongong, Southern Cross University, James Cook University, University of Melbourne and the Queensland University of Technology.

International – University of Miami (Miami, US), King Abdullah University of Science and Technology (Saudi Arabia), Victoria University (Wellington, NZ), Oregon State University (Oregon, US), University of Amsterdam (The Netherlands), University of Barcelona, and the University of Copenhagen (Denmark).

The SeaSim has developed a number of unique capabilities to assist researchers:

- full solar spectrum lighting with the ability to dynamically manipulate spectrum to model conditions as found in the field (e.g. sediment plumes from dredging operations)
- 18 large, fully independent mesocosm systems with the ability to provide daily, monthly and seasonal patterns of light, temperature and pCO_2
- sophisticated climate change and ocean acidification systems with tightly controlled temperature (±0.1 °C) and diel pCO_2
- large-scale systems for coral spawning, larval rearing, settlement and long-term grow out
- flow-through contaminant dosing systems for ecotoxicology research on priority contaminants.

This capability has been applied to a range of high-priority research areas, including climate change and ocean acidification, reef restoration and adaptation, impacts of dredging, pest management and impacts of contaminants.

Over the past 12 months, significant upgrades have been undertaken in the SeaSim Seawater Precinct with new systems to provide additional capability. Upgrades include:

- quarantine-receiving facility for organisms arriving from the field
- large-fish experimental facility
- new larval-rearing facility to support giant triton rearing projects.

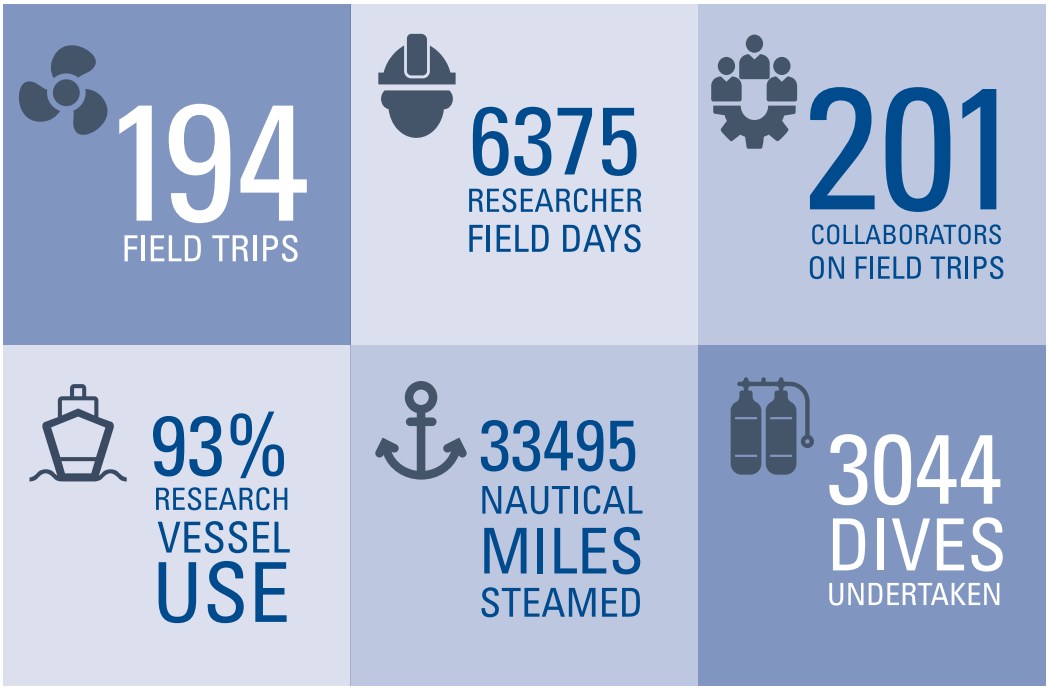
Field operations

AIMS' field activities are supported by a research fleet that provides access across Australia's tropical marine environments. Two large, well-equipped research vessels, the RV *Cape Ferguson* and the RV *Solander*, and a number of smaller vessels, take researchers to diverse habitats in Australia's tropical waters (Figure 11). Our major vessels are equipped with a wide range of facilities essential for long research trips, with the capability to deliver:

- remote diving operations
- deployment of sensitive hydrographic and oceanographic instruments
- underway sampling and measurement
- chemical and sample handling and storage facilities.

About half of all trips on the *Cape Ferguson* and *Solander* involved researchers from collaborating organisations.

Figure 11: Statistics showing AIMS field operations 2017–18.



As the large vessels were used at almost 100 per cent of available capacity (Figure 11), AIMS chartered a further 244 days on third-party vessels, primarily overseas and in the GBR, Torres Strait and Darwin areas, to meet its research commitments for the year.

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.

Total revenue for 2017–18 was $68 million (Figure 13), representing an increase of 13 per cent on 2016–17 revenue (Figure 14). The $7.9 million increase was due to an increase in Australian Government appropriation revenue ($3.3 million) and other revenue ($4.6 million).

Figure 12: Activities of the major research vessels.

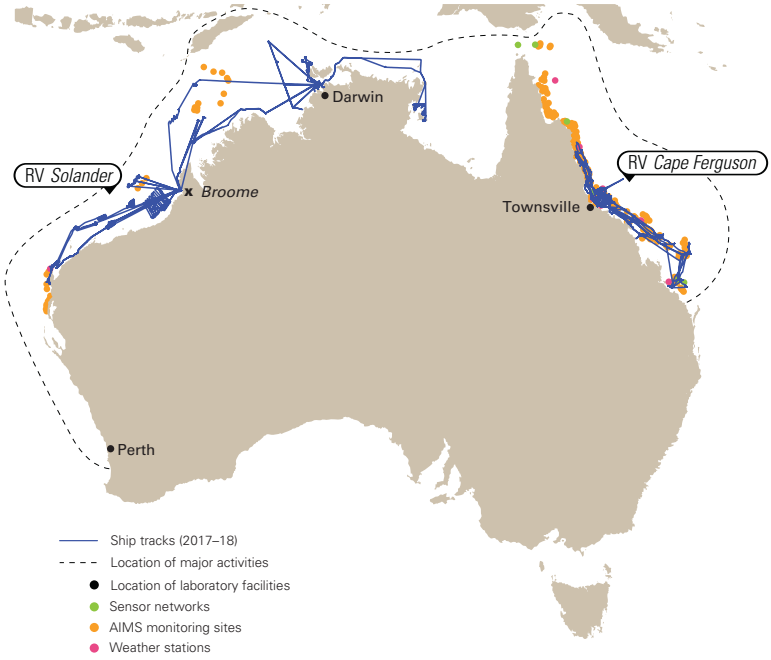
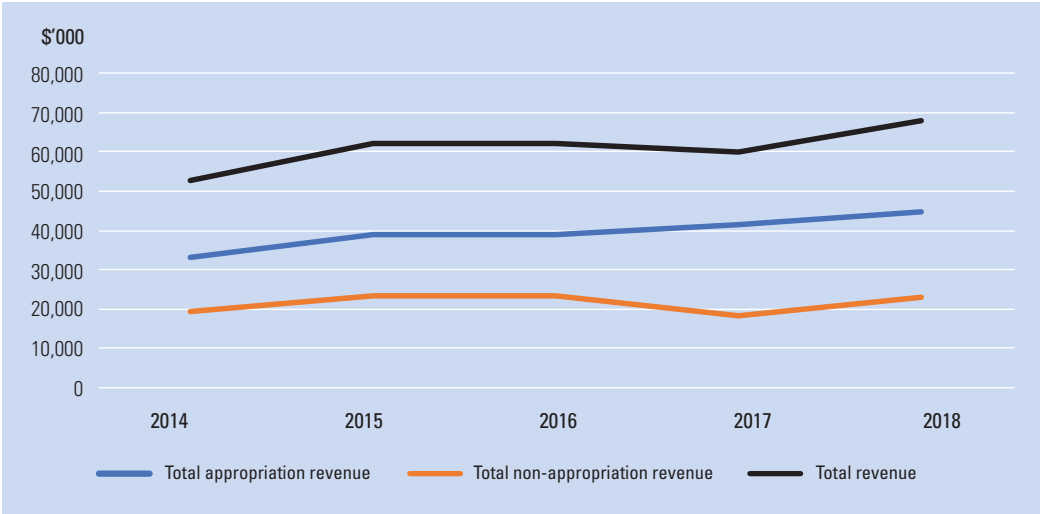


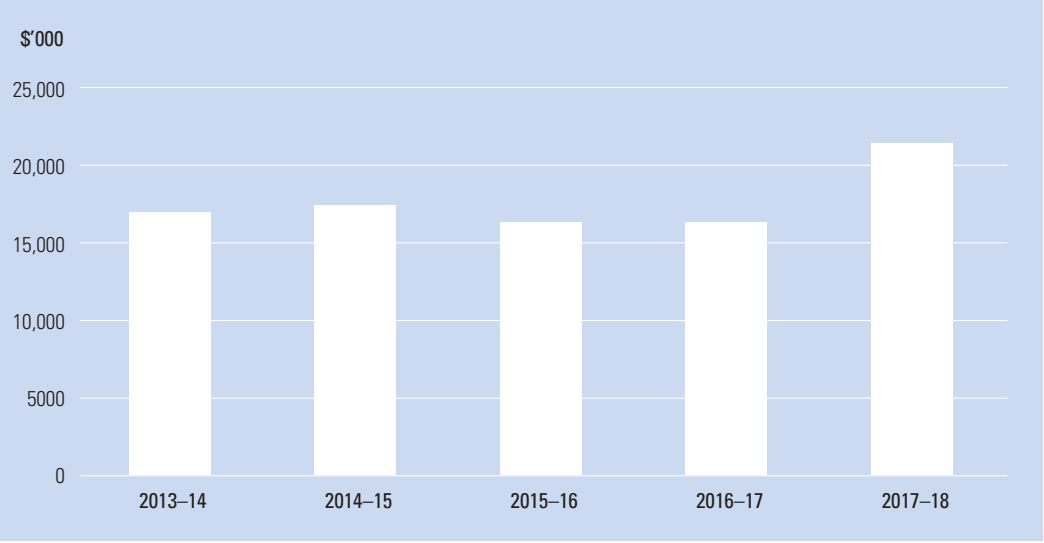
Figure 13: AIMS' revenue 2014–18.



External revenue

External funding is critical for AIMS to maintain its present level of scientific research. In 2017–18, revenue from external sources was $21.426 million, which accounted for 32% of total revenue (Figure 14).

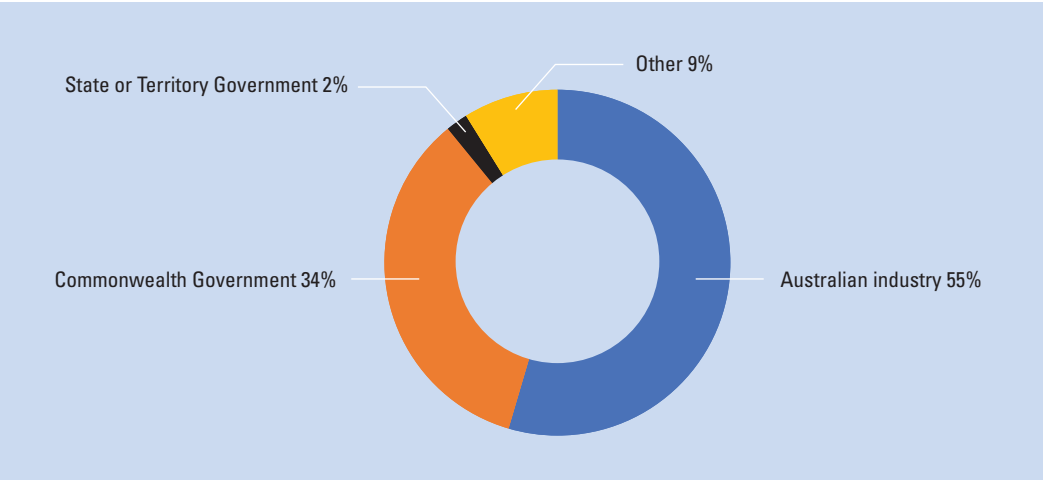
Figure 14: Total external revenue earned by AIMS during the past five years.



Sources of co-investment funding for 2017–18

Australian Government departments and agencies and Australian industry partners together provide 89 per cent of AIMS' total external revenue (i.e. funds earned on top of AIMS' appropriation allocation) through major grants and project contracts (Figure 15).

Figure 15: Major sources of external revenue in 2017–18.



Our organisation

Management and accountability

AIMS has 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 the AIMS Act (Appendix C on page 164). AIMS has two main roles under its governing legislation:

- 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 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 167) provides details of how this annual report meets those requirements.

Responsible ministers

For the reporting period of this annual report (1 July 2017 to 30 June 2018), AIMS' responsible ministers were Senator the Hon. Arthur Sinodinos AO, Minister for Industry, Innovation and Science (1 July 2017 to 20 December 2017) and Senator the Hon. Michaelia Cash, Minister for Jobs and Innovation and Senator the Hon. Zed Seselja, Assistant Minister for Science, Jobs and Innovation (20 December 2017 to 30 June 2018).

Senator the Hon. Michaelia Cash, Minister for Jobs and Innovation.

Senator the Hon. Zed Seselja, Assistant Minister for Science, Jobs and Innovation.

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 Council during 2017–18.

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 2016–17* was submitted to the Senate Economics Legislation Committee (the committee) for review. In the committee's document, *Annual Reports (No. 1 of 2018)* dated 20 March 2018, the committee confirmed that AIMS' annual report was presented in Parliament in a timely manner (by 31 October 2017). The committee also considered such aspects as timeliness of presentation and compliance with relevant reporting requirements and found that *AIMS Annual Report 2016–17* was 'apparently satisfactory'. *AIMS Annual Report 2016–17* 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.

AIMS Council as at June 2018 (L to R): Mr Roy Peterson, Ms Diana Hoff, the Hon. Penelope Wensley AC Chairman), Dr Paul Hardisty (CEO), Professor Sandra Harding, Ms Anna Matysek, Dr Stephen Morton. Not present: Ms Jeanette Roberts.

Role of Council

The AIMS Council sets AIMS' key objectives and research strategies and oversees 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:

- duty to govern the Commonwealth entity
- duty to establish and maintain systems relating to risk and control
- duty to encourage cooperation with others
- duty in relation to requirements imposed on others
- 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, 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 reappointment is permissible. The CEO is appointed by the Council for a period not exceeding five years and is eligible for reappointment.

The Hon. Penelope Wensley AC FAIIA
Council Chairman: 1 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 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), 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 Plan.

Professor Sandra Harding, BSc (Hons), MPubAdmin, PhD, Hon Doc JIU, FACE, FQA, FAICD, FAIM
Council member: 10 May 2007 – 27 May 2020

Sandra Harding represents James Cook University on the AIMS Council, and maintains links with the wider education sector. As Vice Chancellor and President of the University since 2007, she is responsible for ensuring clear and effective leadership and management across all operating sites, including campuses in Townsville, Cairns and Singapore. 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. Current roles include: Project Convener, State of the Tropics project; Commissioner, Australian Centre for International Agricultural Research; Member, North Queensland Defence Advisory Board; Member, Trade, Tourism and Investment Policy Advisory Council; Member, Citizens of the Great Barrier Reef Foundation Board; 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.

Ms Diana Hoff, BSc Petroleum Engineering
Council member: 16 December 2014 – 15 December 2017

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 UK and North America. Ms Hoff has held senior leadership and technical roles in Australia and the US across offshore and onshore projects in both countries, as well as in 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. 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, Doc (Hon. Causa), GAICD
Council member: 16 December 2014 – 15 December 2019

Dr Stephen Morton has extensive expertise in research for conservation, land management and ecological sustainability. He is currently 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 a Doctorate (honoris causa) from the University of Adelaide. He has published more than 150 scientific articles, book chapters, books, refereed reports and popular articles.

In the final decade of a career at CSIRO, Dr Morton held positions as Chief of CSIRO Sustainable Ecosystems and then as Group Executive for Environment and Natural Resources (with responsibility for marine science), for Energy and Environment, and for Manufacturing, Materials and Minerals. Since leaving the CSIRO in 2011, Dr Morton has worked as an independent consultant and adviser, including membership of the Australian Heritage Council (Canberra, ACT); Chair, Scientific Advisory Panel, Lake Eyre Basin Ministerial Forum (Canberra, ACT); Deputy Chair of the Board, Territory Natural Resource Management (Darwin, NT); Chair, Arid Recovery Advisory Board (Roxby Downs, SA); Chair, Science Advisory Committee, Terrestrial Ecosystem Research Network (Brisbane, Qld); member of the Board, Western Australian Biodiversity Science Institute (Perth, WA); and Chair, Steering Committee, Threatened Species Recovery Hub, National Environmental Science Program (Canberra, ACT).

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, BEcon (Hons), MEnv
Council member: 15 June 2017 – 14 June 2022

Ms Anna Matysek is an experienced economist and senior executive currently working as an independent consultant. She has a strong background in strategy, business development, stakeholder engagement, and policy development in the resources, energy and infrastructure sectors based on 20 years' work in both the public and private sectors. She has worked with major global mining companies, utilities, industry associations, agribusinesses, and government agencies including holding senior positions in economics consulting firms, at the Australian Bureau of Agricultural and Resource Economics and working for the Productivity Commission.

Ms Matysek was most recently a member of the Executive at TransGrid, and previously General Manager for Business Development and Corporate Strategy at Rio Tinto. In these roles, she was responsible for developing and implementing business strategies, investment review, project design and goal setting for major cost-cutting programs, productivity performance improvement and stakeholder engagement.

Ms Matysek was a lead author on the Intergovernmental Panel on Climate Change Fourth Assessment Report and on the International Assessment of Agricultural Knowledge, Science and Technology for Development.

She was awarded a Master of Environment at the University of Melbourne in 2006, and a Bachelor of Economics (Honours) at UTAS in 1999.

Ms Jeanette Roberts
Council member: 21 June 2018 – 20 June 2023

Ms Jeanette Roberts is a Director of Jeanette Roberts Consulting. She is a senior executive with more than 30 years' international experience in the oil and gas industry, including in China, India, Russia, Africa, Europe and the Asia–Pacific.

Ms Roberts has major global merger and acquisitions experience, including divestments and global restructures, and risk management and governance expertise. She has held industry leadership roles in safety, skills and workforce development.

Ms Roberts has worked on policy development at state and Commonwealth level, including development of policy solutions to support local content and export competitiveness for Australian companies as part of the Buy Australian at Home and Abroad program. She has also developed policy frameworks for vocational education and training, skills development and international education partnerships.

Ms Roberts has worked with the research sector, including five major Australian universities,

National Energy Resources Australia and WAMSI in developing partnerships and collaboration frameworks, particularly around marine environments and sustainable development.

Ms Roberts previously worked for oil and gas companies including Kvaerner Oil and Gas Australia, where she was responsible for all aspects of Kvaerner's business in Australia, and Woodside Energy. Her experience encompasses the oil and gas value chain from concept development and project development to construction and asset support.

She has a Bachelor of Engineering (Honours) (Chemical) degree from the University of Melbourne and is a Fellow of the Institution of Chemical Engineers, and a Senior Fellow of the LH Martin Institute of the University of Melbourne.

Dr Paul Hardisty
CEO and Council member: 24 July 2017 – 23 July 2022

Dr Paul Hardisty commenced as Chief Executive Officer of AIMS on 24 July 2017. An honours graduate in geological engineering from the University of British Columbia, Canada, he has a Master in Hydrology, and a Doctorate in Environmental Engineering, from Imperial College, London. He has been a Visiting Professor in Environmental Engineering at Imperial College, London, since 1999 and is an adjunct Professor at The University of Western Australia.

Dr Hardisty has worked extensively in marine and coastal environments and on marine research projects, with many of the stakeholder and customer groups that AIMS deals with. He has substantial experience of both the public and private sector. He was the founder, owner and leader of Komex Environmental Ltd, an international environmental consultancy, built from start-up to a $50 million a year turnover company with a thousand employees, and sold to the engineering services company Worley Parsons in 2006. From 2006 to 2013, Dr Hardisty served as Global Director, Corporate Responsibility and Global Director, Sustainability and Economics for Worley Parsons.

In 2013, Dr Hardisty joined the CSIRO, initially as Flagship Director, CSIRO Climate Adaptation Flagship and, more recently, as Business Unit Director, CSIRO Land and Water.

Council attendance

Table 12: Attendance at Council meetings 2017–18

ATTENDANCE	25 AUG 2017 (TELECONF.)	21–22 SEP 2017	4–5 DEC 2017	5–6 MAR 2018	4–5 JUN 2018
The Hon. Penelope Wensley AC	Yes	Yes	Yes	Yes	Yes
Professor Sandra Harding	Yes	Yes	Yes	Yes	Yes
Dr Stephen Morton	Yes	Yes	Yes	Yes	Yes
Ms Diana Hoff (Council member to December 2017)	Yes	Yes	Yes	N/A	N/A
Mr Roy Peterson	Yes	Yes	Yes	Yes	Yes
Ms Anna Matysek	Yes	Yes	Yes	Yes	Yes

ATTENDANCE	25 AUG 2017 (TELECONF.)	21–22 SEP 2017	4–5 DEC 2017	5–6 MAR 2018	4–5 JUN 2018
Dr Paul Hardisty	Yes	Yes	Yes	Yes	Yes
Ms Jeanette Roberts	N/A	N/A	N/A	N/A	N/A

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 2025 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 Chairman and by an external reviewer.

Ethics

Council members are briefed on—and are 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 Council meetings. All of these requirements are currently being met.

Audit Committee

The Audit Committee is a formal subcommittee of the Council that meets quarterly. The 2017–18 Audit Committee members were:

- Mr Roy Peterson (Council member and Committee Chairman)
- Ms Diana Hoff (member to December 2017)
- Dr Steve Morton (member from December 2017)
- Ms Margaret Walker (independent member).

The AIMS CEO 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 FY 2017–18 (Table 12).

Table 13: Audit Committee attendance 2017–18

ATTENDANCE	11 AUG 2017	13 NOV 2017	13 FEB 2018	21 MAY 2018
Members				
Mr Roy Peterson (Chair)	Yes	Yes	Yes	Yes
Ms Diana Hoff (Council member)	Yes	Yes	N/A	N/A
Dr Steve Morton (Council member)	N/A	N/A	Yes	Yes
Ms Margaret Walker (independent member)	Yes	Yes	Yes	Yes
Invitees				
Dr Paul Hardisty (AIMS CEO) – AIMS management representative	No	No	No	No
Mr Basil Ahyick (AIMS CFO)	Yes	Yes	Yes	Yes
Mr David Mead (AIMS COO)	Yes	Yes	No	No
Dr John Chappell (AIMS a/COO)	N/A	N/A	Yes	Yes
Ms Pamela Giese (AIMS Finance Team Leader)	Yes	Yes	N/A	N/A
Mr Jason Davidson (AIMS Finance Manager)	N/A	N/A	Yes	Yes
Mr Will Fellowes (Pricewaterhouse Coopers (PwC), internal auditor)	Yes	Yes	Yes	Yes
Mr John Skilling (PwC, internal auditor)	No	No	Yes	Yes
Mr Kristian Gage (ANAO signing officer 2018)	Yes	N/A	N/A	Yes
Mr Benjamin Nicholls (ANAO)	No	No	No	No
Mr Frederic Ferges (RSM Australia, external auditors)	Yes	Yes	Yes	No
Mr Albert Loots (RSM Australia, external auditors)	Yes	No	No	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. It did not seek such advice in 2017–18.

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 2017 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 2016
- Australian Accounting Standards and Interpretations – Reduced Disclosure Requirements issued by the Australian Accounting Standards Board that apply for the reporting period.

The financial statements are accompanied by a signed statement by the Accountable Authority, 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 2017–18 (refer to Note 3.3 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 2017–18 starts on page 33 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 the Institute's 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 PwC 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 the Institute. The Audit Committee reviewed the ANAO Audit Plan and reported to, and met with, ANAO representatives before 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 2017–18.

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 our Procurement Policy and Procedures and other relevant internal policies.

AIMS spent $22,014 (excluding GST) on consultancies during 2017–18.

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 2017–18.

Industrial relations

No significant industrial relations issues arose during the reporting period.

Customer service charter

AIMS has a formal service charter that outlines the standards it commits to regarding management of customer relationships, a copy of which is posted on our website. AIMS welcomes feedback on its performance against our service standards. The charter and details on how to provide feedback can 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 2017–18.

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 the Institutes's Privacy Policy and Procedures are adhered to and comply with all applicable statutory requirements.

Freedom of information

No requests for documents under the provisions of the *Freedom of Information Act 1982* (FOI Act) were received by AIMS during 2017–18.

In addition, no applications were received during 2017–18:

- 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 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

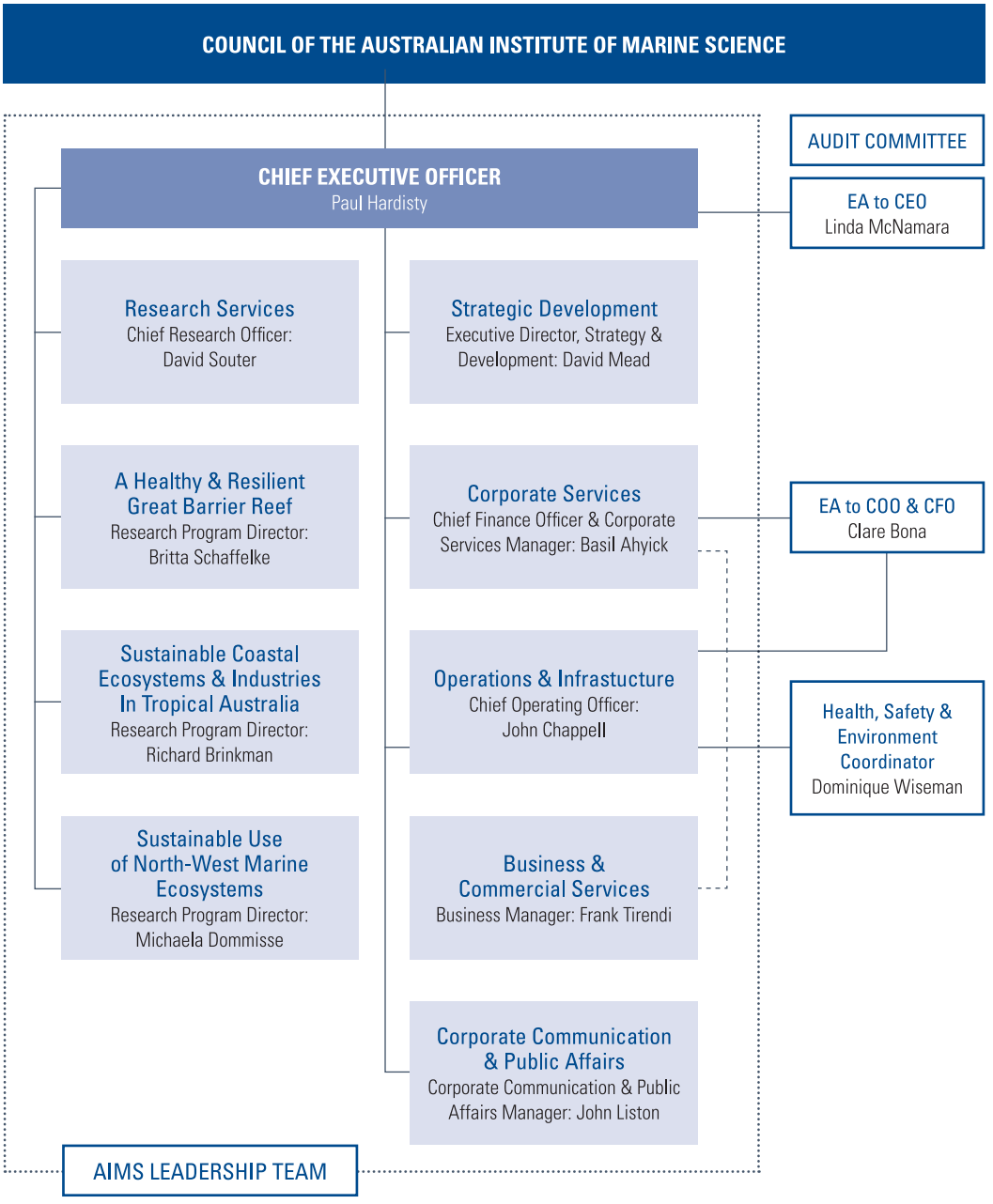
All enquiries and requests for information, or concerning access to documents or any other matters relating to FOI, should be directed to:

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

Figure 16: Organisational structure of the Australian Institute of Marine Science (June 2018).

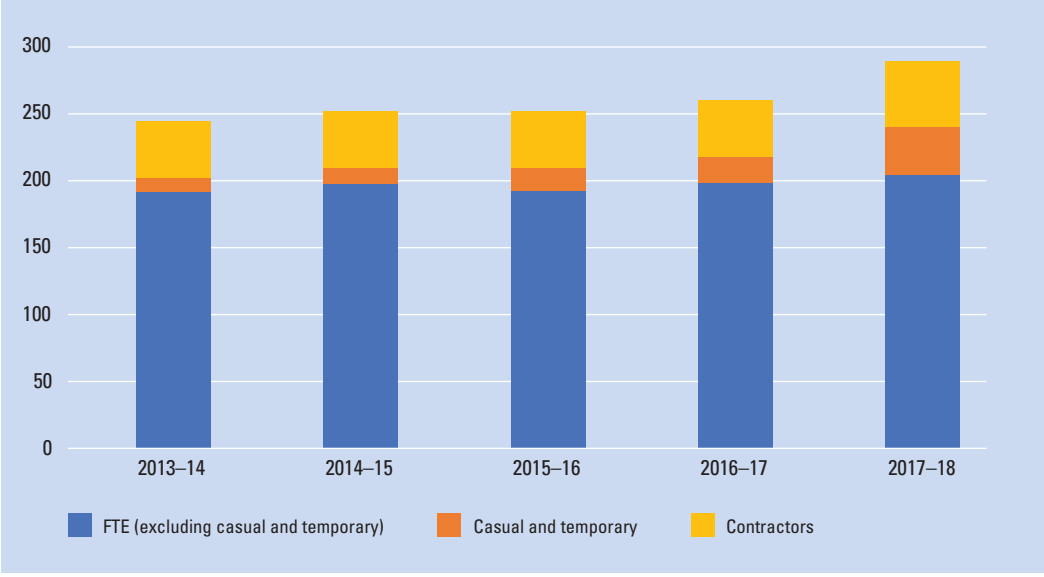


Staff

AIMS employed an average core of 240.5 full-time equivalent (FTE) science and support staff during the 2017–18 financial year, including 22.37 FTE under labour hire arrangements, 3.63 FTE casuals and 9.98 FTE temporary staff. In addition, AIMS engaged 49.0 FTE personnel via outsourced functions (Figure 17).

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 other services including 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 17: Total staff numbers as at 30 June 2018



AIMS core staff numbers

Table 14: Core staff numbers 2013–14 to 2017–18

STAFF CATEGORY	NUMBER OF STAFF (FTE)				
	2013–14	2014–15	2015–16	2016–17	2017–18
Total (excluding casual and temporary)	192	198	193	199	205
Casual and temporary	11	12	17	20	36
Total	**203**	**210**	**210**	**219**	**241**
Postdoctoral researchers (included in total)	(11)	(11)	(4)	(7)	(13)

Number of contractors engaged

AIMS outsources a number of functions via competitive tendering. The subcontracted companies employ about 49 FTE of staff dedicated to these functions. Outsourced functions currently comprise vessel management, building security, catering, cleaning and facilities maintenance.

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 2017–18. 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 (EEO) and workforce 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.

The Institute's staffing policies and procedures align with the requirements of the *Equal Employment Opportunity (Commonwealth Authorities) Act 1987*. Designed to ensure that workforce 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, cafe 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 15: Staff numbers by gender and occupation 2017–18

	NUMBER OF CORE STAFF (FTE) 2017–18 (2016–17)		
CATEGORY	FEMALE	MALE	TOTAL
Research scientists	26 (21)	27 (25)	53 (46)
Research support	28 (24)	44 (44)	72 (68)
Technical and corporate support	46 (37)	70 (68)	116 (105)
Total staff	**100 (82)**	**141 (137)**	**241 (219)**

Staff diversity

Table 16: Staff numbers in equal employment opportunity categories

EQUAL EMPLOYMENT OPPORTUNITY CATEGORY	PROPORTION OF TOTAL STAFF 2017–18 (2016–17) (%)
Aboriginal and Torres Strait Islander	0.98 (1.31)
Non–English-speaking background	16.78 (16.44)
Staff with disability	1.68 (1.84)
Women	41.36 (37.25)

Women in science

In 2017–18, AIMS made progress with the development of a comprehensive Equity and Diversity Strategy (Table 15). This strategy will incorporate the previous objectives of the Women@AIMS Reference Group. A committee is being formed to support and influence the implementation of the strategy. AIMS has also joined cohort three of the Science in Australia Gender Equity (SAGE) initiative. The SAGE initiative seeks to improve gender equity in science, technology, engineering, mathematics and medical (STEMM) related occupations.

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 received one formal reported case of harassment in 2017–18.

Public interest disclosure (whistle-blower policy)

AIMS has a whistle-blower 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 to promote the 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 dealt with one formal reported public interest disclosure case in 2017–18.

Disability strategy

AIMS is committed to ensuring that people with disabilities are given opportunities for independence, access and full participation (Table 16). 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, and their family members, 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, supervisor, human resource staff or workplace health and safety staff to access the program. The use rate during 2017–18 was 6.67 per cent, a decrease on the 2016–17 rate of 9.52%. Analysis reveals that staff accessed the service primarily for issues of a personal nature.

Health and safety

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. We recognise the importance of providing a safe work environment, a robust and accessible health and safety management system, and fostering a culture based on sound risk management, open communication and teamwork.

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.

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

AIMS uses active communication and consultation processes to involve its workforce in safety discussions and decision-making processes. Avenues for participation are varied, and include formal and informal opportunities. Workers are engaged and have input through team and safety specific meetings, targeted working groups, committees and via inspection processes and reporting systems.

Open communication about safety-related issues is actively encouraged throughout AIMS, exemplified by the 'Safety Minute', an initiative introduced by the AIMS CEO and promoted by all members of the Leadership Team. At every internal meeting, or external meeting chaired by AIMS, a safety-related reflection is shared by a team member promoting a continued safety focus and reinforcing safety as a shared value.

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 is dedicated to achieving year-on-year improvement in safety performance and AIMS culture.

Staff-appointed health and safety representatives (HSRs) represent AIMS diverse working groups. The HSR role is valued at AIMS, with representatives actively engaged in routine safety committee meetings and hazard inspection routines, and receiving incident report notifications.

AIMS' strategic work health and safety pillars are:

- leadership and culture
- safety communication
- continuous improvement
- learning culture
- training and personal development
- health and wellbeing.

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

- 2.5 FTE dedicated health and safety team members
- 8 health and safety representatives
- Safety Committee with members comprising health and safety team members and representatives, operational managers and members of the AIMS leadership team
- Chief Warden, 5 deputy chief emergency wardens and 27 fire and deputy fire wardens
- Diving Officer
- Boating Officer
- Diving Supervisor, Boat Attendant and Cruise Leader (field-trip appointed positions)
- Laboratory Operations Manager and 12 dedicated laboratory managers
- Quarantine Officer (statutory position)
- Radiation Safety Officer (statutory position)
- Biosafety Officer (statutory position)
- Fire Safety Adviser (contracted)
- 13 first aid officers
- 7 harassment contact officers
- 2 return-to-work and rehabilitation officers
- Cyclone officer.

Recent training provided includes:

- Operational Risk Management
- Fire Warden
- Health and Safety Representative
- Participative Ergonomics for Manual Tasks program
- Manual Handling

- 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 2017–18, AIMS continued to focus on preventing manual task injury, introducing an Injury Reduction Plan aimed at decreasing the number of workers experiencing significant musculoskeletal injuries. The plan uses a holistic approach, encompassing early intervention, the promotion of health and wellbeing and fitness for work, a participative approach to ergonomic risk management and improved risk awareness through training and instruction. Since implementation, AIMS has achieved significant reductions in the number of significant injuries affecting workers, with further reductions expected in the 2018–19 financial year.

System audits and inspections

Throughout 2017–18, compliance with AIMS' health and safety management system policies and procedures was assessed routinely as part of our internal audit committee processes. Workplace inspections remained on schedule, facilitating the identification of hazards and ensuring the provision of safe workplaces. This process engages senior leaders, HSRs, area managers and staff in identifying potentially unsafe conditions. Mobile technology is available to staff to enable the recording and management of findings in AIMS' health and safety reporting system.

Incidents and hazard reporting

During 2017–18, 426 potential safety matters, of which 80 per cent were hazards, were recorded formally in AIMS' health and safety reporting system. Appropriate preventive actions were implemented, demonstrating a commitment to continuous improvement of safety at AIMS.

AIMS had nine recordable injuries (lost time injury, medical treatment case and restricted work case) and a further 10 minor injuries (first aid or no treatment).

One incident 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. A collaborator on board an AIMS vessel experienced a mild electric shock while commissioning equipment on the back deck of an AIMS vessel, but was uninjured. Comcare was notified, but required no additional action from AIMS beyond the initial notification and immediate investigation.

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 works 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 its many activities contributing to environmental protection and biodiversity conservation, AIMS is committed to minimising any adverse effects on the environment arising from its own activities.

Reducing AIMS' environmental impacts

In 2017–18, AIMS completed refurbishment of the main complex at its Cape Ferguson facility. As part of the upgrade, measures were implemented to reduce energy consumption, including the installation of Low-E glass on external windows (to reduce air-conditioning loads) and replacement of existing lighting with controlled LED lighting systems (to reduce electricity consumption). We began installing upgrades to the 40-year-old site's high-voltage infrastructure, including a 1050 kW photovoltaic solar system, reducing energy consumption by about 20 per cent, depending on weather conditions.

As well as focusing on reducing 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 that 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 57 megalitres (ML) of water in 2017–18, an increase of 20 ML from the previous year. This was due to increased freshwater use in AIMS seawater process and experimental systems as well as hydro-excavation activities required for the new 11 Kv electrical upgrades to the main substation to expose existing underground services.

Recycling

AIMS operates an active recycling program for paper, cardboard, batteries, printer cartridges, lubricants and metals. In 2017–18, we recycled 13,800 kg of paper and 10,080 kg of cardboard, and diverted about 23 kg of printer cartridge waste from landfill.

Energy usage

Cape Ferguson electricity consumption for 2017–18 was 7,718 MW for the year, compared with 7,820 MW in 2016–17. The small reduction in consumption resulted from decreased running of the chillers required to charge the thermal energy storage system. Further reductions are expected in future years from the capital improvements listed above.

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

Two new proposals for dealing with genetically modified organisms (GMOs) were assessed out-of-session by the AIMS Biosafety Committee this year. Two projects—one defined by the Office of the Gene Technology Regulator as an Exempt dealing and the other a Notifiable Low Risk Dealing (NLRD)—were completed. AIMS now has six active GMO projects: one NLRD and five Exempt dealings.

Financial statements

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Statement of Financial Position
Statement of Changes in Equity
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INDEPENDENT AUDITOR'S REPORT

To the Minister for Jobs and Innovation

Opinion

In my opinion, the financial statements of the Australian Institute of Marine Science for the year ended 30 June 2018:

(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 2018 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 2018 and for the year then ended:

- Statement by the Accountable Authority, 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* (the Code) to the extent that they are not in conflict with the *Auditor-General Act 1997*. 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.

Accountable Authority's Responsibility for the Financial Statements

As the Accountable Authority, the Council of the Australian Institute of Marine Science 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 Accountable Authority is also responsible for such internal control as the Accountable Authority 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 Accountable Authority 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 Accountable Authority is also responsible for disclosing, as applicable, matters related to going concern and using the going concern basis of accounting unless the assessment indicates that it is not appropriate.

GPO Box 707 CANBERRA ACT 2601
19 National Circuit BARTON ACT
Phone (02) 6203 7300 Fax (02) 6203 7777

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 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 Accountable Authority;
- conclude on the appropriateness of the Accountable Authority'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

24 August 2018

**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 2018 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
24 August 2018

Signed

Dr Paul Hardisty
Chief Executive Officer
24 August 2018

Signed

Mr Basil Ahyick
Chief Finance Officer
24 August 2018

Statement of Comprehensive Income

for the period ended 30 June 2018

	Notes	2018 $'000	2017 $'000	Original Budget 2018 $'000	Variance[1] Actual vs 2018 Original Budget $'000	
NET COST OF SERVICES						
Expenses						
Employee benefits	1.1A	**28,672**	27,404	28,343	(329)	
Suppliers	1.1B	**28,788**	22,103	27,155	(1,633)	2
Depreciation and amortisation	2.2A	**12,307**	11,758	12,120	(187)	
Foreign exchange loss		**74**	26	-	(74)	
Losses from asset sales		**133**	146	-	(133)	
Total expenses		**69,974**	61,437	67,618	(2,356)	
Own-source income						
Own-source revenue						
Rendering of services		**21,426**	16,318	20,263	1,163	3
Interest on deposit		**1,027**	1,109	1,200	(173)	
Other revenue	1.2	**565**	885	140	425	
Total own-source revenue		**23,018**	18,312	21,603	1,415	
Gains						
Gains from sale of assets		**16**	99	-	16	
Total gains		**16**	99	-	16	
Total own-source income		**23,034**	18,411	21,603	1,431	
Net cost of services		**(46,940)**	(43,026)	(46,015)	(925)	
Revenue from Government		**44,847**	41,552	41,916	2,931	4
Surplus/(Deficit)		**(2,093)**	(1,474)	(4,099)	2,006	10
OTHER COMPREHENSIVE INCOME						
Changes in asset revaluation surplus		**9,713**	-	-	9,713	5
Total other comprehensive income/(loss)		**7,620**	(1,474)	(4,099)	11,719	

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

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

[2,3,4,5,10] Budget variances commentary is contained in Budget Variance Commentary Note.

Statement of Financial Position

as at 30 June 2018

	Notes	2018 $'000	2017 $'000	Original Budget 2018 $'000	Variance[6] Actual vs 2018 Original Budget $'000	
ASSETS						
Financial assets						
Cash and cash equivalents	2.1A	**11,491**	8,764	250	11,241	7
Trade and other receivables	2.1B	**7,277**	5,534	5,741	1,536	8
Other investments	2.1C	**26,100**	27,800	34,528	(8,428)	7
Total financial assets		**44,868**	42,098	40,519	4,349	
Non-financial assets						
Buildings	2.2A	**94,983**	90,005	88,983	6,000	5
Infrastructure, plant and equipment	2.2A	**31,456**	32,994	33,872	(2,416)	5
Computer equipment	2.2A	**1,502**	1,525	1,585	(83)	5
Computer software	2.2A	**4,111**	2,305	1,805	2,306	9
Vehicles	2.2A	**1,716**	1,296	842	874	5
Office equipment	2.2A	**2**	28	22	(20)	5
Ships, launches & vessels	2.2A	**20,506**	18,332	18,809	1,697	5
Library books	2.2A	**3**	42	24	(21)	5
Inventories		**160**	163	207	(47)	
Other non-financial assets	2.2B	**3,232**	2,719	3,299	(67)	
Total non-financial assets		**157,671**	149,409	149,448	8,223	
Total assets		**202,539**	191,507	189,967	12,572	
LIABILITIES						
Payables						
Suppliers	2.3A	**2,648**	1,813	3,641	993	10
Other payables	2.3B	**3,717**	3,252	3,785	68	
Total payables		**6,365**	5,065	7,426	1,061	
Provisions						
Employee provisions	3.1	**10,402**	9,890	10,803	401	
Total provisions		**10,402**	9,890	10,803	401	
Total liabilities		**16,767**	14,955	18,229	1,462	
Net assets		**185,772**	176,552	171,738	14,033	
EQUITY						
Contributed equity		**88,207**	86,607	88,207	-	
Reserves		**77,857**	68,144	68,144	9,713	5
Retained surplus		**19,708**	21,801	15,387	4,321	11
Total equity		**185,772**	176,552	171,738	14,034	

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

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

[5,7,8,9,10,11] Budget variances commentary is contained in Budget Variance Commentary Note.

Statement of Changes in Equity

for the period ended 30 June 2018

	Notes	2018 $'000	2017 $'000	Original Budget 2018 $'000	Variance[12] Actual vs 2018 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	-	
Transactions with owners						
Contributions by owners						
Equity injection		**1,600**	-	1,600	-	
Total transactions with owners		**1,600**	-	1,600	-	
Closing balance as at 30 June		**88,207**	86,607	88,207	-	
RETAINED EARNINGS						
Opening balance						
Balance carried forward from previous period		**21,801**	23,275	19,486	2,315	11
Adjusted opening balance		**21,801**	23,275	19,486	2,315	
Comprehensive income						
Surplus/(Deficit) for the period		**(2,093)**	(1,474)	(4,099)	2,006	11
Total comprehensive income		**(2,093)**	(1,474)	(4,099)	2,006	
Closing balance as at 30 June		**19,708**	21,801	15,387	4,321	
ASSET REVALUATION RESERVE						
Opening balance						
Balance carried forward from previous period		**68,144**	68,144	68,144	-	
Adjusted opening balance		**68,144**	68,144	68,144	-	
Comprehensive income						
Other comprehensive income		**9,713**	-	-	9,713	5
Total comprehensive income		**9,713**	-	-	9,713	
Closing balance as at 30 June		**77,857**	68,144	68,144	9,713	
TOTAL EQUITY						
Opening balance						
Balance carried forward from previous period		**176,552**	178,026	174,237	2,315	11
Adjusted opening balance		**176,552**	178,026	174,237	2,315	
Comprehensive income						
Surplus/(Deficit) for the period		**(2,093)**	(1,474)	(4,099)	2,006	11
Total comprehensive income		**(2,093)**	(1,474)	(4,099)	2,006	
Asset Revaluation Reserve						
Other comprehensive income		**9,713**	-	-	9,713	
Total asset revaluation reserve		**9,713**	-	-	9,713	5
Transactions with owners					-	
Contributions by owners					-	
Equity injection		**1,600**	-	1,600	-	
Total transactions with owners		**1,600**	-	1,600	-	
Closing balance as at 30 June		**185,772**	176,552	171,738	14,034	

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

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

[5, 11] Budget variances commentary is contained in Budget Variance Commentary Note.

Accounting Policy

Equity Injections

Amounts appropriated which as designated as 'equity injections' for a year (less any formal reductions) are recognised directly in contributed equity in that year.

Cash Flow Statement

for the period ended 30 June 2018

	Notes	2018 $'000	2017 $'000	Original Budget 2018 $'000	Variance[12] Actual vs 2018 Original Budget $'000	
OPERATING ACTIVITIES						
Cash received						
Receipts from Government		**44,847**	41,552	41,916	2,931	13
Rendering of services		**22,001**	16,623	19,838	2,163	14
Interest		**1,198**	1,272	1,114	84	
Net GST received		**1,411**	1,586	-	1,411	
Other		**565**	885	140	425	
Total cash received		**70,022**	61,918	63,008	7,014	
Cash used						
Employees		**28,116**	26,821	27,762	(354)	
Suppliers		**32,016**	26,315	27,111	(4,905)	15
Total cash used		**60,132**	53,136	54,873	(5,259)	
Net cash from operating activities		**9,890**	8,782	8,135	1,755	
INVESTING ACTIVITIES						
Cash received						
Proceeds from sales of property, plant and equipment		**157**	232	236	(79)	
Transfer of funds from investments		**1,700**	300	726	974	16
Total cash received		**1,857**	532	962	895	
Cash used						
Purchase of property, plant and equipment		**10,620**	8,888	10,697	77	
Total cash used		**10,620**	8,888	10,697	77	
Net cash used by investing activities		**(8,763)**	(8,356)	(9,735)	972	
FINANCING ACTIVITIES						
Cash received						
Contributed equity		**1,600**	-	1,600	-	
Net cash from/used by financing activities		**1,600**	-	1,600	-	
Net increase in cash held		**2,727**	426	-	2,727	
Cash and cash equivalents at the beginning of the reporting period		**8,764**	8,338	250	8,514	7
Cash and cash equivalents at the end of the reporting period		**11,491**	8,764	250	11,241	

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

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

[7,13,14,15,16] Budget Variances Commentary is contained in Budget Variance Commentary Note.

Budget Variances Commentary

The following tables provide a comparison between the 2017-18 Portfolio Budget Statement (PBS) budget and the final financial outcome in the 2017-18 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 $1.633 million is due to supplier expenses increasing with funding revenue for Reef Restoration and Adaptation Project (RRAP) increasing external funding and costs for research projects. In addition, the timing of several projects with related expenses moved from 2016-17 to 2017-18 and beyond. RRAP was included in Portfolio Additional Estimate Statements.
[3]Rendering of services	Variance of $1.163 million in revenue from rendering of services is the result of some projects being deferred from 2016-17 to 2017-18 and beyond.
[4] Revenue from Government	Variance of $2.931 million is due to appropriation revenue associated with the Reef Restoration and Adaption Project (RRAP) announced in the Portfolio Additional Estimate Statements.
[5] Changes in asset revaluation surplus	Variance of $9.713 million is due to revaluation conducted in March 2018 by Independent Valuer in accordance with AASB116 every 3 years.
Statement of Financial Position	
[7] Cash and cash equivalents & Other investments	Variance 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.
[8] Trade and other receivables	Variance of $1.536 million is from contracts execution delays resulting in three large receivables being generated at year end for the Great Barrier Reef Marine Park Authority ($0.760 million), Western Australia Marine Science Institution ($0.380 million) and University of Tasmania ($0.270 million).
[9] Non-Financial Assets - Computer Software	Variance of $2.306 million is due to upgrade of AIMS Financial Management Information System to Cloud and TechnologyOne new CiAnywhere version. AIMS also increased licences/modules to replace in-house built old systems.
[10] Supplier payables	Variance of $0.993 million is due to payment of all suppliers at the end of the financial year with the balance being expense accruals.
Statement of Changes in Equity	
[11] Comprehensive Income Surplus/(Deficit)	Variance of $2.006 million is due to underspends in Reef Restoration and Adaptation Project (RRAP). The Portfolio Budget Statements are tabled in Parliament prior to the completion of the 2016-17 financial year therefore opening balance for 2017-18 has been updated to reflect closing balance for 2016-17 financial statements.
Cashflow Statement	
[13] Receipts from Government	Variance of $2.931 million is due to receipt of funding for Reef Restoration and Adaptation Project (RRAP) in the 2017-18 Portfolio Additional Estimates Statements.
[14]Rendering of services	Variance of $2.163 million is due to increase in cash received during the year as a reflection of increased external revenue.
[15]Suppliers	Variance of $4.905 million is due to higher payments being made during the year with funding for Reef Restoration and Adaptation Project contractor and other external contractors and the payment of all suppliers at the end of the financial year .
[16]Transfer of funds from investment	Variance of $0.974 million is the result of transferring funds between short-term and long-term investments.

Australian Institute of Marine Science
Notes to and forming part of the Financial Statements

Overview

Objective of Australian Institute of Marine Science

Australian Institute of Marine Science (AIMS) is a corporate Commonwealth entity established by the *AIMS Act 1972*. It is a not-for-profit entity.

The mission of AIMS is to provide research and knowledge of Australia's tropical marine estate required to support growth in its sustainable use, effective environmental management and protection of its unique ecosystems.

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 2017; 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 3.1: Employee Provisions*

Contingent assets and contingent liabilities – *Refer Note 4.1: 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

All new/revised standards and/or interpretations that were issued prior to the sign-off date and are applicable to the current reporting period, did not have a material effect to the AIMS' financial statements.

Taxation

AIMS is exempt from all forms of taxation except Fringe Benefits Tax (FBT) and the Goods and Services Tax (GST). Revenues, expenses, assets and liabilities are recognised net of GST, except:

- where the amount of GST incurred is not recoverable from the Australian Taxation Office; and
- for receivables and creditors.

Events after the reporting period

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

Financial Performance

This section analyses the financial performance of Australian Institute of Marine Science for the financial year ending 2018.

1.1 Expenses

	2018 $'000	2017 $'000
1.1A: Employee Benefits		
Wages and salaries	**21,862**	20,298
Superannuation:		
Defined contribution plans	**1,920**	1,955
Defined benefit plans	**1,706**	1,701
Leave and other entitlements	**3,184**	3,325
Redundancies	**-**	125
Total employee benefits	**28,672**	27,404

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	**52**	53
Consultants	**22**	158
Contractors	**4,428**	1,653
Consumables	**1,464**	1,552
Electricity	**1,584**	1,524
Fuel, oil and gas	**649**	578
Hire of equipment	**1,052**	923
Repairs and maintenance	**3,372**	2,649
Support for post-doctorate positions	**4,143**	2,493
Travel and accommodation	**1,797**	1,529
Vessel management and staffing	**3,693**	3,550
Other	**6,312**	5,249
Total goods and services supplied or rendered	**28,568**	21,911
Goods supplied	**7,299**	5,158
Services rendered	**21,269**	16,753
Total goods and services supplied or rendered	**28,568**	21,911
Other suppliers		
Operating lease rentals	**175**	153
Workers compensation expenses	**45**	39
Total other suppliers	**220**	192
Total suppliers	**28,788**	22,103

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	**84**	81
Between 1 to 5 years	**342**	337
More than 5 years	**1,194**	1,195
Total operating lease commitments	**1,620**	1,613

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 completion 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 when the entity gains control of the funding unless the funding is in the nature of an equity injection or loan.

	2018	2017
	$'000	$'000
1.2: Other Revenue		
Insurance claims	**239**	865
Other	**326**	20
Total other revenue	**565**	885

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

	2018 $'000	2017 $'000
2.1A: Cash and Cash Equivalents		
Cash on hand	**6**	6
Cash on deposit	**11,485**	8,758
Total cash and cash equivalents	**11,491**	8,764

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	**6,908**	5,060
Total services receivables	**6,908**	5,060
Other receivables		
Interest	**157**	328
GST receivable from Australian Taxation Office	**212**	146
Total other receivables	**369**	474
Total trade and other receivables (gross)	**7,277**	5,534

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	**26,100**	27,800
Total other investments	**26,100**	27,800

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 2017									
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 1 July 2017	90,005	32,994	1,525	2,305	1,296	28	18,332	42	146,527
Additions									
Purchase	3,227	2,987	506	439	700	-	710	-	8,569
Internally developed	-	-	-	2,051	-	-	-	-	2,051
Revaluations and impairments recognised in other comprehensive income	6,119	85	132	-	434	(16)	2,984	(25)	9,713
Depreciation and amortisation	(4,368)	(4,531)	(660)	(684)	(547)	(8)	(1,495)	(14)	(12,307)
Disposals	-	(79)	(1)	-	(167)	(2)	(25)	-	(274)
Total as at 30 June 2018	94,983	31,456	1,502	4,111	1,716	2	20,506	3	154,279
Total as at 30 June 2018 represented by									
Gross book value	96,052	32,586	1,666	7,025	1,883	2	20,921	4	160,139
Accumulated depreciation, amortisation and impairment	(1,069)	(1,130)	(164)	(2,914)	(167)	-	(415)	(1)	(5,860)
Total as at 30 June 2018	94,983	31,456	1,502	4,111	1,716	2	20,506	3	154,279
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 $680,325 purchased software and $3,430,989 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 March 2018, 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 2018 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.

2.2 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 2018. 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 2018.

2.2 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.

	2018	2017
	$'000	$'000
2.2B: Other Non-Financial Assets		
Prepayments	**3,232**	2,719
Total other non-financial assets	**3,232**	2,719

2.3 Payables

	2018	2017
	$'000	$'000
2.3A: Suppliers		
Trade creditors and accruals	**2,648**	1,813
Total suppliers	**2,648**	1,813
2.3B: Other Payables		
Unearned revenue	**3,317**	2,899
Salaries and wages including oncosts	**400**	353
Total other payables	**3,717**	3,252

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.

3.1 Employee Provisions

	2018 $'000	2017 $'000
Leave	**9,111**	8,636
Superannuation	**1,276**	1,239
Other	**15**	15
Total employee provisions	**10,402**	9,890

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 2018. 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.

3.2 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 Council members, CEO and Senior Management. Key management personnel remuneration is reported in the table below.

	2018	2017
	$'000	$'000
Short-term employment benefits	**2,429**	2,246
Post-employment benefits	**386**	351
Other long-term employment benefits	**280**	249
Total key management personnel remuneration expenses	**3,095**	2,846

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 (2017: 20 individuals), however it should be noted that there was a period of two CEOs being paid during the transition and while ex-CEO was on leave.

3.3 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 personnel 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:

	2018	2017
	$'000	$'000
Great Barrier Reef Foundation	**69**	-
Indian Ocean Marine Research Centre	**403**	-
James Cook University	**649**	448
University of Tasmania	**-**	231
Total	**1,121**	679

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

	2018	2017
	$'000	$'000
Great Barrier Reef Foundation	**432**	681
Indian Ocean Marine Research Centre	**1,865**	-
Great Barrier Reef Marine Park Authority	**2,138**	1,153
National Environmental Science Program - Tropical Water Quality	**1,204**	-
James Cook University	**102**	-
Reef and Rainforest Research Centre	**-**	967
University of Tasmania	**-**	2,806
Western Australia Marine Science Institution	**-**	1,153
Total	**5,741**	6,760

3.3 Related Party Disclosures (continued)

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

	2018 **$'000**	2017 $'000
Details of balances outstanding at year end were:		
Great Barrier Reef Marine Park Authority	**760**	1
Great Barrier Reef Foundation	**-**	3
University of Tasmania	**285**	547
Total	**1,045**	551

There were no other transactions with Directors or Director-related entities during the year (2017-Nil).
There were no loans made to any Director or Director-related entities during the year (2017-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:

	2018 **$'000**	2017 $'000
Department of Finance	**475**	505
Department of Industry - National Measurement Institute	**214**	-
Commonwealth Scientific and Industrial Research Organisation (CSIRO)	**1,312**	956
Total	**2,001**	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:

	2018 **$'000**	2017 $'000
Great Barrier Reef Marine Park Authority	**2,138**	1,152
Department of the Environment and Energy	**252**	-
Department of the Industry, Innovation and Science	**267**	-
Commonwealth Scientific and Industrial Research Organisation (CSIRO)	**296**	-
Total	**2,953**	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.

4.1 Contingent Assets and Liabilities

	Guarantees		Total	
	2018	2017	**2018**	2017
	$'000	$'000	**$'000**	$'000
Contingent assets				
Balance from previous period	**87**	325	**87**	325
New contingent assets recognised	**100**	158	**100**	158
Rights expired	**(4)**	(396)	**(4)**	(396)
Total contingent assets	**183**	87	**183**	87

Quantifiable Contingencies

AIMS holds performance guarantees of $183,000 (2017: $87,000). Performance guarantees include Bank guarantees in relation to the refurbishment of the AIMS's buildings.

Unquantifiable Contingencies

As at 30 June 2018, AIMS has a 21 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.

4.2 Financial Instruments

	2018 $'000	2017 $'000
4.2A: Categories of Financial Instruments		
Financial Assets		
Held-to-maturity investments		
Investments	**26,100**	27,800
Total held-to-maturity investments	**26,100**	27,800
Loans and receivables		
Cash at bank	**11,491**	8,764
Services receivables	**6,908**	5,060
Other receivables	**157**	328
Total loans and receivables	**18,556**	14,152
Total financial assets	**44,656**	41,952
Financial Liabilities		
Financial liabilities measured at amortised cost		
Trade creditors	**2,648**	1,813
Unearned revenue	**3,317**	2,899
Total financial liabilities	**5,965**	4,712

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 assets 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).

4.2 Financial Instruments (cont'd)

	2017 $'000	2016 $'000
5.2B: Net Gains or Losses on Financial Assets		
Held-to-maturity investments		
Interest revenue	**1,027**	1,109
Net gains on financial assets	**1,027**	1,109

4.3 Fair Value Measurements

The following tables provide an analysis of assets and liabilities that are measured at fair value. The valuation techniques used are as follows:

1) Cost approach: based on the amount required to replace the service potential of an asset; and
2) Market approach: based on market transactions involving identical or similar assets.

AIMS procured valuation services from Pickles Valuation Services (PVS) and relied on valuation model provided by PVS. PVS re-tests the valuation model every 12 months and has provided written assurance to AIMS that the model developed is compliant with AASB13. There was no change to the valuation technique for 2017-18.

4.3A: Fair Value Measurement

	Fair value measurement at the end of reporting period	
	2018 $'000	2017 $'000
	Total	Total
Non-financial assets		
Buildings	**94,983**	90,005
Plant and equipment	**31,456**	32,994
Ships, launches and vessels	**20,506**	18,332
Computer equipment	**1,502**	1,525
Vehicles	**1,716**	1,296
Office equipment	**2**	28
Library books	**3**	42
Total non-financial assets	**150,168**	144,222
Total fair value measurements of assets in the statement of financial position	**150,168**	144,222

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 2018

Note 4: Supplier Expenses

SUPPLEMENTARY FINANCIAL INFORMATION (UNAUDITED)

NOTE 1:

Revenue comparison	2014 $'000	2015 $'000	2016 $'000	2017 $'000	**2018 $'000**
Appropriation revenue					
Operating	25,259	30,775	32,462	33,531	**36,826**
Asset replacement	8,021	8,021	8,021	8,021	**8,021**
Total appropriation revenue	33,280	38,796	40,483	41,552	**44,847**
Non-appropriation revenue					
Sale of goods and rendering of services[1]	16,909	17,396	16,324	16,318	**21,426**
Interest	1,612	1,367	1,283	1,109	**1,027**
Revenues from joint ventures	103	-	-	-	**-**
Other revenue	777	4,739	482	964	**581**
Total non-appropriation revenue	19,401	23,502	18,089	18,391	**23,034**
Total Revenue	**52,681**	**62,298**	**58,572**	**59,943**	**67,881**
Non-appropriation ratio[2]	**37%**	**38%**	**31%**	**31%**	**34%**

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

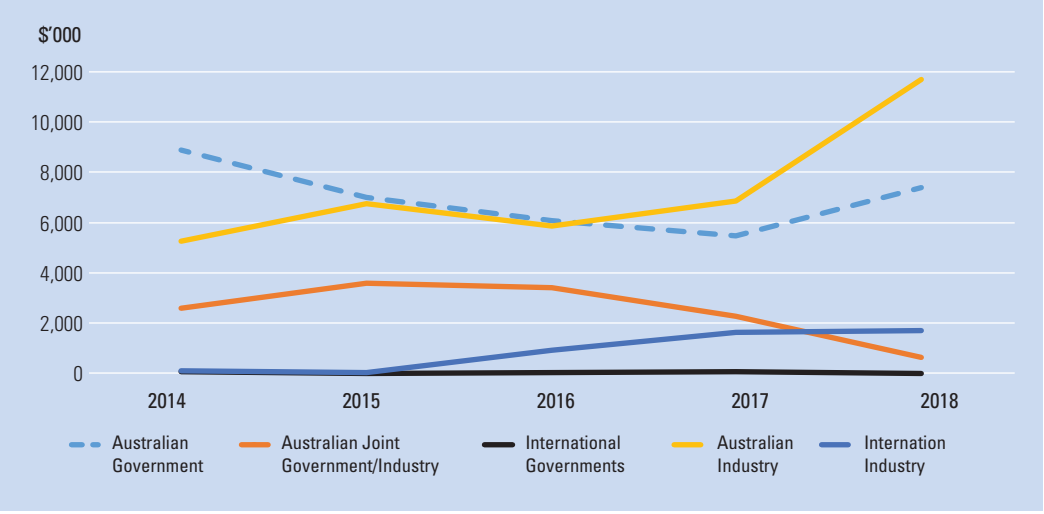
[2]Non-appropriation ratio is percentage non-appropriation revenue of total revenue.

NOTE 2:

Source of sale of goods and rendering of services by sector

	2014 $'000	2015 $'000	2016 $'000	2017 $'000	**2018 $'000**
Australian Government	8,876	7,012	6,084	5,478	**7,401**
Australian joint Government/industry	2,592	3,579	3,401	2,277	**634**
International governments	74	-	36	71	**-**
Australian industry	5,259	6,769	5,867	6,868	**11,689**
International industry	108	36	936	1,624	**1,702**
Sale of goods	-	-	-	-	**-**
	16,909	**17,396**	**16,324**	**16,318**	**21,426**

Source of Sale of Goods and Services by Industry



SUPPLEMENTARY FINANCIAL INFORMATION (UNAUDITED)

NOTE 3: Cost of output by research programs 2017-18

	Variable	Salaries	Depreciation	Overheads	**Total**
	$'000	$'000	$'000	$'000	**$'000**
Data and Technology Solutions	773	2,220	1,079	4,028	**8,100**
A Healthy and Resilient GBR	6,109	5,762	234	10,457	**22,562**
Sustainable Coastal Ecosystem & Industries in Tropical Australia	4,130	5,535	267	10,044	**19,976**
Sustainable Use of NW Marine Ecosystems	8,580	3,774	134	6,848	**19,336**
Total	**19,592**	**17,291**	**1,714**	**31,377**	**69,974**
Percentage of total expenses	28%	25%	2%	45%	100%

SUPPLEMENTARY FINANCIAL INFORMATION (UNAUDITED)

Note 4: Supplier Expenses

	2018	2017
Consist of:	$'000	$'000
Appointment expenses	107	80
Auditing	52	53
Catering	158	60
Chemical and laboratory supplies	261	170
Cleaning and ground maintenance	556	525
Communications, telephone and postage	662	621
Consultancies	22	158
Contracting and servicing	4,428	1,653
Consumables	1,464	1,552
Electricity	1,584	1,524
Equipment and software purchases	174	158
Field costs	508	438
Freight	366	376
Fuel, oil and gas	649	578
Hire of equipment	1,052	923
Insurances	440	511
Lab Services	-	4
Legal	29	1
Licences and fees	1,025	654
Loss on revaluation	-	-
Operating lease rentals	175	153
Patents and trademarks	-	-
Publications, journals and subscriptions	608	446
Rent	256	95
Repairs and maintenance	3,372	2,649
Security	309	427
Stationery	33	27
Support for Post-Doctorate positions	4,143	2,493
Tenders and outboards	17	23
Training, seminars and conferences	487	342
Travel and accommodation	1,795	1,529
Vessels management and staffing	3,693	3,591
Victuals	155	134
Water	163	113
Workers compensation	45	39
Total supplier expenses	28,788	22,103

AIMS monitoring team testing drone transects at Davies Reef. Image: J Gioffre

Appendices

A: Science publications	**137**
B: External committees and non-government organisations and position	**160**
C: Legislative foundation and ministerial powers	**164**

A: Science publications

In 2017–18 AIMS scientists published the following:

212 Journal articles
48 Client & technical reports
4 Books & book chapters
19 PhD theses
Student 58 (28%)
PDF 21 (10%)

Journal articles

1. Abdul Wahab MA, Fromont J, Gomez O, Fisher R, Jones R (2017) Comparisons of benthic filter feeder communities before and after a large-scale capital dredging program. Marine Pollution Bulletin 122: 176–193

2. Abdul Wahab MA, de Nys R, Holzman R, Schneider CL, Whalan S (2017) Patterns of reproduction in two co-occurring Great Barrier Reef sponges. Marine and Freshwater Research 68(7): 1233–1244

3. Adams MP, Collier CJ, Uthicke S, Ow YX, Langlois L, O'Brien KR (2017) Model fit versus biological relevance: Evaluating photosynthesis-temperature models for three tropical seagrass species. Scientific Reports 7:39930

4. Addison PFE, Flander LB, Cook CN (2017) Towards quantitative condition assessment of biodiversity outcomes: insights from Australian marine protected areas. Journal of Environmental Management 198: 183–191

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15. Bennett HM, Altenrath C, Woods L, Davy SK, Webster NS, Bell JJ (2017) Interactive effects of temperature and pCO2 on sponges: from the cradle to the grave. Global Change Biology 23(5): 2031–2046

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17. Bessell-Browne P, Negri AP, Fisher R, Clode PL, Duckworth A, Jones R (2017) Impacts of turbidity on corals: The relative importance of light limitation and suspended sediments. Marine Pollution Bulletin 117(1–2): 161–170

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8. Hempson, Tessa (2017) Coral Reef Mesopredator Trophodynamics in Response to Reef Condition. PhD Thesis, James Cook University

9. Levin, Rachel (2017) Genetic Engineering of Symbiodinium as a Strategy to Reduce Coral Bleaching due to Anthropogenic Climate Change. PhD Thesis, University of New South Wales

10. Malara, Danilo (2017) Photodynamic Antimicrobial Chemotherapy for Pathogen Vibrio Control in Prawn Hatcheries. PhD Thesis, James Cook University

11. Marcus, Lara (2017) Environmental and biological factors driving whale shark abundance at Ningaloo Reef. PhD Thesis, University of Tasmania

12. Morse, Peter (2017) The Behavioural and Molecular Ecologies of the Southern Blue-ringed Octopus *Hapalochlaena maculosa*. PhD Thesis, James Cook University

13. Nicolet, Katia (2017) Investigating Environmental Drivers to Coral Disease. PhD Thesis, James Cook University

14. Ponce-Garcia, Dalia (2017) Transcriptomic, Proteomic and Biological Analyses of Venom Proteins from Two Chrysaora Jellyfish. PhD Thesis, The University of Melbourne

15. Ricardo, Gerard (2017) The Impacts of Dredging on the Early Life History Stages of Coral. PhD Thesis, University of Western Australia

16. Stark, Clair (2017) Spatial and Temporal Water Quality Changes During a Large Scale Dredging Operation. PhD Thesis, James Cook University

17. Strehlow, Brian (2017) The Effects of Sediments on Marine Sponges. PhD Thesis, University of Western Australia

18. Warnakulasooriya, Kanchana (2017) Seasonal Variations in Sources and Cycling of Nitrogen and Carbon in a Tropical Mangrove-lined Creek Impacted by Treated Sewage Effluent. PhD Thesis, Charles Darwin University

19. Winn, Karina (2017) Chemotaxis in Vibrio corallilyticus: Deciphering the Behavioral Dynamics of a Coral Pathogen. PhD Thesis, Flinders University

B: External committees and non-government organisations and positions

International forums

Australia New Zealand Marine Biotechnology Society Management Committee

Convention on Migratory Species, Sharks MOU Conservation Working Group – Member

Global Environment Fund, Coral Disease Working Group

International Congress on Fish Telemetry Committee – Member

International Union for Conservation of Nature (IUCN) Shark Specialist Group – Vice Chair for Strategy

- IUCN Shark Specialist Group
- IUCN Member Synthetic Biology and Biodiversity Conservation Task Force Technical Subgroup on Scientific and Policy Assessment

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

International Society for Microbial Ecology (ISME) International Board Member and Director of International Ambassadors Program

Ocean Acidification Expert Review Committee to the UN Convention on Biological Diversity

Ocean Tracking Network (Canada) Scientific Advisory Committee

Red Sea Research Centre Advisory Board Committee Member

Scientific Committee on Oceanic Research (SCOR) – Australian delegate

- SCOR Working Group 149 Changing Ocean Biological Systems: How will biota respond to a changing ocean?

UN Oceans & 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 (AMOS) – 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 Hydrographic Office, RAN – 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

Australian Ocean Data Centre Joint Facility

Australian Research Council (ARC) Centre of Excellence for Mathematical and Statistical Frontiers: Big Data, Big Models, New Insights (ACEMS) – Governance Advisory Board

ARC Centre of Excellence for Coral Reef Studies – Advisory Board

ARC Centre of Excellence for Coral Reef Studies – Scientific Management Committee

Bureau of Meteorology Northern Territory Marine Reference Group

Centre for Southern Hemisphere Oceans Research – Member

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

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

Darwin Harbour Advisory Committee

Darwin Harbour Integrated Monitoring & Research Program Coordination Committee

Darwin Marine Supply Base – Taskforce Advisory Group

Dry Tropics Partnership for Healthy Waters

eReefs Advisory Board Member

eReefs Operations Committee

eReefs User Reference Group

Fisheries Research and Development Corporation – Indigenous Reference Group

Fitzroy Partnership for River Health Science Panel

Forum for Operational Oceanography – Surface Currents Working Group

Forum for Operational Oceanography – Surface Waves Working Group

Gladstone Healthy Harbour Partnership – Science Panel

Great Barrier Reef Foundation – Biophysical Technical Advisory Group

Great Barrier Reef Foundation – International Scientific Advisory Committee – Member

Great Barrier Reef Marine Park Authority & Queensland Government Reef Integrated Monitoring and Reporting Program (RIMReP)

- GBRMPA Crown-of-Thorns Starfish (CoTS) Advisory Committee
- GBRMPA Reef Integrated Monitoring and Reporting Network – Design Working Group

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

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

Institute of Electrical and Electronics Engineers – Northern Australia Executive Committee

Indian Ocean Marine Research Centre (IOMRC) – Executive Committee (Chairman)

- IOMRC – Management Committee
- IOMRC – Research Committee

Integrated Marine Observing System (IMOS) Advisory Committee for the Australian Animal Tracking Facility

- IMOS Animal Tracking Facility – Task Team (Chair and Leader)
- IMOS Animal Tracking Facility and Biologging Committee
- IMOS Australian National Moorings Network Steering Committee (Chair and Leader)
- IMOS Board Member
- IMOS Facility for Automated Intelligent Monitoring of Marine Systems (FAIMMS)
- IMOS Sub-facility for Ships of Opportunity – Sensors on Tropical Research Vessels (Leader)
- IMOS National Reference Station Scientific Steering Committee
- IMOS Satellite Remote Sensing Facility
- IMOS Steering Committee

Kakadu Research Advisory Committee

Marine Monitoring Program Project Committee

Marine National Facility Scientific Advisory Committee

National BRUVS working group

National Environmental Science Program (NESP) Marine Biodiversity Hub – Partners Committee Member

NESP Marine Biodiversity Hub – Theme Leader

NESP Tropical Water Quality Hub – Steering Committee

NESP Tropical Water Quality Hub – Science Advisory Committee

NESP Tropical Water Quality Hub – CoTS Working Group

National Marine Science Committee (NMSC) – Executive Member

NMSC – Marine Biotechnology subcommittee member

National Science, Technology and Research Committee – Member

Northern Territory Marine and Coastal Science End User Knowledge Needs Analysis – Steering Committee Member

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

Q-IMOS – Node Leader

Q-IMOS – Technical Reference Group

Queensland Fisheries Expert Panel

Queensland Government Pesticide Working Group

Reef 2050 Indigenous Implementation Plan – Steering Committee

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

RIMReP – Expert Working Group on Coral Reefs – Lead

Reef 2050 Long-Term Sustainability Plan – Independent Expert Panel

Reef 2050 Plan – Advisory Group Member

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

Reef Restoration and Adaptation Program – Executive Committee

Reef Water Quality Protection Plan Independent Science Panel

Western Australian IMOS Scientific Reference Group

Western Australian Marine Science Institution (WAMSI) Board

WAMSI – Governors

WAMSI – Node Leader Science

WAMSI – Operations Group

Wet Tropics Healthy Waterways Partnership Report Card – Technical Working Group

C: 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

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

(aa) marine science and marine technology

(ab) the application and use of marine science and marine technology

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

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

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

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

(f) to collect and disseminate information relating to:

(fa) marine science and marine technology

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

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

(ga) marine science and marine technology

(gb) the application and use of marine science and marine technology

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

(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 s. 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:

(ka) marine science and marine technology

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

Ministerial powers of direction

Under s. 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:

Granting leave of absence to Council members (ss. 13, 16(b))

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

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

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

(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.

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* (PGPA Act) 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 108) 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 2017–18*
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 s. 46 of the PGPA Act.	S. 17BB CCEAR Rule	Letter of transmittal: page iii
Alphabetical index.	Mandatory	
The AR must comply with the guidelines for presenting documents to the Parliament.	S. 17BC CCEAR Rule	*AIMS Annual Report 2017–18*
The AR must be prepared having regard to the interests of the Parliament and any other persons who may be interested in it.	Ss. 17BD CCEAR Rule	*AIMS Annual Report 2017–18*

ANNUAL REPORT (AR) CONTENT REQUIREMENTS	SOURCE(S)	WHERE IN AIMS' ANNUAL REPORT
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 85 Entity purpose: page 34 Intended outcomes: page 34 Appendix C Legislative foundation and ministerial powers: page 164 Objects, functions and purpose are also described on page 3 of AIMS Corporate Plan 2017–18
The AR must specify the name and title of the responsible minister(s).	S. 17BE(c) CCEAR Rule	Responsible minister: page 85
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 s. 22 of the PGPA Act • 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 86 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 s. 16F of the PGPA Rule.	S. 17BE(g) CCEAR Rule	Performance statement: starts page 33
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 94 Duty to inform and Ministerial notifications: page 95
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 87

ANNUAL REPORT (AR) CONTENT REQUIREMENTS	SOURCE(S)	WHERE IN AIMS' ANNUAL REPORT
The AR must include an outline of the: • organisational structure of the entity (including subsidiaries) • location of major activities and facilities of the entity.	S. 17BE(j) CCEAR Rule	Council members: page 87
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 • ethics and risk management policies.	S. 17BE(m) CCEAR Rule	Mandatory
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 94
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 • amendments to enabling legislation or any other legislation directly relevant to its operation(s).	S 17BE(p) CCEAR Rule	No government policy orders were issued under s. 22 of the PGPA Act
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 • the particulars of any report on the entity given during the period by the Auditor-General (other than one made under s. 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 96

ANNUAL REPORT (AR) CONTENT REQUIREMENTS	SOURCE(S)	WHERE IN AIMS' ANNUAL REPORT
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 95
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 167
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 33
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 • 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 33
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 33 Overall performance summary: page 37 AIMS' performance against 2016–17 research goals: page 42

ANNUAL REPORT (AR) CONTENT REQUIREMENTS	SOURCE(S)	WHERE IN AIMS' ANNUAL REPORT
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 33
FINANCIAL STATEMENT (FS)		
The AA must prepare annual financial statements and given to the Auditor-General.	S. 42(1) PGPA Act	Financial statements: page 109
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 report must be included in the AR.	S. 43(4) PGPA Act	Financial statements: page 108 Independent auditor's report: page 109
The FS must comply with the Public Governance, Performance and Accountability (Financial Reporting) Rule 2015.	S. 42(2)(a) PGPA Act	Financial statements: page 108
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 49

ANNUAL REPORT (AR) CONTENT REQUIREMENTS	SOURCE(S)	WHERE IN AIMS' ANNUAL REPORT
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 • identify the mechanisms (if any) for reviewing and increasing the effectiveness of those measures.	S. 516A(6) EPBC Act;	Environmental performance: page 106
National Disability Strategy 2010–2020		
The Department of the 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 102
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 97
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] (EEO) program'. This need not be included in the AR but it may be.	S. 9 EEO Act	Equal employment opportunity and workplace diversity: page 100

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RV Solander in Western Australia. Image: N Thake

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