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**Developing Australia's Science and Research Priorities and
National Science Statement – A National Conversation Starter**

**Submission by the
Australian Marine Sciences Association Inc. ARBN 604 875 774**

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The Australian Marine Sciences Association (AMSA) is pleased to provide a submission on the National Conversation Starter for Developing Australia's Science and Research Priorities and National Science Statement. AMSA welcomed the National Science Statement and National Innovation Plan released in 2017 and the vision laid out in these documents. We agree that, as recognised in the Conversation Starter, much has changed in recent years with the global pandemic, accelerating climate change impacts and emerging technologies, and that the current priorities and statement do not adequately or appropriately acknowledge or recognise First Nations science and knowledge systems. We view the priorities already identified in the Terms of Reference for the Conversation Starter as an excellent starting point, and welcome the opportunity to provide additional input to help guide the development of the updated priorities in strategy in light of these needs.

AMSA is Australia's largest professional society of marine scientists with close to one thousand members nationwide. AMSA actively promotes the advancement of marine sciences in Australia and engages in public debate where our members have specialist knowledge. Our members work across research agencies, universities, museums, government departments, and the private sector, and have expertise spanning all disciplines related to marine sciences. AMSA provides science-based position papers and statements on marine issues and throughout its over 60 year history, has been influential in the development of marine science policy in Australia. AMSA is also a member of the National Marine Science Committee and Science & Technology Australia.

AMSA asserts that:

- Marine science research is critically important for the health and wellbeing of all Australians and the ongoing sustainability of Australia's Blue Economy.
 - Marine and climate change research has been neglected, but Australia has the opportunity to become a global leader in marine-related climate action – spanning both mitigation (including negative emissions) and adaptation interventions.
 - There is a need to engage all Australians with marine science, including through building national ocean literacy and stewardship, valuing and inclusion of Indigenous knowledge and leadership, and recognition of Indigenous people as Australia's first marine scientists.
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Narrative feedback on questions from the Conversation Starter

1. What are Australia's greatest:

*a. **challenges** that science could help to address?*

As an island nation, Australia's oceans and traditional marine estates are deeply tied with our national identity and integral to our economy and way of life. As of 2019, 87 % of Australians live within 50 km of the coast. Our marine estate is the 3rd largest marine jurisdiction in the world at 13.86 million square kilometres (almost double the area of our sovereign land territories), spanning over 1/3 of the Southern Hemisphere, and including significant areas of three of the world's four major oceans. As of 2017-18, our Blue Economy had an estimated value of \$81.2 billion, and is growing at 2–3 times the rate of national GDP. In addition to its cultural and economic importance, our marine environment provides supporting, provisioning and regulating ecosystem services that are of global importance and underpin the health and wellbeing of all Australians.

The impacts of climate change and associated extreme events (e.g. marine heatwaves), combined with pressures arising from growing human populations (especially pollution) and our rapidly developing Blue Economy, and the cumulative effects of these pressures are increasingly evident in Australia's marine environment (e.g. see <https://soe.dcceew.gov.au/marine/outlook-and-impacts>). These pressures will only intensify as our Blue Economy continues to expand and activities and industries that have predominantly been restricted to terrestrial and coastal environments (e.g. aquaculture, energy generation) extend offshore, creating new challenges for sustainability and biosecurity. Without decisive action, we are likely to see substantial continued and increasingly widespread degradation of our marine environment, which will impact our social, ecological and economic values.

These are also global challenges. Failure to mitigate climate change and insufficient climate change adaptation are both among the top 10 global risks over the next two years identified in the most recent Global Risks Report produced by the World Economic Forum. They are also the top two risks over the next 10 years, followed by natural disasters and extreme weather events, biodiversity loss and ecosystem collapse.

The Australian Prime Minister, as a member of the 14-nation High-Level Panel for a Sustainable Ocean Economy (HLP SOE), has committed to sustainably manage 100% of the ocean area under national jurisdiction, guided by a sustainable ocean plan, by 2025. 2021 also saw the launch of the UN Decade of Ocean Science for Sustainable Development (oceandecade.org), the UN Decade on Ecosystem Restoration (decadeonrestoration.org), and the publication of Future Earth Australia's Oceans and Coasts Strategy along with the National Marine Science Committee's (NMSC) mid-term report on the National Marine Science Plan.

Addressing these challenges and achieving Australia's commitments to these international initiatives and our own national aspirations will require strong and sustained investment in both fundamental and applied research. Current investment in marine science in Australia is not adequate to achieve these goals nor commensurate with the scale and national value of Australia's marine estate and Blue Economy. Our future prosperity will be dependent upon sustainable management of Australia's environment and safeguarded by research enabling Australia to better anticipate, manage and adapt to our changing climate.

In addition to these overarching challenges, we recommend that the following specific challenges be prioritised in the updated National Priorities and Strategy:

- i) Engaging all Australians with marine science, including through adequate and appropriate valuing and inclusion of Indigenous knowledge and leadership, and recognition of Indigenous people as Australia's first scientists. In the context of the marine environment, this entails strengthening ocean literacy and stewardship.
- ii) Maximising and sustaining the capacity of marine ecosystems and broader social-ecological systems for climate mitigation and adaptation, resilience to natural disasters and extreme weather, and avoiding biodiversity loss and ecosystem collapse.
- iii) Building and maintaining resilient food and energy systems and supply chains that support ongoing national, regional and global food and energy security and sustainable growth of the Blue Economy.
- iv) Building and retaining national marine science capability and skills and enhancing our international scientific leadership by supporting our neighbours in collaborative science and capacity building.

*b. **opportunities** we should seize?*

Australia has the opportunity to become a global leader in marine climate action, sustainability and ocean stewardship.

Seizing this opportunity will require strong and sustained investment in:

- World leading social-ecological environmental and climate research and infrastructure to underpin Australia's sustainable environmental management, mitigation and climate adaptation strategy,

- Research and infrastructure to support integrated environmental assessment, including a national baselines and monitoring system,
- System modelling and adaptation research and infrastructure to support climate change adaptation (this includes both climate/physical modelling and also modelling of how social-ecological systems will respond for evaluation of adaptation strategies).

*c. **strengths** we should maintain or build?*

Australia is already a global research leader in marine science as well as a regional leader in supporting and developing regional scientific capacity. As a minimum, sustained investment is required to maintain this position. However, given the importance, socially and economically, of Australia's marine estate, and the fact that current investment is inadequate to meet near-future needs, marine science is a clear contender for additional investment.

Specifically in:

- Understanding the interactions between human society and the marine environment/ecosystem (including cumulative effects).
- A low carbon/decarbonized maritime economy.
- Appropriate development of marine renewable energy systems including blue-green hydrogen
- Ocean literacy and stewardship - to engage society and highlight the positive steps we can all take towards sustainability.
- Indigenous leadership and inclusion in marine environmental stewardship

Australia also has the opportunity to engage in soft power diplomacy by investing in training and skills development for the next generation of scientists in the region.

2. Does Australia have the capability and capacity needed to address these challenges, opportunities and strengths? If not, how could we build this?

Addressing these challenges will require improved pathways for developing and retaining Australian talent and attracting international talent. This will be enabled by ensuring that careers in both research and STEM education are attractive, sustainable, and supported at a level that adequately reflects the critical national importance of these occupations.

3. Are the principles the right principles to shape the priorities?

AMSA is generally supportive of the principles outlined.

A principle that is missing is that the priorities should be strategic and responsive for the Australian and regional context.