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Public Support for Science and Innovation Study
Productivity Commission
PO Box 80
Belconnen ACT 2616

Dear Sir

The Australian Marine Sciences Association (AMSA) is Australia's largest professional association of marine scientists. Its 800 members come from a broad range of disciplines and work in the private sector, government departments, research and other agencies and universities. AMSA is a member body of the Federation of Australian Scientific Technological Societies (FASTS) and participates in both the National Oceans Advisory Group (NOAG) and the Oceans Policy Scientific Advisory Group (OPSAG), which advise the Commonwealth Minister for Environment on Oceans Policy matters.

Through its communications with Government on marine science issues, AMSA seeks to make positive and constructive contributions to the important debates on public policy. AMSA wishes to make a short and broad-scale submission to the Commission's Inquiry in regard to Public Support for Science and Innovation.

Marine science in both its theoretical and applied dimensions makes a significant contribution to the Australian economy in terms of how we, for example:

- understand and cope with the earth's dynamics,
 - as seen in climate change, and changes in ocean currents and ocean chemistry,
- enhance the sustainability of fisheries, develop mariculture and provide the foundation for marine-sourced biotechnology,
- address the challenges of undersea exploration and mining, in particular for hydrocarbon products,
- understand and manage 'catchment to coast' dynamics,
 - as seen in water quality initiatives, improvement in land use practices, and management of sustainable cities and towns especially those along the seaboard,
- understand, manage and use our estuaries, wetlands and beaches, and the adjacent lands,
 - as seen in the recreational, inspirational and conservational values attributed to these wet areas and the situating of industry and commerce within seaboard communities,
- enable national security and foster international relations (all of our international borders are marine),
 - as seen in defence (especially naval activity), border security, alien species barriers, commercial resource protection, border agreements, international commerce and communications (e.g. undersea cables and pipelines),
- conduct of trade and management of shipping,
 - not only in terms of sustaining the nation's economy but also in terms of the marine-sourced products for trade (e.g. natural gas, fish products, sources for pharmaceutical development, and international tourist drawcards),
- catalogue, understand and offer appropriate protections for our natural marine assets, both geological and biological, and as a corollary, attract visitors to iconic natural sites.

The contribution of marine science is not easy to address in traditional socio-economic terms: people generally do not live or do business on or in the oceans. Also, unlike land-centred science, much marine science is still proceeding through the exploratory stages. Nonetheless, innovation is being realized in terms of national security, resource exploitation and conservation, for example. Marine science is, in a way, similar to atmospheric (and space) science and innovation: each is concerned with the acquisition of knowledge about and understanding of a realm that is largely foreign to us but which is so very important to the nation's future development in the immediate and in the longer term. In the case of the marine realm, this is especially so, Australia being an island nation state and having island territories. Both atmospheric and marine work lead significantly to developments that enhance land-based economies and lifestyles. Interestingly, within both realms are natural systems that operate without concern for nation-state boundaries.

Much of the funding for marine science and innovation comes from public monies. The Commonwealth Government is responsible for the management of Australia's Exclusive Economic Zone, and much of the research it funds helps the Government to meet its own responsibilities – in many instances, the Government is the direct customer. There is no reason why the private sector should fund such science and there can be good public policy reasons why direct private sector funding for some kinds of research might be inappropriate.

Funding provided through government institutions can generally be tracked and quantified but there remains a considerable amount applied by the private sector, such as in the development and management of offshore hydrocarbon fields, where commercial factors will cause the contribution through science and innovation to be not fully revealed. This might also be the case for the strategic scientific work for defence and intelligence purposes. AMSA will therefore not attempt to do more at this stage in this regard other than to:

- recognize that **the economic, social and environmental impacts of public support for marine science and innovation** are considerable;
- note that the majority of that scientific work has to continue to be publicly funded or it will not occur; but
- expect that through the ongoing development of commercial use of Australia's large sea territory, a greater financial contribution by industry will occur.

Your Inquiry is looking at **impediments to the effective functioning of Australia's innovation system**.

There are two particular issues that AMSA has seen the need to highlight in recent times.

(a) Resourcing of infrastructure for the conduct of marine science in 'Australian waters'.

Australia's marine territory, as the Inquiry may be aware, is being extended considerably. A singularly important infrastructure issue concerns the ongoing diminution in the Nation's taxonomic (species identification) workforce and the facilities necessary for competent taxonomic work. Notwithstanding the considerable emphasis in Commonwealth policy on 'Biodiversity Conservation', performance in this area is being constrained through the difficulties scientists and managers are facing in understanding the nature of that biodiversity. How can one conserve biodiversity effectively when its scope is unclear? The implications extend beyond biodiversity conservation: industries (for example, commercial fishing and biotechnology) depend on this work.

There are other marine science infrastructure needs, such as ship-board platforms and ocean observing systems: these infrastructures are expensive to acquire and operate. Australia's participation in overseas-funded collaborative international programs and the increasing use of satellite-based remote-sensing technology put in place by other nations are strategies employed to overcome deficiencies in the national marine science infrastructure.

(b) Integration and coordination of Australia's marine policy.

The Commonwealth's Ocean Policy initiative, which commenced as a 'whole of government' strategy, has been a most welcome development for it brought about a much greater focus on matters marine that had never been achieved before. It was timely as in recent years Australia has been moving to secure its place as a nation with a very large marine territory. The establishment of the National Oceans Office and the advisory bodies NOAG and OPSAG (referred to above) resulted.

However, there has been a draw-back in the government's enthusiasm for Oceans Policy and much of the activity now is couched in terms of environmental protection and biodiversity conservation through the nesting of the National Oceans Office within the Department of Environment and Heritage. This has not been a negative thing, for much work has had to be done in this area (e.g. the development of Regional Marine Plans and of Australia's network of Marine Protected Areas). However, enthusiasm for cross-government ownership of the program has weakened, with consequential impacts on resourcing and overall functioning of the bodies and in turn the effective functioning of Australia's marine science and innovation system. It should be noted that whilst not a driver of Australia's marine science, the Oceans Policy structures are making a significant contribution.

With a considerable amount of marine scientific and management activity being funded and carried out particularly at the Commonwealth level, there has been the need for integration across the several organisations involved, including those outside the Commonwealth. Over the last three decades, we have seen bodies such as the Australian Marine Science Consortium (AMSC) and the Heads of Marine Agencies (HOMA), which served to draw together marine-focussed Commonwealth agencies to provide a coordinated approach to science and management. OPSAG now fills that niche but AMSA is concerned about its perceived vulnerability in the current climate and the consequences for an integrated approach to our oceans.

In regard to evaluation of decision making principles and program design, the transnational nature of much marine science work needs to be taken into account. Australia shares its scientists and innovators with other countries and work done overseas by our scientists may often contribute to our nation's good just as work done in this country contributes to the well-being of other nations.

In summing up, it would appear to AMSA that by far the greatest challenge to be faced by Australia in the future will be dealing with the consequences of global climate change and in the marine context particularly: sea level rise, acidification of the ocean, coastal storm activity, oceanic stability and oceanic productivity. Marine science and its derivative work have much to contribute towards our understanding of the problem and forecasting of the consequences.

It is likely that the Productivity Commission's Inquiry will raise matters concerning the marine sphere that AMSA could not hope to cover within its general submission. AMSA is most willing to assist where it can in enabling the Commission to gather specific input from those specialists in marine science who are within AMSA's membership base.

Yours faithfully

(sgd. Chris Smalley, Secretary, for)

Fred Wells
President, AMSA