



Australian Academy of Science

Ian Potter House, Gordon Street, Canberra ACT 2601

Ms Sarah Redden
Committee Secretary
Senate Standing Committees on Rural and Regional Affairs and Transport
PO Box 6100
Parliament House
Canberra ACT 2600

By email: rrat.sen@aph.gov.au

Dear Ms Redden,

Australian Academy of Science Submission to the Inquiry into the identification of leading practices in ensuring evidence-based regulation of farm practices that impact water quality outcomes in the Great Barrier Reef.

The Australian Academy of Science welcomes the opportunity to provide a submission to the Senate References Committee on Rural and Regional Affairs and Transport *Inquiry into the identification of leading practices in ensuring evidence-based regulation of farm practices that impact water quality outcomes in the Great Barrier Reef*.¹

The Academy suggests that the Committee **recommends** that the overwhelming weight of scientific evidence, as a rule, be used as the evidence base of public policy.

The role of science in public policy

The Australian Academy of Science strongly supports the principle that public policy should be informed by the best available evidence. It is appropriate at all levels of government to ensure that evidence is used to inform policy, and that the evidence base is as strong and as comprehensive as possible.

Scientific evidence is not the only input that policy makers need to assess in reaching decisions about what, if any, interventions are necessary on any given topic. However, science is often a critical input to public policy and the advice of scientists must play an important and obvious role.

The Australian Academy of Science is greatly concerned about a recent tendency to “cherry pick”, dismiss, misrepresent, or obscure scientific evidence or smear individual scientists.

Scientific evidence base

The policy case² for the *Environmental Protection (Great Barrier Reef Protection Measures) and Other Legislation Amendment Bill*, which is the subject of this inquiry, has been based on reliable scientific evidence synthesised in the *2016 Reef Report Card* and expert advice as represented by the

¹ In commenting on the matters subject to this inquiry, the Academy is confining itself to scientific matters and findings regarding the Great Barrier Reef World Heritage Area, an area of 348,000 square kilometres extending across a contiguous latitudinal range of 14° (10°S to 24°S) and stretching from the low water mark along the mainland coast up to 250 kilometres offshore. This wide depth range includes vast shallow inshore areas, mid-shelf and outer reefs, and beyond the continental shelf to oceanic waters over 2,000 metres deep.

² See the *Broadening and enhancing Reef protection regulations: Decision Regulatory Impact Statement* (https://www.qld.gov.au/data/assets/pdf_file/0028/94636/broadening-enhancing-reef-protection-decision-ris.pdf)



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2017 Scientific Consensus Statement: Land use impacts on Great Barrier Reef water quality and ecosystem condition. Similarly, the *Great Barrier Reef Outlook Report 2019*, released by the Great Barrier Reef Marine Park Authority, adds to the evidence base.

These reports collectively represent the work of decades of research from hundreds, if not thousands, of scientists. It is a matter of public record that each of these reports involved extensive synthesis of evidence, consultation with scientific experts, and peer review by oversight committees. These reports, and their predecessors, are widely accepted as the source of scientific knowledge on the Great Barrier Reef.

For example, the *2017 Scientific Consensus Statement: Land use impacts on Great Barrier Reef water quality and ecosystem condition* was prepared by scientists from universities, research agencies like the Commonwealth Scientific and Industrial Organisation (CSIRO) and the Australian Institute for Marine Science (AIMS), scientists in government Departments, and scientists in private sector organisations. There were eleven main authors and thirty-eight contributing authors.

The statement was separately reviewed and commented on by an independent scientific expert panel, which reported that:

*The 2017 Scientific Consensus Statement is currently the best and most authoritative source of information to support evidence-based decisions for better water quality within the Great Barrier Reef World Heritage Area.*³

The Academy of Science supports the evidence base, as represented in the reports, on the basis of an understanding of the scientific process and a respect for the expertise of the scientists who contributed.

Why we can trust in science

In keeping with our mission to provide independent and authoritative scientific advice, and to celebrate and support excellence in Australian science, the Academy wishes to provide additional comment on the nature of science and the use of science to inform public policy. These points are relevant to the inquiry as they touch on the reliability of scientific processes and the importance of ensuring that public policy decisions are informed by the best possible advice.

Australians trust science, and trust scientists. This trust has developed because the scientific process is based on a fidelity to data, a robust peer review process, and a respect for the expertise embedded in scientists and scientific organisations like the CSIRO, AIMS and Australian universities.

Peer review ensures the quality and reliability of science

Peer review is a central component of the scientific process. The best people to assess the scientific merit of research are scientists with comparable skills and knowledge. When a research paper undergoes a peer review prior to publication, this is only a first step.

Following publication, the paper becomes part of the public record and is subject to intense scrutiny by thousands of scientists - *the discipline as a whole*. Any flaws are identified and can be addressed in subsequent studies. Connections can be drawn, counter examples considered, and methodology

³ State of Queensland, *2017 Scientific Consensus Statement*, p. 8



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adjusted. Results are tested from all angles. Observations and conclusions are used to inform new hypotheses, which are then tested and published in the same way.

This continual analysis leads ultimately to robust conclusions. There are few other forms of knowledge that are subject to this intensity of scrutiny.

Cherry picking evidence is antithetical to good policy

A commonly used tactic in opposing or advocating for policy positions is to “cherry-pick” scientific findings rather than consulting and analysing the body of literature systematically. Cherry-picking evidence to support a decision or position is dangerous and leads to poor judgement and outcomes.

Scientific consensus represents best possible advice

When the accumulated evidence converges towards certain strong conclusions in the minds of diverse researchers, we call this a scientific consensus. Such a consensus represents agreement on which pieces of knowledge have endured sufficient testing to be considered reliable. A scientific consensus is not absolute – it may be revised based on new evidence - but it nevertheless represents a firm basis from which advice may be given and decisions made.

Good science leads to better public policy

The hallmarks of good science are: demonstrated expertise, accurate and unbiased reporting, and a commitment to opening one’s work to the scrutiny of peers and the public. For this reason, scientists are more inclined to trust research that appears in peer-reviewed literature and is open to examination and critique. This openness builds trust, and this trust allows scientists to expand their own thinking and their own hypotheses, leading to a deeper understanding of the world.

Through greater understanding better public policy is made.

If you would like to discuss any aspect of this submission, please contact Mr Christopher Anderson, Director of Policy, Australian Academy of Science (chris.anderson@science.org.au).

Yours sincerely

Professor John Shine AC PresAA

President

The Australian Academy of Science