

DEPARTMENT OF AGRICULTURE, WATER AND THE ENVIRONMENT

2021 State of the Environment Report

Chief and Lead Co-Authors

Co-Chief Authors

Dr Terri Janke (Indigenous cultural and intellectual property lawyer)

Professor Emma Johnston (UNSW)

Dr Ian Creswell (consultant, former CSIRO)

SoE 2021 Report - Chief Author Biographies

Dr Terri Janke, Indigenous Co-Chief Author

Dr Terri Janke is a Wuthathi/Meriam woman and an international authority on Indigenous Cultural and Intellectual Property (ICIP), known for innovating pathways between the non-Indigenous business sector and Indigenous people in business. As the owner and Solicitor Director of Terri Janke and Company, she manages her team to deliver excellent results to a diverse client base. Terri advises on legal matters including intellectual property, business law, shareholder agreements and governance of Indigenous organisations. She has written leading ICIP Protocols and models for various sectors including the arts, museums, archives, film and business. Terri is also a valued mentor, accredited mediator and a graduate of the Australian Institute of Company Directors.

Professor Emma L Johnston AO FTSE FRSN, UNSW

Professor Johnston is Dean of Science and Professor of Marine Ecology and Ecotoxicology at UNSW Sydney.

Professor Johnston studies the impacts of human activities in marine ecosystems and how we can build ecological resilience. Her research is conducted in diverse field environments; from Antarctica, to the Great Barrier Reef, and temperate Australian estuaries.

A highly awarded scientist, educator and communicator, Professor Johnston has published more than 160 peer-reviewed articles and supervised 25 successful PhD graduates. She is an elected fellow of the Australian Technological Society (ATSE) and her awards include the Australian Academy of Science's inaugural Nancy Millis Medal and the Royal Society of New South Wales Clark Medal and the Eureka prize for Science Communication. In 2018 she was made an Officer of the Order of Australia (OA) for "distinguished service to higher education, particularly to marine ecology and ecotoxicology, as an academic, researcher and administrator, and to scientific institutes".

Professor Johnston is a national advocate for the Science and Technology sector and is a Director on the Board of the Great Barrier Reef Marine Park Authority and the Antarctic Science Foundation. She consults with industry through the development and implementation of new biomonitoring and

ecological engineering techniques and frequently contributes expert opinion to state, federal & international government agencies. Professor Johnston was the Lead Author for the Coasts theme in the 2016 national State of the Environment report. Professor Johnston is also a highly sought-after science communicator and television presenter for the ongoing BBC/Foxtel series, Coast Australia and ABC Catalyst.

Dr Ian Cresswell, independent consultant (formerly CSIRO)

Dr Cresswell was a Research Director of the Biodiversity, Ecosystem Knowledge and Services Program at CSIRO. Dr Cresswell has extensive experience working in environment and sustainable development both nationally and internationally in several different areas, including reserve planning, fisheries, wildlife regulation, protected areas and biodiversity discovery. Dr Cresswell has undertaken a number of international roles, including working within the United Nations Secretariat to the Convention on Biological Diversity, and has led the Australian delegation to the Convention on International Trade in Endangered Species, as well as negotiations under the Convention for Migratory Species and the Convention on Biological Diversity.

Lead Theme Authors

Antarctic – Dr Dirk Welsford, Dr Barbara Wienecke and Dr Andrew Klekociuk (Australian Antarctic Division)

Air Quality – Dr Melita Keywood and Dr Kathryn Emmerson (CSIRO)

Biodiversity – Dr Helen Murphy (CSIRO) Dr Stephen van Leeuwen (Independent consultant)

Climate – Dr Blair Trewin (BOM) Mr Damian Morgan-Bulled (Independent consultant)

Coasts – Dr Graeme Clark (UNSW) Ms Mibu Fischer (CSIRO) Dr Cass Hunter (CSIRO)

Extreme Events – Dr Dan Metcalfe (CSIRO) Mr Oliver Costello (Independent consultant)

Heritage – Ms Anne McConnell (UTas) Assoc Prof Michael-Shawn Fletcher (University of Melbourne)

Inland Water – Ms Janice Green (BOM) Assoc Prof Bradley Moggridge (UC)

Land – Dr Kristen Williams (CSIRO) Mr Barry Hunter (Independent consultant) **Dr Becky Schmidt (CSIRO)**

Marine – Dr Rowan Trebilco (CSIRO) Ms Mibu Fischer (CSIRO) Dr Cass Hunter (CSIRO)

Urban – Dr Sarah Hill (NSW Government) Ms Tanya Koeneman (NSW Government)

Lead Theme Author Biographies

Antarctic:

Dr Dirk Welsford, Australian Antarctic Division

Dr Welsford is the acting Chief Scientist in the Australian Antarctic Division, and previously the Conservation and Management Program Leader. He has an interest in fisheries, marine ecology, botany, zoology, marine chemistry. Other interests include the use of science and logic in developing resource use and conservation strategies; effective communication of science for use by policy makers; and the role of human relationships in effective decision making. He has represented Australia at meetings for the Scientific Committee for the Conservation of Antarctic Marine Living Resources (SC-CAMLR).

Dr Barbara Wienecke, Australian Antarctic Division

Dr Barbara Wienecke is a Senior Research Scientist at the Australian Antarctic Division. She has studied the foraging ecology of penguins and other seabirds for more than 20 years. Since 1993, she has spent many seasons in Antarctica, the subantarctic and South America, and has published the results of her work in international journals and books. Dr Wienecke is a member of the IUCN's Penguin Specialist Group and a member of the Agreement on the Conservation of Albatrosses and Petrels working groups.

Dr Andrew Klekociuk, Australian Antarctic Division

Dr Andrew Klekociuk is a Principal Research Scientist and leader of the Atmosphere and Ice Sheet Section in the Science Branch of the Australian Antarctic Division. His active research interests include the interactions between ozone and climate, the role of clouds and aerosols in the climate of the Southern Ocean, and interactions between the tropics and Antarctica. He is a committee member of the International Ozone Commission,

Air Quality:

Dr Melita Keywood, CSIRO

Dr Keywood is a Principal Research Scientist at the Centre for Australian Weather and Climate Research - a partnership between the Australian Bureau of Meteorology (BOM) and CSIRO, Oceans and Atmosphere. Dr Keywood leads a pilot program monitoring atmospheric pollution, particularly a category of invisible toxic pollutants called persistent organic pollutants (POPs) which includes DDT, pesticides and dioxins.

Dr Kathryn Emmerson, CSIRO

Dr Emmerson is a Principal Research Scientist at CSIRO, interested in how emissions of gases and particles affect local and regional air quality. She is an expert in developing new parameterisations for atmospheric chemistry models including the CSIRO Chemical Transport Model (C-CTM). She has worked on a diverse range of air quality problems involving smoke, secondary organic aerosol, inorganic chemistry on sea salt aerosol, pollen, mercury, and biogenic gas phase emissions. Kathryn represents Australian research interests on the Southern Hemisphere committee of the International Global Atmospheric Chemistry organisation.

Biodiversity:**Dr Helen Murphy, CSIRO**

Dr Murphy leads the Landscape Management Group in the Biodiversity, Ecosystem Knowledge and Services Program at CSIRO. She has experience in field and modelling-based research for biodiversity and species distributions, and consequences for environmental change for biodiversity.

Dr Stephen van Leeuwen, consultant

Dr van Leeuwen is a Noongar man from Wardandi country between Busselton and Margaret River in south-west Western Australia. Until recently he worked for the Department of Biodiversity, Conservation and Attractions where he was the Assistant Director, Science within the Biodiversity and Conservation Science portfolio. He has substantial knowledge of the biodiversity and heritage values of Western Australia. He also has considerable experience in communicating, liaising and negotiating with a range of stakeholders within government, the corporate sector and Indigenous groups in Western Australia. He currently sits on upwards of 15 committees/advisory groups relating to science, natural resource management, Indigenous participation and environmental matters. Dr van Leeuwen is a respected, astute leader, a knowledgeable executive manager and senior scientist who has a profound respect for Country and Traditional Owners.

Urban Environment:**Dr Sarah Hill, NSW Government**

Dr Hill is the Deputy Secretary at NSW Treasury and the Chief Executive Officer of the Western Parklands City Authority. She is an experienced urban planner and was involved in the Greater Sydney Region Plan (GSRP), the first fully digital urban plan in NSW. Dr Hill is presently preparing a State of the Cities Report for the NSW Government.

Ms Tanya Koeneman, NSW DPIE

Ms Koeneman is a La Perouse Koori community member and Jerrinjah and Wonnarua descendant and has worked primarily in the area of cultural heritage and strategic land use planning during the

last 20 years of her career. She currently manages a program that develops planning tools, strategies and pathways that facilitate the rezoning, subdivision and infrastructure upgrades to Aboriginal communities across NSW and enables them to leverage greater economic, community and cultural use of Aboriginal land. Tanya is a keen advocate for Aboriginal people to have a voice in the development of a more inclusive and just society and serves on a number of heritage advisory councils and committees. During her career, Tanya's work has resulted in the State Heritage Listing of many Aboriginal places of cultural significance across NSW. Importantly her work has included the investigation of many rock art sites and consultation and engagement with the traditional owners of these sites. Tanya is passionate to see the development of a better cultural understanding and management approach of this unique and valuable resource which incorporates the knowledge, cultural authority and stewardship of the traditional owners with their involvement furthering their cultural, social and economic aspirations as land owners and managers.

Climate:

Dr Blair Trewin, BOM

Dr Trewin is a climate scientist at the Bureau of Meteorology. His specialist areas are the development of long-term historical data sets for the assessment of climate change, and the analysis of extreme events, both current and historic. He was the lead developer of the main long-term Australian temperature data set, ACORN-SAT. In the international sphere, he was the scientific coordinator of the World Meteorological Organisation's (WMO) annual Global Climate Statement in 2016, and is a member of the WMO's Task Team on Homogenisation. He was also President of the Australian Meteorological and Oceanographic Society in 2012-14. He is a member of working group one on physical climate systems for the United Nation's Intergovernmental Panel on Climate Change (IPCC).

Mr Damian Morgan-Bulled, Consultant

Mr Morgan-Bulled is Deputy Chief Executive Officer of Yorta Yorta Nation Aboriginal Corporation, Vice-President of Rumbalara Football/Netball Club, Treasurer of Njernda Aboriginal Corporation, Board Member of Moama Local Aboriginal Land Council and participant in the NESP Earth Systems and Climate Change Hub. He holds a Post Graduate Certificate in Environmental and Heritage Interpretation, Deakin University, and a Graduate Diploma in Natural and Cultural Heritage Interpretation, Deakin University. As a proud Yorta Yorta man, Damian has worked within the Cultural Heritage and Natural Resource Management field for more than 20 years including stints with the Murray Darling Basin Authority in Canberra and the Department of Sustainability & Environment, Victoria. Damian has represented the Yorta Yorta Nation on a number of key negotiating teams and committees, currently including both the Steering Committee and Community Consultative Group for the Echuca-Moama Second Bridge Crossing for VicRoads. Damian

is considered a leader within the Aboriginal community of Echuca-Moama and has developed a well establish network throughout Northern Victoria and Southern Riverina New South Wales.

Coasts:

Dr Graeme Clarke, UNSW

Dr Clark is a senior researcher associate for Applied Marine and Estuarine Ecology at the Evolution & Ecology Research Centre at the University of New South Wales. He has a background in coastal and marine ecology, working in diverse environments from the tropics to Antarctica. His research focuses on marine biology, invasive species and impacts of human activities on coastal ecosystems.

Indigenous co-authors will work across both Marine and Coasts.

Ms Mibu Fischer, CSIRO

Ms Fischer is a descendent of the Noonuccal, Ngugu and Gorenpul clans of Quandamooka. Ms Fischer is an early career marine ethnoecologist within the multi-use ecosystems tropical coastal group, in CSIROs Oceans & Atmosphere, having joined CSIRO as an Indigenous Cadet in 2009. She graduated from Southern Cross University with a Bachelor of Marine Science and Management before completing a Graduate Diploma in Natural Resource Management from Charles Sturt University in 2016. Ms Fischer is an Aboriginal scientist with engagement skills for strengthening partnerships between First Nations communities and the research sector. Her specific interests are around Traditional Knowledge (science) and management practices being considered within modern day fisheries, coastal and conservation management. She joins with other Indigenous and Traditional practitioners to strengthen the global indigenous voice and leadership in areas of marine research and coastal indigenous livelihoods. Her goal is to bridge a gap that draws attention to the indigenous communities facing the frontline of impacts and changes to coastlines, ecosystems and livelihoods from climate change impacts.

Dr Cass Hunter, CSIRO

Dr Cass Hunter is a Kuku Yalanji and Torres Strait Islander woman. Dr Hunter is an Indigenous Social Ecological Researcher at the CSIRO, where she started as an Indigenous cadet with the Marine Division while completing her degree in environmental science. Dr Hunter then completed a PhD in Quantitative Marine Science at the University of Tasmania before becoming an Indigenous Post-doctoral Fellow at James Cook University. Dr Hunter is interested in making research more inclusive, accessible, and relevant. Her research interests are interdisciplinary and broadly focused on the development of participatory tools to support sustainable livelihoods and ecosystems. She is motivated by the opportunities to increase Indigenous-led research that is relevant to communities, has benefits, and builds capacity in new areas.

Marine:**Dr Rowan Trebilco, CSIRO**

Dr Trebilco is a Team Leader in the Marine Resources and Industries program at CSIRO Oceans and Atmosphere and co-leads the Environmental Change and Adaptation research theme in the Centre for Marine Socioecology at the University of Tasmania, where he is an adjunct senior researcher. His research focuses on assessing status, trends, risks and opportunities for marine social-ecological systems and on developing strategies for climate change adaptation. He has worked across theoretical ecosystem ecology, statistical and mechanistic modelling, fisheries and natural resource management, in temperate, tropical, and Antarctic oceans.

Heritage:**Ms Anne McConnell, Consultant**

Ms McConnell is an archaeologist anthropologist Quaternary geoscientist who currently runs a Cultural Heritage Management, Archaeology and Quaternary Geoscience Consultancy. Anne has worked for over 30 years in cultural heritage, where her work has focussed on the identification and management of rural and remote heritage, industrial heritage, recreational/tourism heritage, heritage routes, historic and cultural landscapes, intangible heritage and archaeological assessment.

Assoc Prof Michael-Shawn Fletcher, University of Melbourne

Assoc Prof Fletcher is a descendant of the Wiradjuri and a geographer interested in the long-term interactions between humans, climate, disturbance, vegetation and landscapes in the Southern Hemisphere with a particular emphasis on how Indigenous burning has shaped the Australian landscape. Michael-Shawn is an Assistant Dean (Indigenous) and an Associate Professor in the Faculty of Science at the University of Melbourne and a panel member of the Australian Research Council College of Experts.

Indigenous:**Mr Joe Morrison, consultant**

Mr Morrison has Dagoman (Aboriginal) and Mualgal (Torres Strait Islander) heritage, with over 25 years' experience working with Indigenous people. Mr Morrison has a BA in Land Management from the University of Sydney and an Honorary Doctorate from the University of New South Wales for his contribution to Indigenous land and sea management, policy development, advocacy and related topics nationally. Mr Morrison is currently the Managing Director of Six Season Pty Ltd, which aims to advance Indigenous policy through practical solutions. Mr Morrison's previous roles have included CEO of the Northern Land Council, founding CEO of the North Australian Indigenous Land and Sea Management Alliance (NAILSMA) and an Indigenous Land Management Facilitator.

Inland Water:**Ms Janice Green, BoM**

Ms Green is currently the Manager of the Water Accounting and Regulations Section in the Bureau of Meteorology with responsibility for the preparation of the National Water Account; for the provision of water market information and for managing the regulations of the Water Act governing supply of water data to the Bureau. In addition, she is Project Director for the IFD Revision Project being undertaken as part of the revision of Australian Rainfall & Runoff. Ms Green has 30 years' experience in hydrology, hydraulics, and water resource management working in state and commonwealth government agencies and the private sector.

Assoc Prof Brad Moggridge, University of Canberra

Assoc Prof Moggridge is a Kamilaroi Water Scientist from Western Sydney, now residing in Canberra. He holds a Master of Science (Hydrogeology) and Bachelor of Science (Environmental Science). He is currently a PhD Candidate at the University of Canberra's Institute for Applied Ecology and part-time Indigenous Engagement Officer for the National Environmental Science Program's Threatened Species Recovery Hub. He was previously employed by NSW DPI Water as Team Leader for the Aboriginal Water Initiative, and led the only dedicated Aboriginal water unit in Australia for nearly five years. Brad has also been employed by CSIRO, NSW DECC and EPA and in consulting.

Land:**Dr Kristen Williams, CSIRO**

Dr Kristen Williams is a principal research scientist at CSIRO Land and Water with extensive experience in research management, coordination and delivery. As an Ecological Geographer, she specialises in the integration of ecosystem and landscape sciences through multi-disciplinary team collaborations to generate data and knowledge products informing systems of ecologically sustainable land management, where biodiversity prospers, ecosystems function and adapt, and ecosystem services meet the needs of all people. She has extensive experience co-designing research with end users to ensure outputs meet their needs with a focus on biodiversity conservation, vegetation management policies, NRM planning and prioritising conservation investment strategies.

Mr Barry Hunter, Consultant

Mr Barry J Hunter is a descendant from the Djabugay speaking people of Cairns hinterland. He grew up beside the Barron River in the rainforest near Kuranda. Barry has over 30 years' experience in Aboriginal affairs particularly in areas of land, natural and cultural resource management. Barry's employment includes appointments in government conservation agencies, mining and exploration

industry, community and not-for-profit NGOs, and recently as a consultant working around Aboriginal Land management, Carbon Industry and community economic development.

Dr Becky Schmidt, CSIRO

Dr Becky Schmidt is an environmental scientist in CSIRO Land and Water, leading interdisciplinary teams that deliver environmental information that government, community and industry use to make decisions, protect our environment and prosper sustainably. She specialises in science translation between technical teams and customers, targeting and packaging technical information to meet customer needs and maximise adoption. She works with researchers from a range of disciplines, complementing their specialist domain knowledge with her generalist understanding of systems, to address challenges in agriculture, coal mining and coal seam gas, and land and water science. Currently she is collaborating with partners on the Australian Government's national strategy and action plan to implement environmental-economic accounting across Australia, helping government and businesses make balanced decisions using consistent information on the environment, economy and society.

Extreme Events and Hazards:

Dr Dan Metcalfe, CSIRO

Dr Metcalfe is Deputy Director for CSIRO Land and Water, and previously Research Program Leader for the Ecology Program at CSIRO Ecosystem Sciences. Dr Metcalfe has worked on community and landscape ecological questions including management of threatened species, impacts of natural disturbance events (fire, disease, cyclones), on forest succession, weed ecology and management, and the biogeography of Australian rainforest plants. He has spent over two decades working in Queensland's rainforests on subjects including the dynamics of old-growth forest, seed dispersal, impact and recovery from natural perturbations (fire, disease, cyclones), seed dispersal, weed invasion and management. He has worked on fire management and its impact on natural systems in the rainforests and savannahs of northern and eastern Australia, and southern Africa, and as a landscape ecologist he has contributed to the development of monitoring and assessment protocols related to sustainable mining, water abstraction and agricultural development, and provided advice and conducted assessments and reviews for state and territory governments and the national governments of Australia and New Zealand.

Dr Metcalfe has spent the past seven years in predominantly research management roles supporting environmental research and impact across Australia. He is a member of Minister Ley's Wildlife and Threatened Species Bushfire Recovery Expert Panel, was author of the Land theme in the 2016 State of the Environment Report, and has held multiple board and advisory committee positions.

Mr Oliver Costello, consultant

Mr Costello is a Bundjalung man from the Northern Rivers of NSW and has been actively engaged in Cultural Land Management projects with many Aboriginal communities. He believes strongly in the role of Aboriginal culture as a keystone to maintaining livelihoods, supporting identity, connection to country and enabling healthy and regenerative communities to care for Country. He is a founding Director of both the Firesticks Alliance Indigenous Corporation and Jagun Alliance Aboriginal Corporation. He holds a Bachelor of Arts in Adult Education and Community Management from the University of Technology, Sydney. He has a broad range of experience in Natural Cultural Resource management, cultural fire practices, Aboriginal Joint Management partnerships, Culturally significant species and threatened species management. Oliver is a consultant supporting a range of research, policy, advocacy and on ground projects. He is passionate about Indigenous leadership, empowerment, partnerships and recognition of cultural knowledge and practice.