

**Ecosystems and People of the Pacific Ocean -
Threats and Opportunities for Action:
A Scientific Consensus Statement**

Executive Summary:

The people from around the Pacific Ocean, from the Arctic to Antarctic, from countries populous and sparse, are witnessing a decline of the Pacific Ocean's vast resources and in the ability of people to use those resources. Pollutants, nutrient and sediment run-off from land, overfishing, habitat destruction, and climate change emerge repeatedly as the major causes. Though this wide-spread similarity of threats across the Pacific Ocean is alarming, it also provides the opportunity to craft solutions that target pan-Pacific problems and therefore provide hope to hundreds of millions of people who rely on the Pacific Ocean and its ecosystems.

The Pacific, Covering Half the Global Ocean

The Pacific Ocean is the largest single geographic feature on our planet. It represents half the world's ocean area, occupies one-third of the earth's surface, and helps support hundreds of millions of people. The Pacific Ocean contains complex ecosystems and supports ocean-based economies that produce a wealth of resources for local and global benefit. The Pacific is also the engine room of Earth's climate and the storeroom of its ocean biodiversity. However, Pacific Ocean is not being managed sustainably. A host of interacting impacts threaten the future of the human communities around it, the future of life within the Pacific, and the future of our global climate.

A Complex Ocean, a Common Crisis

The Pacific Ocean supports much of the world's marine and terrestrial biodiversity. Threats to the Pacific's ecosystems and to communities that depend on its bounty continue to intensify as its resources are over-harvested, and sediments, nutrients and chemical pollution pour off the land. Marine habitats ranging from shallow corals, mangroves and sea grasses to previously inaccessible deep sea beds show decaying health. Some species of large tuna, sharks and turtles have experienced significant declines, marking the progressive depletion of top predators and other large species in the Pacific Ocean. These reductions jeopardize economies, local livelihoods, and food security across the globe. Climate change exacerbates these threats and increases the vulnerability of coastal and ocean ecosystems and resources.

Scientists who study Pacific Ocean ecosystems have worked together to summarize the most important environmental threats to the Pacific Ocean and its people, and to identify opportunities for addressing many of these threats. This consensus statement:

1. Identifies and prioritizes key threats to the health and productivity of the Pacific Ocean - many accelerated by climate change – for which there is broad consensus in the scientific community.
2. Highlights the environmental and socioeconomic impacts of these threats.
3. Outlines a ‘road map’ that identifies available solutions for these broad categories of threats.

Although the threats are serious, it is not too late to take decisive action to prevent almost certain future catastrophes, and that will bolster a critical part of the life of our planet.

Threats Facing the Pacific Ocean:

A review of environmental threats across the Pacific Ocean shows remarkable similarity between the major problems experienced in poor and rich countries alike, in densely settled areas and rural zones, in populous nations and on small islands. Across these diverse areas, three rank as the most pervasive and serious local threats: habitat destruction, pollution from sewage and land run-off, and over-fishing. In addition, climate change imperils all Pacific ecosystems, already creating pulses of warm water, hypoxic dead zones, and acidic conditions. These threats interact with one another to damage natural ecosystems, reduce biological and human economic diversity, destroy productivity, and make human use of the sea more difficult. Each is described briefly below.

Though this summary suggests that the Pacific Ocean faces ecological peril, it also reveals that countries very different in wealth, population, size, and culture face similar problems. The presence of these same dominant threats across the Pacific suggests that effective solutions to these problems will have major beneficial impacts for societies across the Pacific Ocean. These societies form a network of nations and communities connected by the vast Pacific Ocean, joined by their mutual reliance on the ocean, and united in their need and will to repair its damage.

Pollution: Organic pollutants from sewage, nutrient pollution from fertilizer run-off, plastic marine debris, toxic dumping and oil spills, urban run-off and dispersed pollutants combine to create one of the most critical classes of ocean threats. Sewage and farm run-off can create dead zones, algal blooms, and acidic areas. Across the Pacific organic pollution can fundamentally alter the basic ecosystem structure, create human health risks, and stresses economies. Plastics and other long-lived industrial products accumulate in vast areas in the North Pacific Gyre and on beaches and shorelines around the Pacific. They clog habitats and strangle seabirds, turtles, sea mammals, and fish, and, in certain areas, outnumber plankton. The rate of breakdown of some chemicals is so slow that they persist for decades. In the case of old fishing gear, nets and long lines continue to fish long after they are lost at sea. Toxic chemicals, oil and run-off debilitate coastal marine life, reduce birth rates, and create hormonal disruption.

Habitat destruction: Productive marine habitats are lost to destructive fishing practices, poor agricultural land use, inappropriate coastal development, and industrial wastewater. Destructive fishing, including coastal trawling, the use of dynamite or poisons, and indiscriminate netting, can destroy habitats and reduce fishery productivity. Land use practices that create erosion, or eat up mangroves and smother sea grass beds reduce coastal ecosystem health and impair local productivity. Poorly designed development projects for tourism,

roads, housing, urban centres, and aquaculture needlessly destroy coastal habitats across the Pacific and limit livelihoods that depend on ecosystem productivity.

Overfishing and exploitation: Unsustainable resource use reduces fish stocks throughout the Pacific, limiting fish catches and often causing ecological shifts that further reduce biodiversity and productivity. Over-hunting of herbivores results in uncontrolled growth of algae and seaweeds, which can smother corals and other bottom-dwelling organisms. Fishing on the high seas for top predators such as sharks has made these creatures rare across the Pacific. International tuna fleets often fish unsustainably in waters controlled by small countries, strip stocks to low levels and move on. Bycatch further reduces fish stocks because large numbers of non-target species with low economic return are discarded as waste back into the ocean. Artisanal and recreational fishing suffer when local needs outstrip local supply, causing displacement of fishing activity, reduced income and insecure food supply. Habitat destruction exacerbates overfishing by reducing fishable area and productivity.

Climate change: Pacific countries have already seen strong effects of ocean warming, changes in ocean circulation and abrupt shifts in precipitation patterns. The bleaching and subsequent death of reef-building corals caused by warm water pulses have destroyed reef ecosystems, or required decades to recover. Shifts in ocean and atmospheric currents have created massive dead zones or changed migration patterns of whales and seabirds. Some ocean areas have already acidified to levels known in laboratory studies to cause harm to ocean life. In addition, decreasing pH levels due to CO₂ acidosis are shifting the ecological balance of marine plankton and bottom dwelling species that form calcium skeletons. The rates of current environmental change far outpace anything seen in human history, and are likely to accelerate in the near future. These new conditions present serious challenges to the Pacific Ocean Community for the next decades or centuries. Many areas of the Pacific Ocean may become uninhabitable due to sea level rise, coastal inundation, shifting rainfall, collapse of fresh water supplies, or changes in the migration patterns of food species. These changes will increase the number of impoverished people and reduce the stability of many nation states.

Multiple stressors multiply harm: When marine life is subjected to multiple stressors, such as pollution, habitat destruction, over-fishing, and changing climate, populations of ecologically and economically important species can collapse. From coral reefs to kelp forests to cold water deep seas, an increase in harm and a decrease in growth and reproduction can wipe out once productive communities. In this sense, global climate change is coming at the worst possible time, when many communities around the Pacific – both human and ecological – are threatened by other powerful problems.

Solutions and options for a better future

Maintaining ecosystem health and sustainability should be as fundamental a goal as economic development. While there are currently no solutions in place to solve all these problems across the Pacific Ocean, a set of sensible approaches to pervasive environmental problems can be deployed in a concerted way to limit and even reverse environmental harm, returning Pacific ecosystems and communities to greater health. Overall, solutions must significantly reduce pollution from human sewage, sediment and run-off from poor land use practices, flows of debris and toxic material into the sea from point and nonpoint sources, and unsustainable extraction of marine organisms. Major reductions (some up to 95% of current rates) are probably required in discharges of nutrients and sediments from land to sea.

New technologies, innovative market mechanisms, and financial tools that promote adoption of sustainable practices can empower local communities, help maintain the cultural richness of the Pacific Ocean nations, and reduce the human footprint on the Pacific. In many cases, the straightforward response to an environmental problem (such as pollution or habitat destruction) might be simply to prohibit the human activities that cause the pollution or habitat loss. But for large and complex problems such as those that span the whole Pacific, learning *how* to stop or alter the activities that give rise to these problems is the key to a set of enduring environmental solutions. Strategic changes that can lead to effective solutions include incorporation of ecological principles in economic decisions, use of financial and market instruments such as environmental bonds, legacy trusts, catch share programs, and tax systems to create incentives for activities that promote rather than degrade ecosystem health, and environmental education across the age spectrum to build capacity for local populations in ecosystem and economic management.

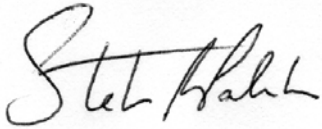
Climate change mitigation is a global task, and yet a united Pacific can be instrumental in promoting frank global dialogue about establishing and achieving mitigation targets. The long term health of Pacific ecosystems and human communities across the ocean requires aggressive mitigation of global greenhouse gas emissions. Key to the solution is the observation that the Pacific contains some of the highest and lowest emitting countries.

In addition to mitigation, each region within the Pacific must adopt sustainable adaptation strategies for ecosystems and human communities in the face of climate change. Though these strategies will need to be locally tailored, they can draw on similar principles to solve common problems. For example sea level rise will impose different challenges for highly urbanized coastal communities than for rural areas, but both geographies can consider a common range of adaptation options to achieve some protection for vulnerable human settlements and ecosystems.

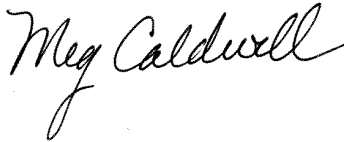
Effective and enduring solutions require capacity-building within the Pacific Ocean Community and integrated problem solving. The solution to the spatial and economic challenges in sustainable management of the Pacific Ocean lies in collaboration at many levels, including social, scientific, regulatory, institutional, and information technologies. To help promote sustainable change in how communities across the Pacific interact with their common ocean, we propose a new executive institution – one that joins banking, industrial, ecological, and educational expertise into a single collective enterprise that can help build capacity within and advise Pacific nations and evaluate overall progress. Combining financial, livelihood, conservation, and educational goals and functions into a collaborative institution would encourage managers and decision makers to examine and address issues across the larger whole, and cultivate the integrated ecological, economic and education understanding and problem solving that progress requires. Pacific Ocean countries need to coordinate their expertise, creating open access online information systems, for example, for education, research, and resource management. A Pan-Pacific Century Trust could provide economic resources and management knowledge for the entire Pacific community, and could deliver education and expertise in how to apply sustainability principles to economic development.

We must act now. The best science indicates that over the next century we can expect to see dramatic declines in the health of the Pacific Ocean, its ecosystems, and the people that rely on this shared resource, unless concerted and prompt action to address known threats is taken. Identifying common problems, uncovering their underlying causes, and addressing them now may allow the Pacific nations to enter the next century as world leaders in the creation of vibrant, intact and highly functioning economically and ecologically sustainable communities.

Initial Signatories



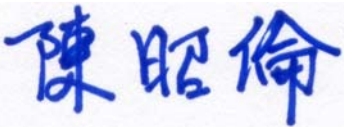
Stephen R. Palumbi
Stanford University, USA



Margaret R. Caldwell
Stanford University, USA



Wang Yamin
Shandong University at Weihai, China



Allen Chen
Academia Sinica, Nankang, Taiwan



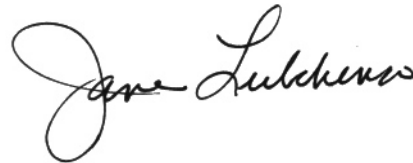
Billy Manoka
School of Business Administration,
Papua New Guinea



Amanda Vincent
University of British Columbia, Canada



Willy Kostka
Micronesia Conservation Trust,
Federated States of Micronesia



Jane Lubchenco
Oregon State University, USA



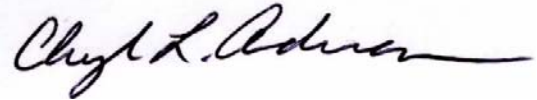
Rodrigo Bustamante
CSIRO, Australia



Miriam Fernandez
Universidad Católica de Chile, Chile



Joeli Veitayaki
University of the South Pacific, Fiji



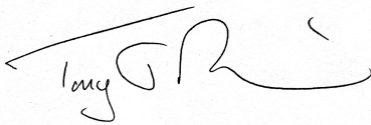
Cheryl Anderson
University of Hawaii, USA



Noah Idechong
Palau National Congress,
Republic of Palau



Mark Costello
University of Auckland, New Zealand



Tony Pitcher
University of British Columbia,
Canada



Ove Hoegh-Guldberg
The University of Queensland, Australia



Steven Gaines
University of California, Santa Barbara, USA



Jessica Teisch
T.C. Hoffmann and Associates, USA



Mark Erdmann
University of California, Berkeley, USA



Tegan Hoffmann
T.C. Hoffmann and Associates, USA



Neil Davies
University of California, Berkeley, USA



Jo Ann Leong
Hawai'i Institute of Marine Biology, USA

Additional Signatories

To sign the Pacific Ocean Scientific Consensus Statement send an e-mail with your name and institution to POIstatement@stanford.edu

Marie Abboud - Abi Saab
National Council for Scientific
Research, Lebanon

Dr. Shanta Achuthankutty
National Institute of Oceanography,
USA

Dr. Paul Adam
University of New South Wales,
Australia

Vera Alexander
University of Alaska, USA

Glenn Richard Almany Ph.D.
ARC Centre of Excellence for Coral
Reef Studies, Australia

S. Elizabeth Alter, Ph.D.
Natural Resources Defense Council,
USA

William D. Anderson, Jr.
College of Charleston, USA

Russ Andrews
University of Alaska, USA

Kevin R. Arrigo
Stanford University, USA

Christos Arvanitidis
Institute of Marine Biology and
Genetics, Greece

Daniel Baden
University of North Carolina, USA

Andrew Hamilton Baird
James Cook University, Australia

C. Scott Baker
Oregon State University, USA

Dr. Elaine Baker
Marine Programme, GRID-Arendal,
Norway

Andrew C. Baker, Ph.D.
University of Miami, USA

Karl Banse
University of Washington, USA

Richard T. Barber
Duke University, USA

Mike Barker
University of Otago, New Zealand

Dr. Andrew C Barnes
The University of Queensland,
Australia

James P. Barry
Monterey Bay Aquarium Research
Institute, USA

Harold P. Batchelder, Ph.D.
Oregon State University, USA

Chris Battershill
James Cook University, Australia

Dr. Line K. Bay
James Cook University , Australia

Dr. Lynnath E. Beckley
Murdoch University, Western
Australia

Jim Beets University of Hawai'i, USA	David R. Bellwood James Cook University, Australia	Dr Kirsten Benkendorff Flinders University, Australia
Matz S. Berggren, Ph.D University of Gothenburg, Sweden	Giacomo Bernardi University of California Santa Cruz, USA	Jason S. Biggs University of Guam Marine Laboratory, Guam USA
Gavin Birch The University of Sydney, Australia	Barbara Block Ph.D. Stanford University, USA	Daniel T. Blumstein University of California Los Angeles, USA
Anthony John Booth Science Rhodes University, USA	Melissa Booth, Ph.D. University of Georgia, USA	Michael A. Borowitzka Murdoch University, USA
Ella Bowles University of British Columbia, Canada	Matthew E. S. Bracken Northeastern University, USA	Corey J. A. Bradshaw University of Adelaide, Australia
Michael Brauer, Sc.D. The University of British Columbia, Canada	Susan H. Brawley University of Maine, USA	Kenneth Broad University of Miami, USA
Elisabet Brock University of Gothenburg, Sweden	Jon Brodie James Cook University, Australia	Dr Gilianne Brodie University of the South Pacific, Fiji
Barry W. Brook The University of Adelaide, Australia	Dr. Charlotte A. Brunner The University of Southern Mississippi, USA	Erin J. Burge Marine Science Coastal Carolina University, USA
Karen G. Burnett, Ph.D. College of Charleston, USA	James E. Byers, Ph.D. University of Georgia, USA	Lisa Campbell Texas A&M University, USA

Bradley J. Cardinale University of California Santa Barbara, USA	Mark H. Carr University of California Santa Cruz, USA	William James Casey University of Queensland, Australia
C. Page Chamberlain Stanford University, USA	Faouzia Charfi Faculté des Sciences de Tunis, Tunisia	James J. Childress University of California Santa Barbara, USA
Brendan Choat Australian National University, Australia	Hong-Nong Chou, Ph.D. National Taiwan University, Taiwan	Villy Christensen, Ph.D. University of British Columbia, Canada
Patrick Christie University of Washington, USA	Joshua E. Cinner, Ph.D. James Cook University, Australia	James S. Clegg University of California Davis, USA
David A. Cleveland, Ph.D. University of California Santa Barbara, USA	C. Sarah Cohen San Francisco State University, USA	Felicia Coleman Florida State University, USA
Ross Coleman The University of Sydney, Australia	Sean P. Colin Roger Williams University, USA	Judith L. Connor, Ph.D. Monterey Bay Aquarium Research Institute, USA
David O. Conover Stony Brook University, USA	Jorge Cortés Universidad de Costa Rica, Costa Rica	Robert K. Cowen University of Miami, USA
Dr. Sean F. Craig Humboldt State University, USA	Larry B. Crowder Duke University, USA	Benjamin Cuker, Ph.D. Hampton University, USA
George Curtis University of Hawaii, USA	John Cusick, Ph.D. University of Hawaii at Manoa, USA	Mikael Dahl University of Gothenburg, Sweden

Chang-feng Dai National Taiwan University, Taiwan	Gretchen Daily Stanford University, USA	Patricia Ellen Rosemary Dale Griffith University, Australia
Anthony F. D'Andrea Oregon State University, USA	Carla M. D'Antonio University of California Santa Barbara, USA	Marta deMaintenon University of Hawai'i, USA
Richard T. Di Giulio Duke University, USA	Paul A. Dinnel, Ph.D. Shannon Point Marine Center, USA	Rodolfo Dirzo Stanford University, USA
Fred C. Dobbs Old Dominion University, USA	Richard E. Dodge, Ph.D. Nova Southeastern University, USA	Maria Dornelas James Cook University, Australia
Walter C. Dudley University of Hawai'i, USA	J. Emmett Duffy The College of William and Mary, USA	Norman C. Duke, Ph.D. The University of Queensland, Australia
Rob Dunbar, Ph.D. Stanford University, USA	Dr. Kenneth H. Dunton University of Texas at Austin, USA	Sylvia A. Earle National Geographic Explorer in Residence, USA
Karen L. Eckert, Ph.D. Wider Caribbean Sea Turtle Conservation Network, USA	Graham Edgar University of Tasmania, Australia	Christopher A. Edwards University of California Santa Cruz, USA
Karen Edyvane Arafura Timor Research Facility, Australia	Dr. Rodolfo Elias Universidad Nacional de Mar del Plata, Argentina	Richard B. Emlet University of Oregon, USA
Charles E. Epifanio University of Delaware, USA	James A. Estes University of California Santa Cruz, USA	Marta Estrada Institut de Ciències del Mar, CSIC, Spain

Dr. Katharina Fabricius Australian Institute of Marine Science, Australia	Dr. Mary C. Fabrizio The College of William & Mary, USA	Eibleis Fanning The Society for Environmental Exploration/Frontier, UK
Horst Felbeck University of California San Diego, USA	Damián Martínez Fernández Fundacion KETO, Costa Rica	Anders Fernö University of Bergen, Norway
Dr. Simon Foale James Cook University, Australia	Jeri L. Fox University of New England, USA	Valerie M. Franck, Ph.D. Hawaii Pacific University, USA
Marc Frischer Skidaway Institute of Oceanography, USA	Stewart Frusher The University of Tasmania, Australia	Stephen Garnett Charles Darwin University, Australia
Johnathan Geller Moss Landing Marine Laboratories, USA	Sal Genovese, Ph.D. Northeastern University, USA	Marcela Gerpe Mar del PLata University and National Research Council, Argentina
Anne E. Giblin The Ecosystems Center, Marine Biological Laboratory, USA	Dr. Jack A. Gilbert Plymouth Marine Laboratory, UK	Dr. Howard Gill Murdoch University, Western Australia
Dr. James Gilmour University of Western Australia, Australia	Peter W. Glynn University of Miami, USA	Anna Godhe Göteborg University, Sweden
Joaquim Goés Bigelow Laboratory for Ocean Sciences, USA	Paulo Yukio Gomes Sumida Instituto Oceanografico da Universidade de Sao Paulo, Brazil	Malcolm S. Gordon University of California Los Angeles, USA
Andrew Gracey University of Southern California, USA	Michael H. Graham San Jose State University, USA	Dr. J. Frederick Grassle Rutgers University, USA

Edward Gregr Univeristy of British Columbia, USA	Blaine D. Griffen, Ph.D. University of South Carolina, USA	Dr. Gary B. Griggs University of California Santa Cruz, USA
Julien Grignon University of Perpignan, France	Rikki Grober-Dunsmore, Ph.D. Institute of Applied Sciences, Fiji	Alexandra Grutter The University of Queensland, Australia
Michael D. Guiry Martin Ryan Institute, Ireland	Neil Gunningham Australian National University, Australia	Woo-Seok Gwak, Ph.D. Gyeongsang National University, Korea
Elizabeth A. Hadly Stanford University, USA	Nigel Haggan University of British Columbia, Canada	Stephen J. Hall The WorldFish Center, Malaysia
Leon E. Hallacher, Ph.D. University of Hawai'i, USA	Gustaaf M. Hallegraeff The University of Tasmania, Australia	Benjamin S. Halpern National Center for Ecological Analysis and Synthesis, USA
Dr. Yu-San Han National Taiwan University, Taiwan	Jon Havenhand University of Gothenburg, Sweden	Dr. Kirsten Heimann James Cook University, Australia
Dennis Heinemann, Ph.D. Ocean Conservancy, USA	Dr Robert Heinsohn Australian National University, Australia	Mike Heithaus Florida International University, USA
Brian Helmuth, Ph.D. University of South Carolina, USA	Professor Chad L. Hewitt University of Tasmania, Tasmania	David E. Hinton, Ph.D. Duke University, USA
Dr. Alistair Hobday CSIRO Marine and Atmospheric Research, Australia	Gretchen Hofmann, Ph.D. University of California Santa Barbara, USA	Sally J. Holbrook University of California Santa Barbara, USA

James T. Hollibaugh
University of Georgia, USA

Dr. Hwey-Lian Hsieh
Academia Sinica, Taiwan

Pan-Wen Hsueh
National Chung Hsing University,
Taiwan

Tom Hutchinson, Ph.D.
Plymouth Marine Laboratory, UK

Glenn Hyndes
Edith Cowan University, Australia

K. David Hyrenbach, Ph.D.
Hawai'i Pacific University, USA

Dr. Baban Ingole
National Institute Of Oceanography,
India

T.G. Jagtap
National Institute of Oceanography,
India

Dr. Andrew Jeffs
University of Auckland, New
Zealand

Stuart Jenkins
Bangor University, Wales

Kerstin Johannesson
University of Gothenburg, Sweden

Mark Johnson
The University of British Columbia,
Canada

Chris Johnson
James Cook University, Australia

Mark Peter Johnson
National University of Ireland,
Ireland

Dr. Emma L. Johnston
University of New South Wales,
Australia

David W. Johnston, Ph.D.
Duke University Marine Laboratory,
USA

Geoff P. Jones
James Cook University, Australia

Per Jonsson
University of Gothenburg, Sweden

Laura K. Jordan Ph.D.
University of California Los Angeles,
USA

Dr. Pete Jumars
University of Maine, USA

Stephen M. Kajiura
Florida Atlantic University, USA

Dr. Subramanian Karuppiah
National University of Singapore,
Singapore

Edward O. Keith
Nova Southeastern University, USA

Dr. Deborah S. Kelley
University of Washington, USA

Dr. Patricia H. Kelley
University of North Carolina at
Wilmington, USA

Willett Kempton
University of Delaware, USA

Julie Anne Kennedy, Ph.D.
Stanford University, USA

Alexander M. Kerr University of Guam, Guam USA	Judith T. Kildow, Ph.D. Monterey Bay Aquarium Research Institute, USA	Suam Kim, Ph.D. Pukyong National University, Korea
Michael J. Kingsford James Cook University, Australia	Nancy Knowlton Smithsonian Institution, USA	Marguerite S. Koch-Rose, Ph.D. Florida Atlantic University, USA
Jeffery R. Koseff, Ph.D. Stanford University, USA	Chris Kuebler Ocean Conservancy, USA	Philip S. Lake Monash University, Australia
Anthony W.D. Larkum University of Sydney, Australia	Dr. Fredrik Larson University of St Andrews, Scotland / University of Gothenburg, Sweden	Burney J. Le Boeuf University of California Santa Cruz, USA
Heather Leslie Brown University, USA	Michael P. Lesser University of New Hampshire, USA	Sarah Lester, Ph.D. University of California Santa Barbara, USA
Senjie Lin, Ph.D. University of Connecticut, USA	Niels Lindquist University of North Carolina at Chapel Hill, USA	Dhugal Lindsay Nagasaki University, Japan
L. Richard Little Commonwealth Scientific and Industrial Research Organisation, Australia	Marian K. Litvaitis University of New Hampshire, USA	Rainer Lohmann University of Rhode Island, USA
Glenn Lopez Stony Brook University, USA	Jose V. Lopez, Ph.D. Nova Southeastern University, USA	George S. Losey Jr University of Hawai'i, USA
Janice M. Lough Australian Institute of Marine Science, Australia	Catherine Lovelock The University of Queensland, Australia	George Paul Lukacs James Cook University, Australia

R. Bruce MacFarlane
University of California Santa Cruz,
USA

Antonios Magoulas
Hellenic Centre for Marine
Research, Greece

Helene Marsh
James Cook University, Australia

Michael Mastrandrea
Stanford University, USA

Pamela Matson
Stanford University, USA

T. Kieran McCarthy
National University of Ireland,
Ireland

Julian P. McCreary, Jr.
University of Hawai'i, USA

Karla J. McDermid, Ph.D.
University of Hawai'i, USA

Karen L. McLeod, Ph.D.
Oregon State University, USA

John W. McManus, PhD
National Center for Coral Reef
Research, Univ. of Miami, USA

Dr. Marcia K. McNutt
Monterey Bay Aquarium Research
Institute, USA

David K. Mellinger
Oregon State University, USA

Susanne Menden-Deuer, Ph.D.
University of Rhode Island, USA

Charles G. Messing
Nova Southeastern University, USA

Anna Metaxas
Dalhousie University, Canada

Christopher Meyer
Smithsonian Institution, USA

Fiorenza Micheli
Stanford University, USA

Edward L. Miles
University of Washington, USA

Dr. Peter Miller
Plymouth Marine Laboratory, USA

Dr. Cara Miller
University of the South Pacific, Fiji

Todd Minchinton
University of Wollongong, Australia

Snejana Moncheva
Bulgarian Academy of Sciences,
Bulgaria

Marco Nemesio E. Montañño
University of the Philippines,
Philippines

Dr. Patricia Teresa Monteiro
Cunningham
Instituto Oceanografico da
Universidade de Sao Paulo, Brazil

John Montgomery
University of Auckland, New Zealand

Harold Mooney
Stanford University, USA

Steven G. Morgan
University of California Davis, USA

Frank Muller-Karger University of Massachusetts Dartmouth, USA	James W. Murray University of Washington, USA	Dr. Nyawira Muthiga Wildlife Conservation Society, USA
Dr. Ramaiah Nagappa National Institute of Oceanography, India	Winifereti Nainoca Fiji Institute of Technology, Fiji	Warwick Nash The WorldFish Center, New Caledonia
Gabrielle A. Nevitt University of California Davis, USA	Dr. Melissa Nursey-Bray The University of Tasmania, Australia	Jeff Obbard, Ph.D. National University of Singapore , Singapore
Anna Occhipinti-Ambrogi University of Pavia, Italy	Thomas A. Okey, Ph.D. University of Victoria School of Environmental Studies, Canada	Guy W. Oliver, Ph.D. Long Marine Laboratory, USA
Aramis Olivos-Ortiz, Ph.D. Colima University, Mexico	Rosemary E. Ommer, PhD. University of Victoria, Canada	Dr. Mark Orams, JP, Ph.D. Massey University, New Zealand
Dr. Michael K. Orbach Duke University, USA	Michael A. Osborne University of California Santa Barbara, USA	Gary K. Ostrander, Ph.D. University of Hawai'i, USA
Dr. Evgeny A. Pakhomov University of British Columbia, Canada	Eric I. Paling Murdoch University, Western Australia	John M. Pandolfi University of Queensland, Australia
Mark R. Patterson College of William & Mary, USA	Dr. Charles K. Paull Monterey Bay Aquarium Research Institute, USA	Dr. Daniel Pauly University of British Columbia, Canada
Joseph R. Pawlik UNCW Center for Marine Science, USA	Eduinetty Ceci Pereira Moreira de Sousa Instituto Oceanográfico da Universidade, Brasil	James E. Perry, III, Ph.D., PWS College of William and Mary, USA

Charles Henry Peterson University of North Carolina at Chapel Hill, USA	Mark S. Peterson The University of Southern Mississippi, USA	Conrad Alexander Pilditch University of Waikato, New Zealand
Jesús Pineda Woods Hole Oceanographic Institution, USA	Serge Planes The University of Perpignan, France	Dr. Serge Planes Centre de Recherche Insulaire et Observatoire de l'Environnement, France
Stephen Pond University of British Columbia, Canada	Dr Alistair G. B. Poore University of New South Wales, Australia	Hugh Possingham The University of Queensland, Australia
Donald C. Potts University of California Santa Cruz, USA	Bob Pressey James Cook University, Australia	Joseph M. Quattro University of South Carolina, USA
Gabriel Quijandria The Nature Conservancy-Peru	Pete Raimondi University of California Santa Cruz, USA	Vina Ram-Bidesi University fo the South Pacific, Fiji
C. Lynn Raulerson University of Guam, Guam USA	Dr. Laurie J. Raymundo University of Guam Marine Laboratory, Guam USA	Erin L. Rechisky University of British Columbia, Canada
James Davis Reimer, Ph.D. University of the Ryukyus, Japan	Nathalie Reynolds, PhD University of San Diego, USA	Anthony James Richardson University of Queensland, Australia
Tyrone Ridgway The University of Queensland, Australia	Matthew L. Rise, Ph.D. Memorial University of Newfoundland, Canada	Daniel Rittschof Duke University, USA; National University of Singapore, Singapore
David Alan Ritz University of Tasmania, Australia	Steven B. Roberts University of Washington, USA	Dr. Leonie Robinson University of Liverpool, U.K.

Andrew A. Rosenberg, Ph.D.
University of New Hampshire, USA

Dr. Barry Russell
Arafura Timor Research Facility,
Australia

John Ryan
Monterey Bay Aquarium Research
Institute, USA

Christopher Sabine, Ph.D.
University of Hawaii, USA

Isidro T. Savillo
Society of Wetland Scientists, Asia
Chapter, Philippines

Robert Scheibling, Ph.D.
Dalhousie University, Canada

Tom Schils
University of Guam Marine
Laboratory, Guam USA

Stephen H. Schneider
Stanford University, USA

Chris Scholin
Monterey Bay Aquarium Research
Institute, USA

Raymond Seed
Bangor University, Wales

Steven E. Seifried, Ph.D.
University of Hawai'i, USA

Jose I. Sepulveda-Vidal
Pontificia Universidad Catolica de
Valparaiso, Chil

David G. Shaw
University of Alaska, USA

Dr. Marcus Sheaves
James Cook University, Australia

Barry F. Sherr
State University Corvallis, USA

Evelyn B. Sherr
State University Corvallis, USA

William B. Sherwin
University of New South Wales,
Australia

Dr. Thomas C. Shirley
Texas A&M University, USA

Dr. Jamie Shutler
Plymouth Marine Laboratory, UK

Charles Arthur Simenstad
University of Washington, USA

Helen Nilsson Sköld, Ph.D.
University of Gothenburg, Sweden

George N. Somero
Stanford University, USA

Erik Edward Sotka
College of Charleston, USA

Su Sponaugle, Ph.D.
Rosenstiel School of Marine &
Atmospheric Science, USA

Alan Springer
University of Alaska, USA

John J. Stachowicz
University of California Davis, USA

Dr. Mark Steer
The Society for Environmental
Exploration/Frontier, UK

Andreas Steigen
University of The Gambia, The Gambia

Peter Steinberg
University of New South Wales,
Australia

Richard Steiner
University of Alaska, USA

Dr. Michael S. Stekoll
University of Alaska, USA

Robert S. Steneck, Ph.D
University of Maine, USA

Jonathon Stillman
San Francisco State University, USA

Gregory S. Stone, Ph.D.
Global Marine Programs, New
England Aquarium, USA

Allan Strand
College of Charleston, USA

Donald R. Strong
University of California Davis, USA

Ninghu Su
James Cook University, Australia

Kristina Sundbäck
University of Gothenburg, Sweden

Dr Carl Johan Svensson
University of Gothenburg, Sweden

Dr. Alina M. Szmant
UNCW-Center for Marine Science,
USA

Liana Talaue-McManus, Ph.D.
University of Miami, USA

Gordon T. Taylor, Ph.D.
Stony Brook University, USA

Nora Terwilliger
University of Oregon, USA

Dr. Randy R. Thaman
University of the South Pacific, Fiji

Stuart H. Thompson
Stanford University, USA

Raymond Thompson, PhD
Memorial University, Canada

Simon Thorrold
Woods Hole Oceanographic
Institution, USA

Dr. Ian R. Tibbetts
The University of Queensland,
Australia

Fausto Tinti, PhD
University of Bologna, Italy

Joseph J. Torres
University of South Florida, USA

Dr. Antonio Trujillo-Ortiz
Universidad Autonoma de Baja
California, Mexico

Miriam Helena Tuaty Guerra
Instituto Nacional dos Recursos
Biológicos Nacionais, Brazil

Dr. John R. Turner
Bangor University, Wales

Dr. Alexander Turra
São Paulo Univesity, Brazil

Dr. Sven Uthicke Australian Institute of Marine Science, Australia	Robert L. Vadas, Sr. University of Maine, USA	Rebecca J. Van Beneden University of Maine, USA
Cindy Lee Van Dover Duke University, USA	Dr. Lynne van Herwerden James Cook University, Australia	Dr. Madeleine van Oppen Australian Institute of Marine Science, Australia
Catsiki Vassiliki-Angelique Hellenic Centre for Marine Research, Greece	Dr. Peter G. Verity Skidaway Institute of Oceanography, USA	Philomene Verlaan, Ph.D. University of Hawaii, USA
Peter Vitousek Stanford University, USA	Ernst von Weizsäcker University of Santa Barbara, USA	Dr. Benjamin Walther Australian National University, Australia
Guangyi Wang University of Hawai'i, USA	Dr Selina Ward The University of Queensland, Australia	Robert Warner University of California Santa Barbara, USA
Douglas Wartzok, Ph.D. Florida International University, USA	James M. Watanabe Stanford University, USA	Scarla J. Weeks, Ph.D. The University of Queensland, Australia
Kristi West, Ph.D. Hawaii Pacific University, USA	Dr Neil J. White CSIRO Marine and Atmospheric Research, Australia	Robert Whitlatch University of Connecticut, USA
Clive Wilkinson, Ph.D. Global Coral Reef Monitoring Network, Australia	Terrie M. Williams University of California Santa Cruz, USA	Dr. Gray A. Williams The University of Hong Kong, Hong Kong
Stephen E. Williams, Ph.D. James Cook University, Australia	Susan L. Williams, Ph.D. University of California Davis, USA	Bette Willis James Cook University, Australia

Jon D. Witman
Brown University, USA

Jeff Wright
The University of Tasmania,
Australia

Sylvia B. Yamada, Ph.D.
Oregon State University, USA

David Yellowlees
James Cook University, Australia

Hwan Su Yoon
Bigelow Laboratory for Ocean
Sciences, USA

Oran R. Young
University of California Santa
Barbara, USA

Dr. Chaoshu Zeng
James Cook University, Australia

Chuanlun Zhang
University of Georgia, USA