**Survey Statistics**

Forty-eight statements were compiled and adapted from key international horizon scanning literature (e.g., CCA 2012; Fleishman et al. 2011; Parsons et al. 2014; Sutherland et al. 2006; Sutherland et al. 2013.; international processes were designed to prioritise scientific research with respect to maintaining a healthy environment. Workshop participants ranked each of the statements to identify how marine science can contribute to our economic, cultural and environmental wellbeing.

Results showed clear priorities across all workshop participants toward managing for cumulative impacts, integrated management, undesirable change, stewardship and restoration, balancing of long and short term benefits, effective appropriately resourced networks, and translation of knowledge into practise. Workshop participants included a range of expertise in marine science, from established to emerging scientists, across research institutes, universities, and government agencies, and across marine disciplines including social sciences, ecology, physics, chemistry, geology, economy, modelling, and marine governance. Highest ranking statements (16 of 48) were then compiled to develop five over-arching research themes that were discussed at roundtables at the workshop, identifying strategic science gaps and research priorities for each theme.

Results from the pre-workshop survey (n=30) showing rank based on the percent of respondents that ranked a statement as high priority (ranking of either 1 or 2).

| 1 & 2 rank | | Statement |
| --- | --- | --- |
| Rank | % |
| 1 | 87 | Identifying the policy, legal, or institutional arrangements that are effective in integrating management for terrestrial watersheds and adjacent coastal environments |
| 2 | 80 | Developing techniques to quantify change and risk to ecosystem integrity associated with multiple stressors and cumulative impacts |
| 2 | 80 | Identifying techniques to define tipping points and the consequences of alternative states |
| 4 | 77 | Establishing and maintaining a network of institutions to identify and monitor environmental change and its impacts on biodiversity |
| 4 | 77 | Identifying the ensemble of indicators to assess the state of coasts and ocean |
| 6 | 73 | Establishing effective innovative governance systems which provide incentives to private and public sector leaders at all levels to engage and support healthy marine ecosystems and community wellbeing |
| 6 | 73 | Identifying the impacts and mitigation measures of marine and land based activities including emerging contaminants, new energy sources, and spills and accidents |
| 8 | 70 | Formulating solutions which improve the wellbeing of communities and the environment simultaneously |
| 8 | 70 | Establishing how uncertainty, risk, and precautions should be incorporated into effective ocean governance and policy-making |
| 10 | 69 | Identifying the environmental and social impacts, benefits, and risks of human activities in oceans undergoing change due to extractive industries, fishing, tourism, navigation, and traditional uses |
| 11 | 67 | Finding appropriate and effective methods of valuing marine environments (including marine-based resources) |
| 11 | 67 | Identifying the links between marine ecosystem function (including biodiversity and compositional structure components), ecosystem services and values |
| 11 | 67 | Identifying the strategies which can be used to promote long-term integrated cross-disciplinary collaborations in ocean science and management |
| 14 | 63 | Including public involvement and formal recognition of customary rights in conservation decisions which aim to shape effective conservation interventions |
| 14 | 63 | Identifying which aspects of climate change, e.g storms, sediment transport, are most likely to affect marine ecosystems and coastal communities |
| 16 | 60 | Identifying techniques to develop adaptive management strategies and assess their social, ecological and economic effectiveness |
| 16 | 60 | Determining how exchanges of energy and matter connect habitats and ecosystems to maintain ecosystem function |
| 16 | 60 | Understanding the unique challenges of high seas management and the best methods for ensuring effective and credible high seas governance and conservation outside national jurisdiction |
| 19 | 57 | Identifying what investments will encourage strong and sustainable partnerships among people, communities, governments and businesses |
| 19 | 57 | Incorporating the provision of tools such as marine spatial planning into marine conservation planning and management of marine ecosystem services |
| 19 | 57 | Identifying ways to financially and structurally support innovation in maintaining or improving marine ecosystems and economies |
| 19 | 57 | Evaluating the consequences of biotic invasion and native species loss on biodiversity and ecosystem function |
| 19 | 57 | Identifying significant benefits provided by poorly understood ecosystems (e.g. deep oceans) |
| 24 | 55 | Ascertaining how marine ecosystems can support food security, cultural security, and human well-being |
| 25 | 53 | Identifying methods that allow for resource and value trade-offs for social-ecological costs and benefits |
| 25 | 53 | Evaluating the timeframe of ecological information needed to make management decisions |
| 27 | 48 | Identifying the most critical messages and concepts that should be communicated to citizens to influence their beliefs and attitudes regarding ocean management |
| 28 | 47 | Evaluating the effects of increasing human dissociation from nature on the management of marine biological diversity |
| 28 | 47 | Identifying technologies and strategies to deliver ocean-based renewable and non-renewable resources to society with minimal harm to the ocean environment |
| 28 | 47 | Identifying decision making frameworks required to establish a socially and ecologically sustainable balance between aquaculture and wild fisheries in marine ecosystems |
| 28 | 47 | Determining how the dispersal of marine species functionally connects populations and locations |
| 28 | 47 | Identifying how climate change will affect the integrity of polar systems |
| 33 | 45 | Evaluating the benefits and costs of integrating ocean governance across environment, health, and trade |
| 34 | 43 | Assessing the effects of different strategies for building community capacity on levels of citizen engagement in coastal and ocean stewardship, restoration, and conservation |
| 34 | 43 | Identifying effects of exploration and exploitation of marine resources in Antarctica |
| 37 | 40 | Identifying the inequalities in social power which contribute to non-optimal recognition and appreciation of ecosystem values |
| 37 | 40 | Investigating how different political cultures and institutions affect the acquisition and treatment of scientific evidence in ocean policy formulation, implementation and evaluation |
| 37 | 40 | Evaluating how humankind's various worldviews influence management priorities for marine ecosystems |
| 33 | 40 | Finding which strategies for distributing the material benefits derived from biodiversity most effectively foster environmental stewardship |
| 37 | 38 | Identifying which local and traditional knowledge can be synthesised with scientific knowledge to inform ocean science management and governance |
| 41 | 37 | Managing the feedback loops of each social/economic action |
| 41 | 37 | Evaluating the effects of climate change associated dispersal and colonisation on ecosystem function in polar oceans |
| 41 | 37 | Finding methods which can identify, reduce, and integrate sea surface temperature and sea-ice-related uncertainty in climate modelling systems |
| 44 | 34 | Evaluating the degree to which MPAs can provide resilience or a buffer against ecosystem disruption caused by climatic changes or human activities |
| 45 | 33 | Identifying the economic incentives which will reward efforts that create long-term economic prosperity |
| 46 | 27 | Assessing the impacts of contaminant spills and accidents in polar and deep seas, and the appropriate strategies and technologies for prevention and mitigation |
| 47 | 20 | Discerning how management practises and environmental variability influence how pathogens and parasites affect marine ecosystems |
| 48 | 17 | Assessing how paleo-oceanographic records can be used to predict the future state of the ocean-atmosphere system |