



PROCEEDINGS OF THE
THIRD INTERNATIONAL CONFERENCE
ON **MARINE MAMMAL**
PROTECTED AREAS

ICMMPA 3: *Important Marine Mammal Areas —
A Sense of Place, A Question of Size*

November 9-11, 2014 Adelaide, Australia Editor: Erich Hoyt



EDITOR

Erich Hoyt

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- Whale and Dolphin Conservation (WDC)

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In the preparation of the report, we would like to give our sincere appreciation to Rebecca White for design and layout and handling input of the corrections, to Jim Lee and Gary Duker for copy editing, and to Doug DeMaster for helping to facilitate the production and printing.

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Cover photo: Baird's beaked whales surfacing in the Commander Islands State Biosphere Reserve.
Photo by Russian Cetacean Habitat Project, Whale and Dolphin Conservation (WDC)

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Editor: Erich Hoyt

Working toward Important Marine Mammal Areas (IMMAs)

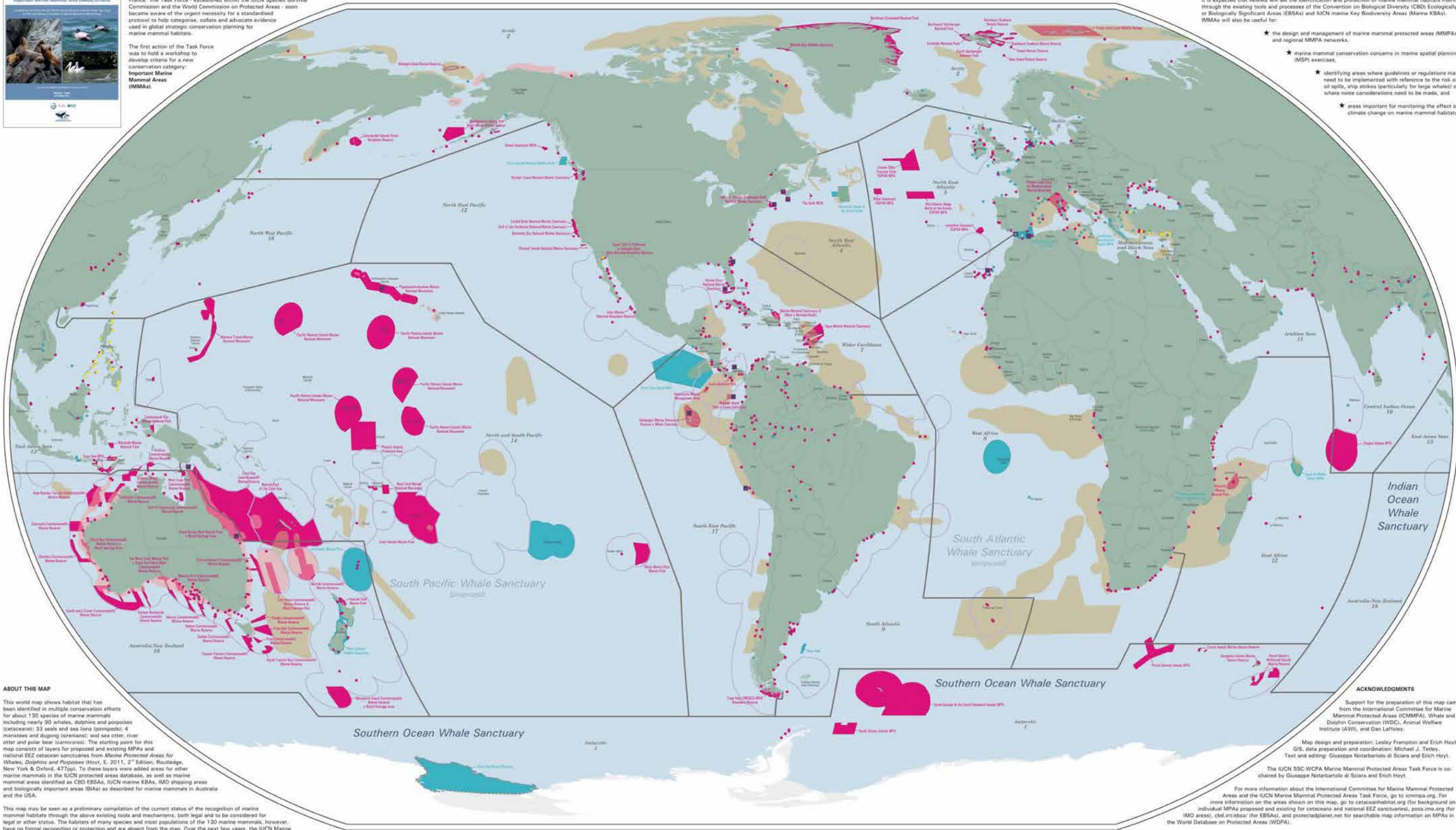
Preliminary Indications of Marine Mammal Habitat from Various Existing Political and Biological Designations



IUCN MARINE MAMMAL PROTECTED AREAS TASK FORCE

In October 2013, the IUCN Marine Mammal Protected Areas Task Force was launched by IUCN and the International Committee for Marine Mammal Protected Areas (ICMMPA) at the 3rd International MPA Congress (IMPAC 3) in Marseille, France. The Task Force - established within the IUCN Species Survival Commission and the World Commission on Protected Areas - soon became aware of the urgent necessity for a standardised protocol to help categorise, collect and advocate evidence used in global strategic conservation planning for marine mammal habitats.

The first action of the Task Force was to hold a workshop to develop criteria for a new conservation category: **Important Marine Mammal Areas (IMMAs)**.



ABOUT THIS MAP

This world map shows habitat that has been identified in multiple conservation efforts for about 130 species of marine mammals including nearly 90 whales, dolphins and porpoises (cetaceans); 33 seals and sea lions (pinnipeds); 4 manatees and dugong (sirenians); and sea otter, river otter and polar bear (carnivores). The starting point for this map consists of layers for proposed and existing MPAs and national EEZ cetacean sanctuaries from *Marine Protected Areas for Whales, Dolphins and Porpoises* (Hoyt, E. 2011, 2nd Edition, Routledge, New York & Oxford, 477pp). To these layers were added areas for other marine mammals in the IUCN protected areas database, as well as marine mammal areas identified as CBD EBSAs, IUCN marine KBAs, IMO shipping areas and biologically important areas (BIAs) as described for marine mammals in Australia and the USA.

This map may be seen as a preliminary compilation of the current status of the recognition of marine mammal habitats through the above existing tools and mechanisms, both legal and to be considered for legal or other status. The habitats of many species and most populations of the 130 marine mammals, however, have no formal recognition or protection and are absent from the map. Over the next few years, the IUCN Marine Mammal Protected Areas Task Force plans to evaluate the evidence for the habitat needs of these species and to identify many new areas across the ocean and thereby to create a network of Important Marine Mammal Areas (IMMAs).

Habitat areas that are less than about 2,000 km² are shown as points while most areas larger than that are shown as polygons. This map uses a modified Robinson Projection centred on 81° West.



COLOUR KEYS FOR POTENTIAL IMPORTANT MARINE MAMMAL AREAS AS SHOWN ON THE MAP

- Existing Marine Mammal Protected Areas (MMPAs), designated by law in the waters of one or more countries, or on the high seas by regional agreement. Also includes freshwater habitats for river and a few other dolphins, freshwater pinnipeds, sirenians, and otters as well as limited areas for polar bears and land-based rookeries and haulouts for pinnipeds. MMPAs are defined as MPAs either declared for marine mammals or known to include important marine mammal habitat.
- Proposed Marine Mammal Protected Areas (p-MMPAs)
- Ecologically or Biologically Significant Areas (EBSAs) identifying marine mammal habitat through the Convention on Biological Diversity (CBD). EBSAs appear as continuous areas on the map. Some about or have smaller overlapping sites contained inside but these are not delineated on the map. The EBSAs shown include a few that have been agreed at workshops but are pending approval by the CBD.

- IUCN Marine Key Biodiversity Areas (Marine KBAs), selected in limited countries to date as outstanding examples of marine biodiversity (locations shown include marine mammal habitats)
 - Particularly Sensitive Sea Areas (PSSAs) and other International Maritime Organisation (IMO) directives for marine mammal habitats (shipping lanes or speed restrictions in or near marine mammal habitats)
 - Biologically Important Areas (BIAs) with marine mammal habitat (in Australia and USA only). BIAs that abut or overlap are shown continuously on the map.
 - National (EEZ) Marine Mammal Sanctuaries (areas declared mainly as "no hunting areas" for cetaceans in the national waters of a country or territory)
- The oceans of the world, as shown on the map, are divided into 18 marine regions according to accepted IUCN World Commission on Protected Areas (WCPA) divisions.

Two International Whaling Commission (IWC) ocean-wide sanctuaries are noted on the map: the Indian Ocean Whale Sanctuary and the Southern Ocean Whale Sanctuary. There are also two proposed IWC sanctuaries: South Atlantic Whale Sanctuary and South Pacific Whale Sanctuary. These are mainly no-whale-hunting areas although they have stimulated considerable scientific research and debate, as well as engagement by bordering countries. Yet, because of their large scale, they are not considered to be contributing to knowledge of specific marine mammal habitat areas.

IMPORTANT MARINE MAMMAL AREAS (IMMAs)

Important Marine Mammal Areas (IMMAs) are discrete portions of habitat, important to one or more marine mammal species, which have the potential to be delineated and managed for conservation.

It is expected that IMMAs will aid the identification and protection of marine mammal habitats mainly through the existing tools and processes of the Convention on Biological Diversity (CBD) Ecologically or Biologically Significant Areas (EBSAs) and IUCN marine Key Biodiversity Areas (Marine KBAs). IMMAs will also be useful for:

- ★ the design and management of marine mammal protected areas (MMPAs) and regional MMPA networks.
- ★ marine mammal conservation concerns in marine spatial planning (MSP) exercises.
- ★ identifying areas where guidelines or regulations may need to be implemented with reference to the risk of oil spills, ship strikes (particularly for large whales) or where noise considerations need to be made, and
- ★ areas important for monitoring the effect of climate change on marine mammal habitats.

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Support for the preparation of this map came from the International Committee for Marine Mammal Protected Areas (ICMMPA), Whale and Dolphin Conservation (WDC), Animal Welfare Institute (AWI), and Dan Laffoley.

Map design and preparation: Lasey Frampton and Erich Hoyt. GIS, data preparation and coordination: Michael J. Tetley. Text and editing: Giuseppe Notarbartolo di Scara and Erich Hoyt.

The IUCN SSC/WCPA Marine Mammal Protected Areas Task Force is co-chaired by Giuseppe Notarbartolo di Scara and Erich Hoyt.

For more information about the International Committee for Marine Mammal Protected Areas and the IUCN Marine Mammal Protected Areas Task Force, go to icmmpa.org. For more information on the areas shown on this map, go to cetaceanhabitat.org for background on individual MPAs proposed and existing for cetaceans and national EEZ sanctuaries, psa.imo.org (for IMO areas), cbd.int/ebsa/ (for EBSAs), and protectedplanet.net for searchable map information on MPAs in the World Database on Protected Areas (WDPA).

This map should be considered as a draft living document. The latest high resolution version of the map and other Task Force documents, including the "Criteria Report" shown top left, can be freely downloaded from the Task Force website: mmpatf.org. Please send additions, changes and suggestions to both Erich Hoyt, erich.hoyt@me.com and Giuseppe Notarbartolo di Scara, discara@gmail.com.





Contents

Executive Summary and Main Conclusions	1
---	----------

Conference Welcome and Opening Talks

Naomi McIntosh (Chair, International Committee on Marine Mammal Protected Areas – ICMMPA, and NOAA Office of National Marine Sanctuaries, Pacific Islands Region, Hawaii, USA), Uncle Frank Wanganeen (Kaurua Elder), Mike Bossley (Manager, Science and Education, Whale and Dolphin Conservation Australasia, Australia), and Senator Simon Birmingham (Parliamentary Secretary to the Minister for the Environment and Senator for South Australia).	3
--	----------

Keynote 1: Jeff Ardron (Senior Fellow, Institute for Advanced Studies in Sustainability – IASS, Germany) Developing Protected Area Criteria: Be Careful What You Wish For	5
---	----------

Keynote 2: Erich Hoyt (Research Fellow, Whale and Dolphin Conservation, and Co-Chair, IUCN Marine Mammal Protected Areas Task Force, UK) Marine Mammal Protected Areas: Small, Big, Good, Bad and Why We Need to Map Important Marine Mammal Areas (IMMAs)	7
--	----------

Panel 1: Putting MMPAs and IMMAs on the International Agenda	9
---	----------

Panel 2: How Are Marine Mammals Being Managed in Small MMPAs?	13
--	-----------

Panel 3: How Marine Mammals Are (or Could Be) Managed in Large MPAs	17
--	-----------

Panel 4: Regional Issues	21
---	-----------

Panel 5: Public Engagement: Expanding Constituencies of Support by Reaching Wider Audiences.	25
---	-----------

Workshop 1: Synergies between Marine Mammal Conservation and Marine Spatial Management	29
---	-----------

Sidebar 1. Case Study on MSP in the Aegean Sea to support Mediterranean monk seal conservation	31
---	-----------

Workshop 2: Regional Cooperation.	33
--	-----------

Workshop 3: Wildlife Interpretation and Education: Connecting with Marine Mammals and Their Habitats	35
---	-----------

Workshop 4: Protecting Spinner Dolphin Resting Areas	41
---	-----------

Workshop 5: Marine Mammal Tourism	47
--	-----------

Workshop 6: Making Very Large MMPAs Work for Marine Mammal Conservation	51
--	-----------

Workshop 7: Program of Work for the Delivery of Important Marine Mammal Areas	53
--	-----------

Sidebar 2. IMMA strategic planning workshop assessment: Breakdown by timeframe	57
---	-----------

Workshop 8: Citizen Science and Important Marine Mammal Areas.	59
---	-----------

Workshop 9: Examining the Unique Threats in Small Coastal MMPAs along Heavily Developed Coastlines.	63
--	-----------

Keynote 3: David Mattila (Technical Adviser, Human Impact Reduction, Secretariat, International Whaling Commission, USA) MMPAs Take on New Responsibilities and Roles Beyond Their Borders . . .	69
Keynote 4: Naomi McIntosh (Chair, International Committee on Marine Mammal Protected Areas – ICMMPA, and NOAA Office of National Marine Sanctuaries, Pacific Islands Region, Hawaii, USA) The International Committee on Marine Mammal Protected Areas: Reflecting on What We're Learning after Three Conferences in Six Years . . .	71
Pre-Conference ICMMPA 3 Workshop: Regional Expert Workshop to Test the Draft Criteria Used in the Identification of Important Marine Mammal Areas (IMMAs)	73
Public Event: Talks by Tony Flaherty and Erich Hoyt.	81
Brief Reports from the IUCN World Parks Congress Ocean+ Pavilion	83
Steering and Program Committee, International Committee on Marine Mammal Protected Areas – ICMMPA	84
Organization, Contacts, and Acronyms	85

Executive Summary and Main Conclusions

More than 100 marine mammal protected area (MMPA) researchers, managers as well as government and conservation group representatives from 20 countries convened in Adelaide, South Australia, from 9-11 November 2014 for the Third International Conference on Marine Mammal Protected Areas (ICMMPA 3). The two main goals were (1) to highlight the importance of place and size for protected areas that feature or include marine mammals, and (2) to explore the use of a new tool for conservation — the important marine mammal area, or IMMA, designation — which the IUCN Marine Mammal Protected Areas Task Force has been developing.

The conference theme “Important Marine Mammal Areas - A Sense of Place, a Question of Size” was explored in panels and workshops. Many large new MPAs designated by Pacific nations as well as the USA, UK and France have come on-stream in the last few years. They are presenting new challenges for management. The conference also wanted to revisit the smaller areas and how they can help marine mammal conservation. But the spotlight was on IMMAs. Modeled after the successful conservation tool of important bird areas (IBAs), IMMAs are defined as “discrete portions of habitat, important to one or more marine mammal species, which have the potential to be delineated and managed for conservation.” Thus, IMMAs are not in themselves MMPAs and neither are MMPAs de facto IMMAs. Rather, the IMMA is a scientific tool that has the potential to lead to place-based conservation. The policy response could be designation of one of a range of space-based tools, including MMPAs and MMPA networks, marine spatial planning (MSP), and marine traffic directives through the International Maritime Organisation (IMO). Other potential policy responses could be to check how existing MMPAs or zoning designations correspond to the IMMAs selected, or to make a decision simply to monitor a given area over time. The IMMA criteria, to be finalized in 2015, are aiming to be consistent with CBD’s ecologically or biologically significant areas (EBSAs), IUCN key biodiversity areas (KBAs), and biologically important areas (BIAs) identified in Australia and the USA.

The conference was co-hosted by Whale and Dolphin Conservation (WDC) Australasia and the governments of Australia and South Australia. In various talks and workshops, participants were introduced to the small but effective local Adelaide Dolphin Sanctuary as well as on the final evening with a WDC-sponsored dinner cruise through the sanctuary. Other organizations helping to sponsor the conference included the French MPA Agency, the IUCN Marine Mammal Protected Areas Task Force, the U.S. Marine Mammal Commission, the Eulabor Institute, International Fund for Animal Welfare (IFAW), the Secretariat of the Pacific Regional Environment Programme (SPREP), and the Government of México’s National Commission of Natural Protected Areas (CONANP).

During the conference, the French Marine Protected Agency announced a joint agreement for networking between the

Agoa Sanctuary in the French Caribbean and the Saguenay–St. Lawrence Marine Park in Québec, Canada. Some humpbacks make the journey between the two parks every year. On the final day, the conference applauded the declaration of Bangladesh’s first offshore marine protected area to safeguard Bryde’s whales, tropical dolphins, sea turtles, and sharks in the Swatch-of-No-Ground. The ICMMPA has promoted the sister sanctuary concept as a network initiative and has been supportive of the Bangladesh MMPA network’s extension to offshore waters.

Key ideas and recommendations that emerged from ICMMPA 3 followed mainly from workshop discussions on the various topics.

- There was considerable debate about marine spatial planning (MSP), which is being adopted by many countries to plan future use of the ocean. Given the lack of robust and consistent data on marine mammal distribution and densities – let alone ecological requirements – it was agreed that MSP initiatives ought to focus on identifying areas of potentially high threat to marine mammals, and to use those hotspots to guide further, improved modeling, along with real data acquisition from marine mammal surveys and applied research. In this way, MSP can help marine mammal conservation by prioritizing where intense research needs to be done, in order to acquire the kind of science needed to guide MSP in such a way that it benefits marine mammals. MSP is an iterative process, so applied and focused marine mammal research can and should be made available to planners and those practicing adaptive management, to fine-tune marine plans and adjust MPA borders and regulations over time. Yet there is some urgency – and innovative ways of collecting data are urgently needed. The MSP workshop stressed the objective to use MSP to avoid marine mammal decline that might occur from uncontrolled activities creating a sea of degradation in which MMPA islands of protection sit.
- The conference included participants from Pacific islands, many of which have relatively small human populations with extraordinarily large marine exclusive economic zones (EEZs). With both a panel and workshop focusing on the Pacific islands region, as well as regional input in most sessions, participants recognized that community groups can play a vital role in establishing MMPAs, both by raising public awareness and by influencing governments. However, capacity building is vital for community groups in Pacific Island countries seeking to learn more about their marine mammals and to improve the protection available to them. It was recommended that conservation groups, universities and other institutions, along with marine mammal biologists and regional and government agencies, can provide valuable assistance to community groups in the establishment and management of MMPAs in the Pacific Islands.



Conference keynote and opening speakers, from left to right, Mike Bossley, Naomi McIntosh, Erich Hoyt, Senator Simon Birmingham and Jeff Ardron. Photo: Nikki Zanardo.

- The workshops also provided a valuable forum to exchange ideas among whale watching tour operators and researchers, managers of both large and small MMPAs, including small MMPAs along heavily developed coastlines, as well as spinner dolphin researchers involved in protected areas around the world. Ideas emerging were the need to quantify threats and identify allies, as well as being clear about the objectives and the limitations of MMPAs, particularly in degraded habitats.
- Almost every keynote, panel and workshop talk and subsequent discussion focused on the need for ICMMPA and conference delegates to engage more stakeholders in MMPAs and to keep them engaged. MMPAs can provide a valuable sense of ownership and without that it is difficult to make things work. With the prospect of work on the IMMAs, too, although the selection of such areas is seen as a scientific process, gaining acceptance and traction for IMMAs in terms of using them as tools for conservation will depend upon the engagement of stakeholders. The Citizen Science workshop went even deeper into this issue, coming up with ideas to train and nurture more citizen scientists who would be at the leading end of stakeholder groups.
- The education and interpretation workshop also stressed the need to connect people with the ocean — not just the nearshore waters but offshore waters and the great expanse of the high seas. It is envisaged that this would involve a process of reaching out to stakeholders who now use the high seas, including cruise and container ships, fishing boats and others, which could become “vessels of opportunity” to obtain data, create educational engagement as well as using technology to “reach out” to the high seas and bring it into interpretive centers, living rooms and the hearts and minds of people. As the high seas are being mapped for IMMAs and explored as

possible MMPAs, this role of connecting the public will be essential.

- Several panels and workshops produced valuable discussions about IMMAs. These led to insights into the current thinking about how IMMAs could be useful and desirable tools for global marine mammal conservation. Secondly, the discussions provided specific recommendations for the IMMA initiative of the Marine Mammal Protected Areas Task Force of which the three below are highlighted:
 - (1) The Task Force should establish a secretariat to oversee the IMMA development, delivery and implementation. This includes building of networks and management of expert working groups.
 - (2) The Task Force should set up a community-wide consultation on the IMMA criteria to assist with their finalization and overall credibility of use.
 - (3) The Task Force should prepare an IMMA Toolkit detailing methods to be used in IMMA identification and assessment of available data types, with examples from data-rich and data-poor areas.

The ICMMPA conferences will continue every 2-4 years, with a proposed ICMMPA 4 in México in late 2016 or 2017. ICMMPA 4 will be sponsored by the Government of México’s National Commission of Natural Protected Areas (CONANP). Behind the scenes the International Committee for Marine Mammal Protected Areas plans to work with the IUCN Marine Mammal Protected Areas Task Force to help plan and implement the IMMAs concept. In addition, the Committee will continue to help address the needs expressed in the recommendations and to promote better networking and problem solving through the growing constituency developed from the first three conferences and in the plans for the next conference.

Conference Welcome and Opening Talks

Naomi McIntosh, Chair of the International Committee on Marine Mammal Protected Areas, gave us all a warm “Aloha” and then introduced **Uncle Frank Wanganeen**. Speaking in the Kurna language, Uncle Frank, a Kurna Elder born at Wallaroo on Narungga country, gave us a formal welcome to Kurna lands. Naomi then thanked all the participants for coming, some from great distances and introduced award-winning conservationist and scientist **Mike Bossley**. The Third International Conference on Marine Mammal Protected Areas (ICMMPA 3) would not have happened without Mike’s efforts over several years to bring the conference to Adelaide. Mike is from the Australian office of Whale and Dolphin Conservation, which is based in Adelaide. Mike has had a long career working internationally for whale and dolphin conservation as well as locally with scientific and conservation work on the bottlenose dolphins living in the Adelaide Dolphin Sanctuary. Mike founded the sanctuary and has helped make it into a popular feature of the city. Mike’s welcoming thoughts were followed by **Senator Simon Birmingham**’s remarks on Australia’s work on marine mammal protected areas (MMPAs) and other aspects of habitat conservation with Australia’s role in the Pacific. These were followed by two invited keynote talks from two international conservation experts from outside the region, **Jeff Ardron** and **Erich Hoyt**.

Mike Bossley (Manager, Science and Education, Whale and Dolphin Conservation Australasia, Australia)

The media tends to focus on actions such as harassing whalers in Antarctica or sealers in Newfoundland so the general public thinks that these are the most important issues in marine mammal conservation. We here all know the protection of habitat is ultimately of far more significance to the survival of species: no habitat equals no species, and I believe we must work harder to get this message understood more widely.

We are honored to have so many stellar workers for marine mammal protected areas at the conference. The fact that many have travelled half way round the world to get here is testimony to the importance they give place-based conservation.

An important and unique aspect of ICMMPA is that it brings together researchers, policy makers, managers, tourism operators and NGOs. Collaboration between all stakeholders is necessary for the effective identification of critical habitat, the design of adequate protection, the marketing of these habitats to politicians and the public, and achieving compliance.

An equally important feature of ICMMPA is that it makes every effort to include participants from developing countries and small island states. Despite serious financial constraints the achievements of some developing countries have been outstanding and I particularly look forward to hearing more about these during the conference.

The keynote speakers, the panels and the workshops will cover many facets of issues surrounding the protection of habitats for

marine mammals. I am sure that when it comes time for the final wrap on Tuesday afternoon there will be exciting new ideas to share and many calls to action.

Finally, achieving this conference depends on the support of many governments and NGOs. I would like to thank the Australian, U.S. and French governments; the state government of South Australia; WDC, and all the other sponsors that made this conference possible.

Senator Simon Birmingham (Parliamentary Secretary to the Minister for the Environment, Australia) (edited extract)

Today we face heightened and multiple challenges in our stewardship of oceans. These include pollution, climate change, coastal degradation and how we can better protect marine mammals. We will discuss all this in the coming days.

Within this region and globally, Australia recognizes we have an important role to play. Our major transboundary management issues relate to the Pacific Islands region which covers 32 million km² and is in the middle of the largest continuous marine habitat on the planet – the Pacific Ocean. This region is home to a diverse range of large marine animals, including cetaceans and dugongs, with over half the world’s known species of cetaceans and the world’s largest remaining populations of dugong in this area. The continuing health of populations of these marine animals is essential to maintaining a healthy Pacific Ocean.

Australia, as a founding member of and donor to the Pacific Regional Environment Programme (SPREP), wishes to congratulate SPREP for developing The Pacific Islands Regional Marine Species Programme 2013 – 2017 which outlines actions for the conservation of dugongs, marine turtles, and whales and dolphins. Australia is also a key partner to the Coral Triangle Initiative, and the Framework for a Pacific Oceanscape.

As a marine nation with the third largest marine jurisdiction in the world, Australia has a strong interest in conserving and sustainably managing the 16 million km² of ocean within our jurisdiction. It’s estimated that oceans contribute approximately AUD \$44 billion per annum to the Australian economy. This is projected to increase to some \$100 billion per annum by 2025. One of Australia’s iconic protected areas is the Great Barrier Reef World Heritage Area. The maze of 3000 coral reefs and 1050 islands is spread over 348,000 km² — an area the size of Italy.

The Great Barrier Reef Outlook Report 2014 confirms that the Great Barrier Reef’s outstanding universal value and integrity remain largely intact but that it faces continuing threats from climate change, poor water quality associated with land-based run-off, impacts from coastal development, and remaining impacts of fishing. We are working to support the Reef through our Reef 2050 plan, the establishment of the Reef Trust, and by funding other projects.



Blue whale. Photo: Lucy Molleson, courtesy Whale and Dolphin Conservation (WDC)

Australia's marine protected area estate covers some 3.2 million km², or about 36 percent of the waters within Australia's jurisdiction, making it the largest representative network of marine protected areas in the world. Australia has exceeded the 10 percent Aichi Target for marine protected areas.

The Australian Government has developed a spatial concept to inform decisions about the protection and management of protected species, including marine mammals. This concept is known as biologically important areas (BIAs). BIAs are not necessarily protected areas, but rather areas where it is known that a species displays biologically important behaviors, such as breeding, foraging, resting and migration. BIAs have been identified for 75 protected species in Australian waters including seabirds, turtles, sharks, five whales, three inshore dolphins, dugong and the Australian sea lion.

BIAs have been identified using expert scientific knowledge about species' distribution, abundance and behavior in a marine region. The process for creating BIAs involves mapping proposed areas digitally, based on expert advice and published literature, and then obtaining independent scientific review of the proposed areas. BIA maps and descriptions are displayed in a visual tool, the Conservation Values Atlas, which is publically available through the web. Whilst BIAs do not have any legal status, they are an additional layer of information used by decision-makers when assessing proposed activities in the marine environment under Australia's national environmental legislation, the Environment Protection and Biodiversity Conservation Act 1999.

Australia is home to 45 species of whale, dolphin and porpoise, some of which are permanent residents in Australian waters, while others migrate from their summer feeding grounds in the Antarctic to the warmer waters of our coast during the winter.

We have long recognized the importance of whales, dolphins and porpoises to our marine ecosystems and believe that it is essential to ensure their survival.

Whale watching tourism is important to the economies of many of our coastal communities. Whale watching is an environmentally sound and economically robust global industry sector, with more than 1.6 million people estimated to be participating in whale and dolphin watching per year. In 2008 whale watching tourism in Australia contributed AUD \$31 million in direct expenditure to the Australian economy.

Australia has committed to implement a Whale and Dolphin Protection Plan which will allocate AUD \$2 million dollars to protect whales and dolphins. The Plan includes a Whale Stranding Action Plan, Dolphin Conservation Plan and a National Whale Trail.

As you know, Australia will be hosting the IUCN World Parks Congress from 11 to 19 November 2014 in Sydney. The Congress will share knowledge and innovation, setting the agenda for protected areas conservation for the decade to come. Of particular relevance to you all is a special event presented 14 November by the IUCN Marine Mammal Protected Areas Task Force in collaboration with IUCN World Commission on Protected Areas and Species Survival Commission, the International Committee on Marine Mammal Protected Areas, Tethys Research Institute and Whale and Dolphin Conservation. The session will present the work of the Marine Mammal Protected Areas Task Force to put important marine mammal areas (IMMAs) on the world map. The talks will highlight the contribution of marine mammals in ecologically or biologically significant areas (also known as EBSAs), marine protected areas and in marine spatial planning (MSP), and will explain the rationale for developing IMMAs.

Keynote 1: Developing Protected Area Criteria: Be Careful What You Wish For

Jeff Ardron

Senior Fellow, Institute for Advanced Studies in Sustainability – IASS, Germany

Protecting places is a good idea that can run into several problems during implementation. The purpose of this talk is to add a few words of caution about unexpected pitfalls that could hurt the MMPA initiative, if we are not mindful of lessons from the past.

1. Protect the right places

It might seem that protecting the ocean is always a good idea, especially since so little of it is protected, yet, in practice, there is limited political, financial, and social will to do so. Therefore, our selections will have to be strategic and well-placed. Compromise, or "paper parks," or mediocre options can do more harm than good. There has been a tendency in the past to protect tracks of ocean that no one else wants ("residual" places). While this may indeed be a good strategy for protecting places from future incursions, it will do little to help marine mammals that are threatened or endangered in their prime, productive habitats, and that need greater protection now.

2. Think globally, act locally (not vice versa)

Almost always, MPA selection is one site at a time — or at best, a few sites at a time. Rarely, if ever, are MPA networks established in one go. However, this should not stop us from thinking about the big picture and how our local sites will contribute to larger networks in the future.

Population viability analyses and other techniques can help to identify life history "bottlenecks" where protection can be most effective. However, in many cases, the full life history of a species will need some sort of protection. Therefore, even if sites are protected one at a time, this is best done in the context of a larger strategy that will end up with an ecologically coherent cluster of sites in the end, perhaps spread across several jurisdictions.

Finally, if there can be an agreed-upon review period (e.g., every 5-10 years), then site delineations can be modified, or even moved, based on monitoring data. Such flexibility is attractive to stakeholders and scientists alike. It can take into account climate change, shifting human uses, and better understanding of what is required to effectively protect the marine mammals in question.

3. Developing MMPA criteria: Aim for the moon with your feet on the ground

Ideally, our MMPA and IMMA criteria would have access to all data, and those data would all be excellent! The reality, as we know, is different. Therefore, our criteria systems should be staged, with basic assessments at the beginning, followed by progressively more sophisticated tests as our MMPA networks, experiences, and data evolve. We must avoid overfitting decisions to limited data, as they are less likely to be robust given time and changing conditions.

To get started, we must recognize those places that are already known to be special. Secondly, we should anchor spatial planning around more persistent features, when possible. Thirdly, let's choose scales that are stable to perturbations (e.g., functional communities vs. only individual species level); and lastly, we must take a portfolio approach (distributing risk across sites with different management strategies).

In this presentation, I have joked that penguins have usurped marine mammals as the new marine superstars. However, that is not to say that the public does not still connect with marine mammals. It remains an incredible advantage that the marine mammal community has over researchers and conservationists trying to champion many other marine species. That said, there is no denying that marine mammal budgets have in many cases been declining and funding has become much more competitive. In this light, I would urge the marine mammal research and conservation communities to reach out to other marine researchers and conservationists. Joining forces in favor of integrated marine protection will help not just the iconic species of the day (be they penguins, whales, dolphins or giant squid), but the marine ecosystem as a whole in the long term.



Keynote speaker Jeff Ardron. Photo: Nikki Zanardo.

Keynote 2: Marine Mammal Protected Areas: Small, Big, Good, Bad and Why We Need to Map Important Marine Mammal Areas (IMMAs)

Erich Hoyt

Research Fellow and Head, Critical Habitat/Marine Protected Areas Programme, Whale and Dolphin Conservation and Co-chair, IUCN Marine Mammal Protected Areas Task Force, UK

The questions surrounding our theme for this conference revolve around the pluses and minuses of small and large MMPAs and what we can do to make them more effective as conservation tools. I'm going to give a status report on whether marine mammals are on the road to good habitat protection. On the high seas, in CBD and other planning, until recently marine mammals have been largely left out of the discussion. But we have a new tool — IMMAs, or important marine mammal areas—and this may help us address a wide range of marine mammal threats related to habitat concerns.

Protecting habitat for wide-ranging marine mammals and their ecosystems is coming of age. Between 2004 and 2011, the number of declared protected areas for whales and dolphins rose from 359 to 575 mainly in national waters with a further 175 areas at the proposal stage. From 2008-2014, eight large areas (150,000-2,000,000 km²) were added to the highly protected MPA coverage, with substantial potential benefits for marine mammals. Worldwide, the percentage of MPA coverage now reaches 3.4 percent of the global ocean's surface, but the highly protected areas only cover 0.7 percent.

There are pluses and minuses to big as well as small areas. In general, securing adequate financing, engaging stakeholders and managing (research, monitoring, enforcement) large MPAs may be more problematic but given a large scale vision and adequate budgets, there can be economies of scale that make large areas more efficient and cost effective per km² than small areas. In any case, the MPAs being created are largely coastal and the main part of the ocean, the high seas, has only 0.25 percent in protection as of late 2014. Furthermore, the formal identification of marine mammal habitat has until the past couple years been largely left out of international work, and even the coastal MPAs are largely political compromises, and are rarely based on habitat identification.

How can marine mammal protection efforts be accelerated and made effective, particularly on the high seas? BirdLife International, with its marine important bird areas (marine IBAs) approach, has spearheaded seabird protection efforts in national waters and on the high seas with the first world seabird atlas in 2012. In October 2013, the IUCN Species Survival Commission and the World Commission on Protected Areas, with the assistance of the International Committee on Marine Mammal Protected Areas, set up the IUCN Marine Mammal Protected Areas Task Force. Adapting the BirdLife IBA tool to marine mammals, the first activity of this Task Force has been the introduction of the concept of important marine mammal areas (IMMAs). Two workshops, held as part of ICMMPA 3, have tested criteria and are proposing a future program of work. Identifying IMMAs will lead not only to more MPAs and MPA networks but better marine spatial planning (MSP), as well as enable risk reduction of shipstrike, noise, bycatch and other threats, and help with monitoring for climate change.

Obtaining the funding necessary to identify habitat, prepare management plans and to pay for management bodies, research, enforcement and monitoring programs remains a great challenge. MMPAs and IMMAs won't be considered useful, or put on the agenda, until we can establish values for protecting nature, and convince stakeholders and the public.



Keynote speaker Erich Hoyt. Photo: Nikki Zanardo.



Killer whales living off the Kamchatka peninsula, Russia, recently declared an ecologically or biologically significant area (EBSA) by the Convention on Biological Diversity. Photos: Tatiana Ivkovich, Far East Russia Orca Project (FEROP, WDC)

Panel 1: Putting MMPAs and IMMAs on the International Agenda

Coordinators: **Erich Hoyt** (Critical Habitat/Marine Protected Areas Programme, Whale and Dolphin Conservation and IUCN Marine Mammal Protected Areas Task Force, UK) and **Giuseppe Notarbartolo di Sciara** (Tethys Research Institute and IUCN Marine Mammal Protected Areas Task Force, Italy)

Chair: **Erich Hoyt**

Introduction and Overview

The concept of marine mammal protected areas, and the invention of the new acronym “MMPA”, was celebrated for the first time at the ICMMPA 1 in Hawaii in 2009. For the most part MMPAs have been situated in the coastal waters of nations and have served a particular role in terms of introducing the public to the ocean and the concepts of marine stewardship and ecosystem management through marine mammals. Now as we look farther offshore, we see few MMPAs and in general little consideration of marine mammal habitat. In October 2013, the IUCN Species Survival Commission and the World Commission on Protected Areas, in cooperation with the International Committee on Marine Mammal Protected Areas, set up the IUCN Joint Marine Mammal Protected Areas Task Force. This task force has since reported that consideration of marine mammals has largely been absent from discussions surrounding CBD EBSAs and other high seas initiatives. The need became evident for the development of a new tool, important marine mammal areas, or IMMAs, to identify marine mammal areas both on the high seas and within existing MMPAs in order to advance conservation measures. The question before the panel was how could the tools of MMPAs and IMMAs be used for high seas conservation of marine mammal habitat.

Session Objectives

- To look at how the tools of MMPAs and IMMAs can be used to further conservation particularly on the high seas
- To look at how MMPAs and IMMAs can be set up as part of CBD EBSAs, CMS agreements and initiatives, among others, and to consider the developing legal regime on the high seas

Presentation Summaries

Giuseppe Notarbartolo di Sciara talked about the special case of the Mediterranean where through a variety of means including the CMS cetacean agreement ACCOBAMS, and the Regional Activity Centre for Specially Protected Areas (RAC-SPA) under the Barcelona Convention, as well as the CBD EBSA process, a number of areas were selected. They might be considered areas of interest (AoIs) leading to candidate IMMAs (cIMMAs). Margi Prideaux outlined the role for the CMS in terms of MMPA networks and the IMMA work. Lora Reeve considered the legal

challenges on the high seas, the areas beyond national jurisdiction (ABNJ), and Jeff Ardron talked about the task of getting IMMAs recognized in international processes from his experience primarily with the EBSA process within the CBD, but also across the broad spectrum of hard and soft international agreements.

The Special Mediterranean Case

Giuseppe Notarbartolo di Sciara (Tethys Research Institute and IUCN Marine Mammal Protected Areas Task Force, Italy)

The Mediterranean Sea stands as a special case for the high seas, the ABNJ, because most coastal countries of the Mediterranean have not yet managed to reach agreement with neighbors on boundaries. The Mediterranean high seas, thus, will eventually disappear, with all parts of the region one day encompassed within national waters, the EEZs.

However, the questions are as follows:

- have we learned anything about MPA designation or building MPA networks, that might be useful for future efforts on the high seas?
- will the efforts toward marine mammal habitat identification prove useful for spreading the concept of IMMAs on the high seas?

Up until now, the Specially Protected Areas of Mediterranean Importance, or SPAMI designation, created within the framework of the Barcelona Convention, is the only process that has contributed to the establishment of any semblance of an MPA network of protected areas in the ABNJ portion of the region. SPAMIs have been added to the list year after year solely on the basis of the availability of certain countries to propose them, and therefore their aggregation lacks ecological representativeness. At the same time, repeated attempts to establish a region-wide network of MPAs to protect cetacean habitat through the cetacean conservation agreement ACCOBAMS have so far been unsuccessful. Substantive progress was made in recent years, however, with an effort by Mediterranean nations and the EU in 2009 to identify priority conservation areas on the Mediterranean high seas. In 2014, such effort was further developed and perfected with the designation and adoption by the CBD of 15 Mediterranean EBSAs.

For these recently approved Mediterranean EBSAs, the presence of marine mammal critical habitat was one of the primary bases for their selection. Thus, we can consider that the IMMA concept has played a role in the process of Mediterranean conservation even before IMMAs have been incorporated into marine conservation practice.

Connecting politics is critical: The role for CMS in transboundary and network MMPAs and IMMAs

Margi Prideaux (Wild Migration and Indo-Pacific Governance Research Centre, Australia)

Marine mammal protected areas (MMPAs) or important marine mammal areas (IMMAs) that cross boundaries or are part of a network of protection covering the full range of a species will require substantial intergovernmental coordination to be effective. Conservation efforts made in one jurisdiction can too easily become eroded by mismatched levels of effort in others. Creating the political space to secure shared commitment and coordination is time consuming and difficult, especially if there is little existing relationship between the countries involved.

Civil society conservationists are often disappointed with government inactivity when protected areas are declared and action plans developed. There is little or no follow-up and the protected areas do not respond to evolving and emergent scientific information. The Convention on Migratory Species (CMS) provides an institutional framework to facilitate such cooperation, with a range of implementation avenues. It has become an international norm for non-governmental organizations (NGOs) as the professional and organized expression of civil society, to work through CMS institutions.

In many cases, NGOs run CMS species agreement secretariats or major conservation programs, with the support and buy-in of government signatories and CMS institutions. These NGO-led activities make use of the connected political processes offered by CMS but are driven from the ground up, informed by communities and scientists. These soft-law routes have proved to be quick to develop and responsive to ecological and political realities. They are taken seriously by governments because they adhere to political norms and procedures of intergovernmental diplomacy and decision-making, including involvement from foreign affairs and environment ministries. Yet, such solutions are often derided by commentators seeking hard-law outcomes even though NGO-led CMS agreements have shown considerable conservation benefits to species. In an era when governments are shying away from additional hard-law commitments, using CMS for transboundary and network MMPAs and IMMAs makes conservation sense.

Legal challenges and opportunities in the high seas: International law and the conservation of marine mammals in areas beyond national jurisdiction

Lora L. Nordtvedt Reeve (University of Hawai'i at Hilo, USA)

There is currently no comprehensive binding instrument under international law to effectively address the anthropogenic risks and impacts to marine mammals in the high seas. Emerging

regulation in the high seas ABNJ is primarily sectoral-based, leading to governance gaps, inconsistency, and fragmentation. Present management of the effects to marine mammals from human activities mainly involves spatial-temporal restrictions such as marine protected areas, which extend to very few regions in ABNJ.

The existing international legal framework presents challenges for the protection of marine mammals in the high seas, considering the freedoms and duties for State parties to the UN Convention on the Law of the Sea (UNCLOS), the CBD process to describe ecologically or biologically significant marine areas (EBSAs), the IMO designation of particularly sensitive sea areas (PSSAs), and the provisions of other relevant hard and soft law.

Promising developments relating to marine mammal protection include the recently instituted IUCN Marine Mammal Protected Areas Task Force, the new IMO Guidelines for the Reduction of Underwater Noise from Commercial Shipping to Address Adverse Impacts to Marine Life, the continuing review commissioned by the CMS Secretariat regarding the EBSA process with respect to, *inter alia*, migratory cetaceans and the momentum at the United Nations to develop an implementing agreement under UNCLOS to conserve marine biodiversity beyond national jurisdiction.

How can IMMAs be recognized, and MMPAs established, on the high seas?

Jeff Ardron (Institute for Advanced Studies in Sustainability – IASS, Germany)

Identifying and testing criteria for important marine mammal areas (IMMAs) is understandably our focus at the moment. However, two steps down the road, in order to protect places beyond national jurisdiction (the high seas) we will have to insert these IMMAs into international processes; that is, they will have to become recognized before we can hope for protective measures to be established.

How can this be achieved?

Important bird areas (IBAs) offer some lessons in this regard from the non-governmental perspective, as that they have in some cases become part of identified EBSAs under the CBD.

Unfortunately, the CBD, like other international conservation agreements, has limited ability to protect places from the most pressing of human pressures (e.g., fishing, shipping, and mining), which is one reason why we need an international agreement on protecting biodiversity in the high seas. Until such time, however, we will have to go to the individual sectoral bodies, cap in hand, urging greater protective measures (Figure 1). To strengthen our voice, we may need to build relationships with other researchers of other marine species to establish a comprehensive and compelling case that extends beyond our particular marine mammal of interest. We will also need to seek out sympathetic State Parties to these various sectoral conventions that have the power

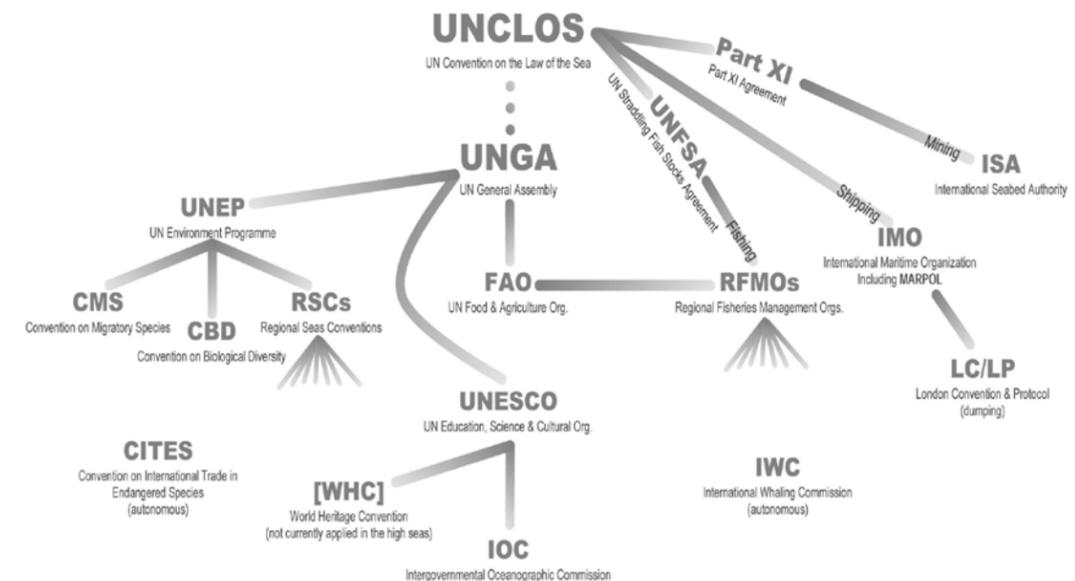


Figure 1. High seas governance. Moving from left to right, these represent a continuum from non-binding to binding agreements related to the ocean and in particular the high seas (Figure courtesy Jeff Ardron, from Ardron, J.A., Warner, R. [In press] International Marine Governance and Protection of Biodiversity. In Smith, H.D., Suarez de Vivero, J.L., and Agardy, T.S., eds. Chapter 4, Handbook of Ocean Resources and Management. Taylor & Francis/Routledge, London, UK).

to recognize, and more importantly, protect these ecologically important places.

None of this will be easy, but having a set of IMMAs that are supported by the international research community is a necessary first step.

Summary of Discussion

There were mixed reactions to Jeff Ardron's final slide diagram showing the relationships between binding (hard) and non-binding (soft) agreements and conventions (Figure 1). Most of us in the room had familiarity and connections with the soft, left-hand side of the diagram which includes CMS, CBD, and the Regional Seas Conventions (RSCs), under UNEP. Some of us have had dealings with the International Whaling Commission which floats to the right of center in the diagram, a somewhat hard island unto itself. As Margi Prideaux, Ardron and others have said, researchers and NGOs must build connections and engage more with the right hand side, the hard, binding agreements which include the regional fisheries management organizations (RFMOs), the International Maritime Organisation (IMO) and the International Seabed Authority (ISA), among others, in order to make progress with marine mammal conservation.

Several on the panel and in the audience stressed the importance of getting the conservation-oriented stakeholders involved in the high seas. As Lora Reeve said, currently the stakeholders on the high seas are the profit-oriented extractive industries which have the financial resources to engage and push for terms that benefit their activities. They engage in setting the rules because they want to have a predictable situation for operating their businesses.

Ardron noted that NGOs are already doing a lot to engage with the hard, binding agreements. He cited the Deep Seas Conservation Coalition working within the RFMO meetings

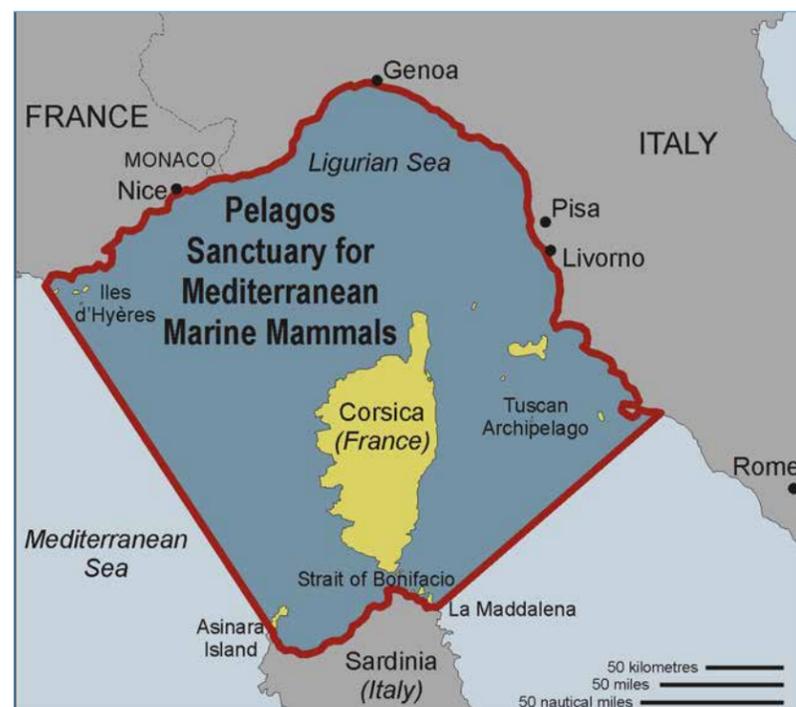
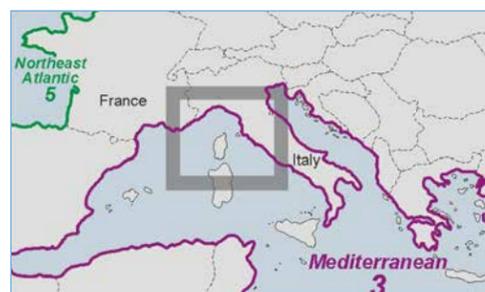
for the past 10+ years to push through UN Resolution 61-105 to control bottom trawling and Greenpeace getting observer status at meetings including IWC, ISA and others.

Ardron made the point that the main stakeholders on the high seas are States and it is necessary to go through one's own country to get a voice. Industries already do this. If NGOs are to make more connections between stakeholders and the hard as well as the soft agreements, then more funding is needed for this NGO work as they are in a league dominated by States and industry.

José Palazzo and Chandra Salgado Kent said that the ICMMPA conferences need to invite more local stakeholders who are close to marine mammals and their ecosystems and are not the "usual suspects." Prideaux pointed out that we must feed their concerns into the soft agreements, and from there to the hard agreements.

Mike Donoghue reminded the audience that in the Pacific there are 16 small economy States with jurisdiction over 10 percent of the global ocean and in some cases influencing what goes on in the high seas. They live on or beside the ocean and have long-standing relationships with marine mammals, and they are at the sharp end of climate change. Many Pacific island governments stand ready to collaborate and help with conservation.

In summary, the group felt that the nonbinding agreements are best at engaging with the broadest group of stakeholders (IUCN specialist groups, local and international NGOs) who can influence conservation outcomes and that these agreements were often a path toward putting conservation on the agenda, but that more bridges had to be built between the nonbinding and binding agreements in order to ensure that marine biodiversity concerns will be incorporated into the binding agreements.



Pelagos Sanctuary for Mediterranean Marine Mammals. Map by Lesley Frampton, from Hoyt, E. 2011. *Marine Protected Areas for Whales, Dolphins and Porpoises*. Routledge/Taylor & Francis/Earthscan, Oxford and New York.



Panel 2 speakers, from left to right, Randall Reeves, Putu Liza Mustika, Elisabeth Slooten, Giuseppe Notarbartolo di Sciara, Brian D. Smith, and chair, Lorenzo Rojas-Bracho. Photo: Nikki Zanardo.

Panel 2: How Are Marine Mammals Being Managed in Small MMPAs?

Convener and Chair: Lorenzo Rojas-Bracho (Instituto Nacional de Ecología – INE, México)

Introduction and Overview

Most MMPAs are small, that is, < 4,000 km², and represent political compromises that give only token attention to marine mammal habitat. Still, these small MMPAs have a role:

- (1) in terms of public education and awareness of marine mammal populations,
- (2) as springboards to the creation of larger areas and the formation of networks,
- (3) as vehicles to encourage research and monitoring of marine mammals and their ecosystems, and
- (4) for keeping marine mammals on national political and international conservation agendas.

The Steering Committee developed some guidance, not meant to constrain the discussion, to offer some useful and appropriate focus on the conference theme of important marine mammal areas (IMMAs). IMMAs have been tentatively defined as “discrete portions of habitat, important to one or more marine mammal species, which have the potential to be delineated and managed for conservation.”

Some IMMAs, for example, pinniped haulouts or rookeries and sea otter feeding areas, may be located entirely within a small MMPA. Small IMMAs within a small MMPA may comprise zones of “critical habitat” which may then be given greater care and attention by MMPA managers. However, most IMMAs for the highly mobile marine mammals are anticipated to be much larger. In most cases it will be the IMMA and not the MMPA which will capture the full extent of marine mammal critical habitats. But with larger IMMAs, as they are identified, a new role for small MMPAs can be envisaged. Typically, the IMMAs will be much larger than the existing small MMPAs and will point up a possible extended mission of each small MMPA in terms of studying and helping to manage the habitats of marine mammals with ranges that extend into the high seas, to other small or large MMPAs as part of a network, and potentially into areas where engagement in MSP, regional agreements and other processes as part of CMS, CBD, UNEP, IMO and other agencies and agreements, will be valuable.

Session Objectives

- Exploring the value and overcoming the limitations of small MMPAs
- Enlarging the role of small MMPAs in terms of IMMAs

Presentation summaries

Tokenism and trade-offs: Weaknesses and strengths of too-small MPAs

Randall Reeves (IUCN SSC Cetacean Specialist Group) and **Lorenzo Rojas-Bracho** (Instituto Nacional de Ecología – INE, México)

Specially protected areas, not only for marine mammals but for mobile marine organisms more generally, are often too small to provide significant protection to entire populations or species. A classic example of a too-small MMPA is the Sha Chau and Lung Kwu Chau Marine Park in Hong Kong, established in 1996 to protect a tiny (12 km²) patch of habitat for Indo-Pacific humpback dolphins. This could aptly be called a *token park*, that is, something to demonstrate responsiveness to the demands of environmental activists but still falling far short of ensuring a secure future for the local dolphin population. Even what was seen at the time as a large and comprehensive protected area for vaquitas in México, the 9348 km² Upper Gulf of California and Colorado River Delta National Biosphere Reserve declared in 1993, proved to be both too small and ill-designed to give this endemic species the protection it needed.

An intrinsic feature of many too-small MPAs is that they represent a trade-off between demands for economic benefit and the ecological needs of species. This concept has been formalized under the International Finance Corporation’s Performance Standard 6 (effective from 2012) where “biodiversity offsets” are defined as follows: “measurable conservation outcomes resulting from actions designed to compensate for significant residual adverse biodiversity impacts arising from project development....”

These case examples from Hong Kong and México enable us to weigh up the weaknesses and strengths of using designations of “small” MPAs as compensation for biodiversity loss resulting from economic development.

Small MMPAs in South and Southeast Asia: Status update, threats and suggestions for management (Results from a workshop, 17-18 August 2014, Semenyih Malaysia)

Putu Liza Mustika (College of Marine and Environmental Science & College of Business, Law and Governance, James Cook University, and Whale Stranding Indonesia, Indonesia)

A protected area initiative can be complex when applied to marine megafauna (e.g., whales, dolphins, dugongs, sea turtles and sharks) which travel vast distances from one habitat to another. The spatial extent of an MPA to protect such species is challenging financially, socially and institutionally, although some countries in Asia, particularly in the Coral Triangle region, have displayed eagerness in having as many MPAs as possible in their jurisdictions. For an MPA to effectively protect marine mammal habitat, a checklist of enabling conditions must be formulated to assist each country in designing their MPA for the benefit of animals and people.

Thus, a group of marine mammal scientists working in South and Southeast Asia convened in Semenyih, Malaysia, in August 2014, to obtain more information and input on enabling conditions to create effective MMPAs in Asia. Countries represented were Indonesia, Malaysia, Thailand and Sri Lanka. Taxa discussed were dugongs, whales and dolphins. Habitats represented and discussed were riverine, coastal (shallow continental shelves) and near-shore oceanic (narrow continental shelves), although the second day group discussions put more emphasis on the latter two habitats.

During two days of meetings, the group:

- produced updates on marine mammal conservation planning in the region;
- discussed required features to make MPAs in coastal and near-shore oceanic habitats work for dugongs and cetaceans and challenges to adopt those successful features;
- listed biophysical and socioeconomic data requirements, as well as habitat-specific and taxa-specific threats and considerations for zoning plans;
- listed conservation action plans for marine mammals in these habitats and the required management and evaluation plans for sustainable MMPAs in South and Southeast Asia; and
- listed challenges faced in implementing these conservation action plans, divided into biological, social, economic and governance challenges.

Protected areas are a useful tool to conserve marine mammals at specific life phases, but the MMPA focus must be paired with additional initiatives to be effective. Such initiatives include sustainable fisheries management, tourism management, marine

traffic regulation and better regulations on offshore mining, and oil and gas exploration. As well, transboundary conservation planning initiatives are needed among Asian countries, even though transboundary MPAs are considered to be difficult to implement due to regional political complexities. Instead, it is recommended that a network of MMPAs involving adjacent countries that share the same marine mammal populations be developed.

Protected areas for the New Zealand dolphin: Are they large enough?

Elisabeth Slooten (Otago University, Dunedin, New Zealand)

The first marine protected area (MPA) for the endangered New Zealand dolphin (*Cephalorhynchus hectori*) was the 1170 km² Banks Peninsula Marine Mammal Sanctuary, created in 1988. Situated near Christchurch on the east coast of the South Island of New Zealand, this MPA protects dolphins from gillnets in an area from the coastline to 4 nautical miles (nmi) offshore and from trawl fisheries to 2 nmi offshore. Recreational gillnetting is permitted for part of the year in several of the larger harbors. Trawling with nets <1.5 m high is permitted anywhere in the MPA. Fifteen years later, a second MPA was created off the North Island west coast, and in 2008 several more were added.

Results from ongoing research at Banks Peninsula are encouraging. A Bayesian capture-recapture analysis of photo-ID data indicates that survival has increased by 5.4 percent and population growth has increased 6 percent. This shows that MPAs can work for marine mammals. The population was declining rapidly before the MPA was created and is now almost stable.

Similarly, recent extensions to the North Island MPA have reduced bycatch for the critically endangered subspecies Maui's dolphin (*Cephalorhynchus hectori maui*). In 2012, Maui's dolphin mortality in gillnets and trawl nets was estimated at 4.97 per year. Recent extensions to the MPA have reduced this to 3.28-4.16 per year. The potential biological removal, or PBR, is 0.04-0.10 per year. Ongoing monitoring has resulted in the feedback loop shown in Figure 2.

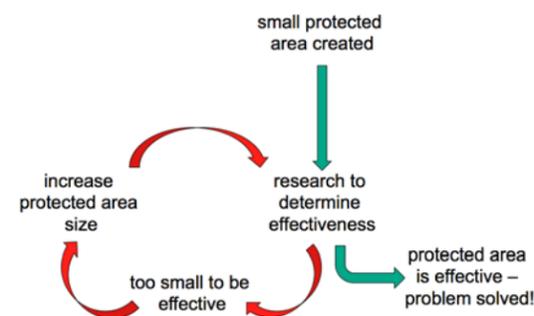


Figure 2. Feedback loop for MPA management with research component to determine effectiveness

MPAs will need to be extended significantly to allow recovery and to avert the extinction of Maui's dolphin. For the endangered South Island subspecies, the goal is avoiding continued decline towards critically endangered status and ensuring recovery towards non-threatened status. The small population size of Maui's dolphin (55 individuals one year and older) means that going around the feedback loop one more time would involve a very high risk of extinction.

Making the whole greater than the sum of its parts in small MMPAs for two threatened freshwater dolphins in Bangladesh

Brian D. Smith (Wildlife Conservation Society – WCS, Ocean Giants Program, Bangladesh and USA)

Small marine mammal protected areas (MMPAs) have distinct advantages. Their declaration is easier to achieve, their management easier to implement, and they can serve as a catalyst for conservation outside of their boundaries. While small MMPAs are not appropriate for all marine mammals, they are particularly valuable for species that have a clumped distribution and predictable occurrence in areas that overlap with critical threats. This situation applies to freshwater dolphins whose habitat is generally defined by counter-current pools induced by confluences and meanders that are also the focus of threatening activities – particularly from entangling fishing gears.

In January 2012, the Government of Bangladesh declared three Wildlife Sanctuaries covering 10.7 km² for the protection of Ganges River dolphins (*Platanista gangetica*) and Irrawaddy dolphins (*Orcaella brevirostris*). Working with local stakeholders, WCS is promoting effective conservation management in the MMPAs and enhancing protection benefits for freshwater dolphins outside of these protected areas. These activities include:

- (1) finalizing a science-based management plan,
- (2) demarcating boundaries and communicating regulations,
- (3) supporting the Forest Department to patrol the sanctuaries using a SMART (Spatial Monitoring and Reporting Tool) approach,
- (4) monitoring populations and threats,
- (5) using the sanctuaries as a platform for understanding freshwater dolphin ecology and informing adaptive management,
- (6) testing sustainable use strategies for potential application outside the sanctuaries,
- (7) conducting extensive educational outreach including a boat-based exhibition that reached almost 50,000 people,
- (8) maintaining an extensive mortality monitoring network that gives us a presence in local communities, and

- (9) taking a zoning approach that links the MMPAs and promotes broader scale aquatic protection.

Small MMPAs can be an effective part of the tool box of solutions for conserving freshwater dolphins, especially when linked to broader scale ecosystem-based and community-informed programs.

Can IMMAs support the effectiveness of small MMPAs?

Giuseppe Notarbartolo di Sciara (Tethys Research Institute and IUCN Marine Mammal Protected Areas Task Force, Italy)

Area-based protection can support the conservation of highly mobile species, such as marine mammals, provided that:

- a) it addresses area-based threats,
- b) it addresses areas containing a sufficient proportion of the species' critical habitat, and
- c) we don't forget that marine mammals also range outside of protected areas.

By contrast, area-based protection will not work if political processes make protected areas smaller than what they should be, or don't place them with a consideration of their critical habitat or of threats to the population. Examples include the Upper Gulf of California and Colorado River Delta National Biosphere Reserve for the critically endangered vaquita in México, and the Pelagos Sanctuary in the Mediterranean for endangered fin and sperm whales. In the Mediterranean region, there have been attempts to design MPA networks to effectively protect endangered biota (e.g., ACCOBAMS for cetaceans), yet in over a decade none of the protected areas adopted in principle by the ACCOBAMS parties have been declared, likely because of the amount of political and financial commitment needed for the formal establishment of MPAs.

More recently, 15 EBSAs were declared in the Mediterranean on the basis of seven criteria, including ecological considerations, and the presence of marine mammal habitat. These EBSAs have now the potential of attracting attention to the existence of important marine mammal habitat, which could not happen through proposed MPA designation because of political inertia. It is therefore apparent that EBSAs, and in the future IMMAs, which have no political constraints, can serve the function of creating a wider buffer around MPAs, reminding us that marine mammal habitat can also exist outside of the MPA boundaries. Thus in a future in which marine spatial planning (MSP) may be implemented in a framework of ecosystem-based management (EBM), with genuine concern for marine biodiversity protection and sustainability at the forefront, IMMAs may end up providing a service to marine mammal conservation even greater than many MMPAs.



Summary of Discussion

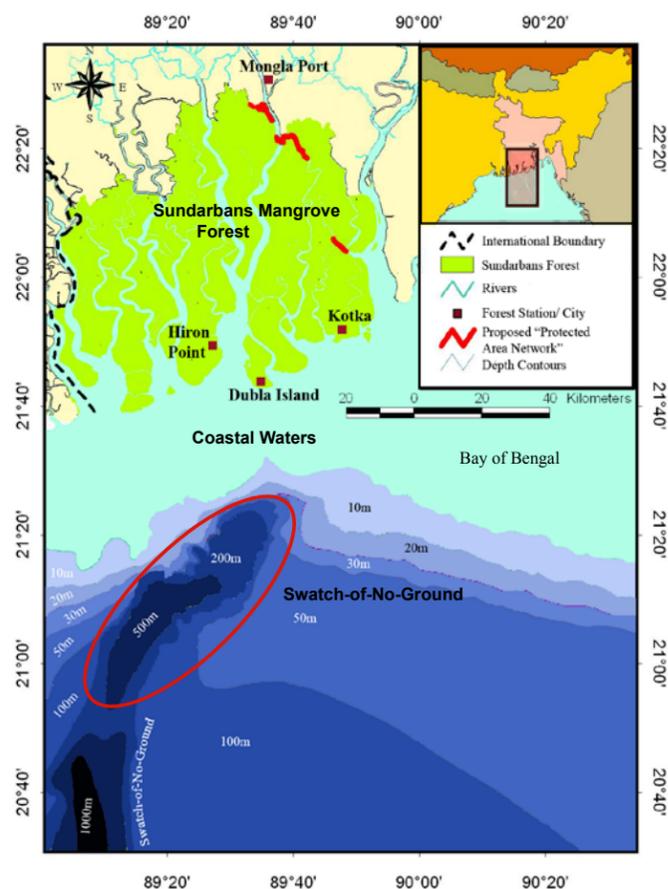
Small MMPAs can be effective for pinnipeds when they are on their territorial rookeries and haulouts and when births occur in these concentrated areas. The problems arise in areas such as the Mediterranean with habitat encroachment and direct killing from small fishermen. These small MMPAs need enforcement. But pinnipeds are also wide-ranging and fishing poses a big threat. However, fisheries issues are usually best addressed as part of fisheries management rather than in MPAs. Still, when restrictions are passed for protected areas, they must be fairly enforced (i.e., illegal fisherman should not be benefiting).

Incorporating local knowledge, as well as mentoring from senior scientists, are ingredients for successful small MMPA management. Bangladesh is a good example of where it's working. In New Zealand, fishermen can see the need for more effective fisheries management and want to ensure fairness in fisheries management decisions (commercial vs. recreational fishers). In Indonesia information from elders is considered useful but it does have to be paired with good science, even if it is basic. Government must take a role, particularly with strandings and gaining wide-ranging information about cetaceans.

Besides local knowledge, rigorous scientific programs must be followed by communicating the science to local stakeholders. This can be difficult when literacy is low in some communities. We need to find core science messages and communicate them in an appropriate way.

Some small MMPAs (e.g., the biosphere reserve where vaquita are found) are already natural IMMAs (i.e., unique populations, genetically isolated, rare species, feeding/breeding areas), but the IMMA would need to be larger than the existing biosphere reserve boundaries. It may be that the Gulf of California will be entirely comprised of overlapping IMMAs.

Bryde's whales in the new Swatch-of-No-Ground MPA. Map shows the proposed Bangladesh Cetacean Diversity Protected Area Network. Photo and map courtesy Elisabeth and Rubaiyat Fahrni Mansur and Brian D. Smith, Bangladesh Cetacean Diversity Project, Wildlife Conservation Society.



Panel 3: How Marine Mammals Are (or Could Be) Managed in Large MPAs

Coordinator and Chair: Tundi Agardy (Sound Seas, USA)

Session Overview

Marine protected areas are established for a wide variety of purposes, along a spectrum of size and scale. In recent years there has been a bifurcation of sorts in MPA planning: Most new MPAs were targeted to a smaller set of marine conservation challenges and were generally small, coastal, and community-based. However, a significant number of very large MPAs have also appeared. These MPAs often have a wide range of objectives, cover pelagic and nearshore domains, and are sometimes imposed in a more top-down manner than smaller, community-based MPAs. The question of how marine mammals are or might be managed within these very large MPAs, and whether this is indeed a powerful tool for addressing marine mammal conservation concerns, was the subject of this panel.

Session Objectives

The objective of this panel was to compare and contrast approaches used by planners and managers of very large MPAs to approaches used by smaller MPAs, as they relate to the conservation of marine mammals. Speakers were drawn from around the globe to reflect the variety of successes and constraints in using MPAs to conserve marine mammals, especially cetaceans and pinnipeds. The presentations and brief discussions from this and the preceding panel on small MMPAs effectively set the stage for the next day's Workshop 1 on Marine Spatial Planning (MSP), with discussions across a variety of scales showing how size matters in the design and management of MMPAs, in addition to a more general discussion on MSP.

Presentation Summaries

Introductory remarks: Very large MPAs: the solution to the conservation of far-reaching marine mammals?

Tundi Agardy (Sound Seas, USA)

The previous panel outlined the benefits, as well as the problems, of using small MMPAs to conserve marine mammals, with specific case studies that demonstrate small MMPAs in action. Our panel is focused on the challenges and benefits of using very large MMPAs to conserve marine mammals.

Why go large? Planners may decide that a very large area designated to protect marine mammal species is preferable to small MPAs or a string of interconnected but discrete protected areas, or networks. The reasons for this vary: The target species may be

a highly migratory species and the protections may be needed for the entire home range of the species. Alternatively, the objective of management may be to capture a wide array of marine mammal (and other) species, which leads to an umbrella approach to spatial management. This array of species usually includes both resident and migratory species, necessitating a temporally and spatially complex set of management measures. Other very large MMPAs may focus on protecting a small suite of focal species that are subject to a range of pressures originating across wide distances. Due to the fluid nature of the marine environment, the geographically wide connectivity, and the fact that managers must deal with pressures from afar, very large MMPAs often make sense.

However, managing very large areas can be a challenge. By going wide and ranging far, planners and managers have more issues to address. Understanding precisely what is affecting marine mammal species across a very large area is one challenge, as is management that addresses identified issues once the MPA has been established. Research, monitoring, establishing and communicating regulations, and achieving compliance are all easier in small MPAs, as Brian Smith (and others) indicated in the previous panel. Enforcement is a particular challenge in vast areas. The ability to engage effectively with all the necessary stakeholders – both in planning and in subsequent management – becomes more limited the wider the protected area.

Our panel cannot highlight all the very large MMPAs across the globe (there are many) but we do have good geographic coverage. We'll start with Latin America and the Costa Rica Dome, move to the Mediterranean to look at the Pelagos Sanctuary for Mediterranean Marine Mammals, then jump to the wider Pacific, and conclude with a critical look at large MMPA efforts here in Australia.

Large MPAs for marine mammal conservation in the Central American and Caribbean region: Challenges and opportunities

Jorge Jiménez (MarViva Foundation, Costa Rica)

During the last 10,000 years, humankind has been in the business of erecting fences. Boundaries are fundamental for spatial management and control. But boundaries do not always address realities in the field.

Phenomena such as the Costa Rica Dome which expands over both EEZ and high seas areas are artificially crossed by political boundaries. This mixture of jurisdictions is complicated by the lack of a legal framework for the high seas. How then to manage

these areas and ensure the conservation of migratory species such as blue whales, various dolphin species and leatherback turtles?

The regulation of human uses in mixed jurisdictional areas is complex. Stakes are high since many of these uses have considerable value: Tuna fisheries in the Eastern Tropical Pacific amount to USD \$1.5 billion/yr. Maritime traffic in the area moves 6 per cent of world cargo.

Managing large areas demands regional collaboration. For the Costa Rica Dome some advances have been made: Part of it has been declared an EBSA, and Central American countries are willing to include it in their marine regional agenda. The urgent need is for countries to establish a governance mechanism for the high seas portion of the Dome. This should start by consolidating the information for the region, raising awareness of this site, regulating maritime traffic and pursuing responsible fishing in the Dome.

Looking beyond Pelagos to conserve marine mammals of the Mediterranean

Simone Panigada (Tethys Research Institute and ACCOBAMS Scientific Committee, Italy)

The high mobility of many cetacean species presents a challenge to the ability of MPAs to provide effective protection and threat mitigation. Most cetacean species regularly occurring in the Mediterranean Sea concentrate in the Pelagos Sanctuary for Mediterranean Marine Mammals, due to the favorable feeding environment. This large MPA (87,000 km²) was established in 1999 by France, Italy and Monaco, to provide a good conservation status for resident cetaceans. However, the Pelagos Sanctuary includes only part of the critical habitats of the cetacean populations found within its borders.

Data from recent aerial surveys in the central Mediterranean Sea and on satellite telemetry projects stress the need to focus conservation and threat mitigation efforts over a wider area, including the Gulf of Lions and the sea around the Balearic Islands.

Location-only satellite transmitters (SPOT5, Wildlife Computers) were attached to eight individual fin whales, *Balaenoptera physalus*, in the Pelagos Sanctuary in September 2012. Deployments occurred as late in the summer as possible, to maximize information outside known summer feeding grounds. Fine scale associations with oceanographic features and potential feeding habitats within the Sanctuary have been investigated.

Tagged fin whales remained in the Pelagos Sanctuary feeding ground longer than expected, possibly due to the current mild climate conditions which allowed prolonged feeding activities in the area. Two individuals left the Pelagos area and moved towards the Balearic Islands, remaining in a defined area (100 x 100 km) for approximately 20 days before moving towards the Gulf of Lions. A Bayesian hierarchical state-space model was applied to discriminate between transiting and area-restricted

search (ARS) behavior. The animals were found to engage predominantly in ARS behavior, while showing only short-term transiting between areas. The occurrence of ARS behavior has been associated with environmental variables which allow us to investigate the mechanisms driving the animals' habitat choice.

It has been suggested to design and manage a zoned system whereby areas containing cetacean critical habitats outside and within the Sanctuary boundaries are afforded protection. Such system would also contribute to strengthen the bases for the identification of CBD EBSAs in the region, and support the implementation of a marine spatial planning (MSP) scheme whereby human activities impacting on cetaceans could be made to coexist with environmental protection. Alongside information on threats (e.g., vessel traffic), telemetry data are important for helping to develop focused mitigation measures and to provide baseline data to measure the effectiveness of the measures.

Large MPAs and Marine Mammal Sanctuaries of the Pacific Islands region, and the opportunities they present for cetacean conservation

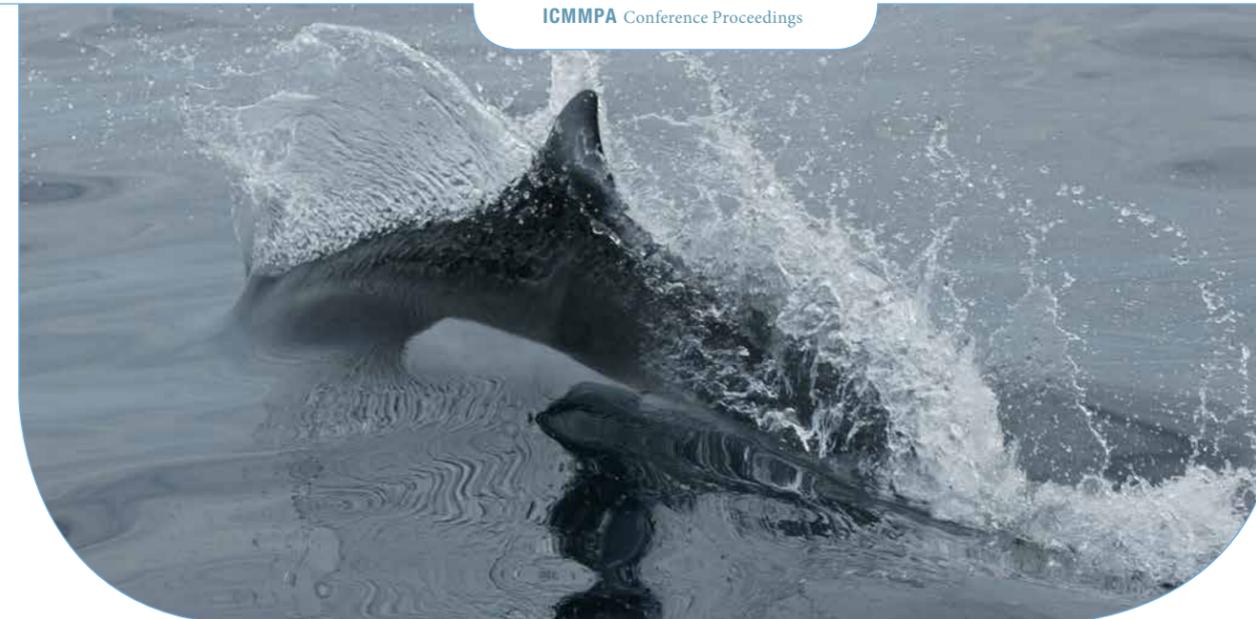
Mike Donoghue (Threatened and Migratory Species, Secretariat for the Pacific Regional Environment Programme – SPREP, Samoa)

SPREP is the intergovernmental organization of the Pacific Islands with the regional responsibility for environmental management and protection, which is an integral component of sustainable development.

The SPREP region is huge — twice the size of the continental USA and larger than the moon. Pacific Island countries generally have small populations and limited national budgets, yet their EEZs are enormous. Their limited resources make it especially difficult to effectively manage the enormous maritime areas over which they have jurisdiction. They should be considered a separate category: Large Ocean States.

Despite these challenges, many Pacific Island countries have shown global leadership in protecting the ocean and its inhabitants. At last count, 12 countries and territories had declared their EEZs as whale sanctuaries, covering over 12 million km². In addition:

- Kiribati has established the 408,000 km² Phoenix Islands Protected Area;
- the Cook Islands has declared a 1.1 million km² marine park;
- New Caledonia's Coral Sea Marine Park covers 1.2 million km²;
- Palau is establishing a National Marine Sanctuary which will prohibit fishing in 80 percent of its 600,000 km² EEZ;



Dall's porpoise in the Commander Islands State Biosphere Reserve, Russia. Photo: Tatiana Ivkovich, Far East Russia Orca Project (FEROP, WDC)

- Tokelau has declared its waters (the size of the land area of the UK) a sanctuary for whales, turtles and sharks; and
- the Marshall Islands has established the world's largest shark sanctuary.

The vision for a Pacific Oceanscape, which provides an overarching framework for the sustainable development and conservation management of the Pacific Islands oceanic realm, has been endorsed by the leaders of all the governments in the region. This presents a unique opportunity for the adoption of innovative protection measures for marine mammals such as IMMAs. The important work on IMMAs would thus align with the Oceanscape framework and would be warmly welcomed by SPREP.

Towards effective MPAs: From belief systems to evidence base

Bob Pressey (Australian Research Council Centre of Excellence for Coral Reef Studies, James Cook University, Australia)

Moving to evidence-based protection of marine biodiversity and marine systems requires understanding the past, evaluating management options in the present, and predicting the future, in terms of management responses and overall outcomes. An analysis of protected areas, primarily on land, shows that to date our protected areas designs have been based more on unsubstantiated belief systems than on empirical evidence regarding historical condition, options available, and the degree to which protection will result in an improvement in condition, away from the default trajectory of biodiversity decline. In fact, most protected areas on land turn out to be residual reserves – areas protected for ease of establishment rather than for efficacy.

Three assumptions need to be critiqued in MPA planning:

- (1) going for large sizes to gain high percentages in coverage (often to meet international obligations) will lead to the most effective protection,
- (2) planning by acronym (EBM, EBSA, etc.) will resolve the challenge of how to plan and then evaluate MPAs, and
- (3) global analyses to identify ranges of target species will guide placement and design of effective MPAs.

Challenging these assumptions shows why our current modes of planning can lead to failure. Agreement on criteria and alignment of areas with criteria do not make an evidence base; neither does wide endorsement of an MPA designation and influence with high-level policy-makers. Instead, the focus must be on demonstrating that MMPAs make a difference – predicting and then verifying the impact. The following steps are recommended for designing effective, evidence-based MMPAs:

- assess threats to marine mammals, species by species;
- assess spatial and non-spatial ways of mitigating those threats;
- identify quantitative objectives for each species, by life-history requirements;
- at appropriate scales, identify spatial priorities for MMPAs (variable in prescriptions and seasonality) to achieve objectives (this could include KBAs, EBSAs);
- test priorities with models of future threats and related losses of populations with and without identified MMPAs (and non-spatial measures); alter priorities accordingly;
- use the same models to compare “proactive” and “reactive” MMPAs (e.g., remote vs. near-shore, high-threat areas) to cut through the data-free debate and identify balanced portfolios of MMPAs.



Bottlenose dolphins and pelicans in the Adelaide Dolphin Sanctuary. Photos: Mike Bossley, Whale and Dolphin Conservation (WDC)

Panel 4: Regional Issues

Convener and Chair: Mike Donoghue (Threatened and Migratory Species, Secretariat for the Pacific Regional Environment Programme – SPREP, Samoa)

Session Overview

Panel 4 provided an overview of a range of issues relating to marine mammal conservation and MMPAs in the region including underwater noise, community involvement in cetacean conservation, undertaking conservation efforts in the face of data deficiency and bycatch. It also provided an opportunity for panelists to consider the potential value of important marine mammal areas (IMMAs) in a regional context.

The first speaker Tiare Holm has been involved in community-based conservation in Palau for many years, where communities are in the driver's seat in terms of conservation action. Like many other island groups in the Pacific, there is a long-standing traditional conservation ethic in the region. Laura Boren spoke on the conservation of Maui's dolphin and emphasised that protection has shifted from a government-led approach to a collaborative community-based approach. Cara Miller summarized the CMS Cetaceans MOU in the Pacific – this is now an influential vehicle for marine mammal conservation in the region. Simon Goldsworthy's presentation demonstrated the importance of sound science to underpin marine resource management, and for managers and scientists to communicate effectively with each other. In the case of the Australian sea lion, the combined work of science and management led to spatial closures and a change in fishing methods, which should lead to positive outcomes for the species' survival. Finally, Chandra Salgado Kent demonstrated the need to be aware of the problems marine mammals face in a much noisier world and how this information can inform management actions.

Session Objectives

For presenters to give an overview of key issues relevant to marine mammal protection in the Pacific region.

To discuss the following aspects of IMMAs:

- What value might IMMA identification have in advancing more effective conservation and management of marine mammals in the regions being discussed in these sessions?
- How can the identification of IMMAs in these regions advance efforts of MMPA managers for individual sites, and for networks and systems of MMPAs in these regions?
- Are size thresholds for IMMAs different for different regions?
- Can a site be “important” in one region but perhaps not be considered as “important” in another region? Does the regional context matter?

Presentation Summaries

Sustainable decisions: The Palau Marine Mammal Sanctuary

Tiare Holm (Sustainable Decisions, Palau Marine Mammal Sanctuary, Palau)

In Palau – with a population of about 20,000 people but 100,000 visitors a year – marine mammals, particularly dugongs, have traditional cultural importance.

Palau has an extensive national protected areas network (PAN) – visitors pay a \$50 USD departure “green fee” to support the PAN. Along with earnings from the Micronesia Challenge endowment, this is one of the region's best-known sustainable funding mechanisms for conservation. There was extensive consultation with the enforcement community before legislation was enacted to establish the PAN.

Palau has established a whale sanctuary in its EEZ, and some research and awareness-raising has been carried out. One objective of Palau's whale project will be to identify IMMAs. This initiative is locally driven, but nationally supported.

Palau President Tommy Remengesau supports conservation. He is driving the establishment of a national marine sanctuary, which is intended in the near future to exclude 80 percent of foreign fishing vessels from all of Palau's waters. However, there are geographical challenges in monitoring the EEZ and the protected area network, especially around the offshore islands in Palau. Palau is situated near a hotbed of illegal, unreported and unregulated (IUU) fishing. Many IUU vessels are under 90 metric tons, so they are not readily visible on shore-based radar or other forms of remote surveillance.

The next step in developing the national marine sanctuary is to use a comprehensive approach to develop an enforcement strategy by building the capacity within our existing marine law capability.

Palau communities have used a variety of tools in their planning and management activities (e.g., adapting KBA and IBA criteria for including sites in networks and eco-regions to evaluate representativity). These tools can be used to prioritize activities for management and in monitoring impacts as part of the Micronesia Challenge.

Palau also supports the use of EBSAs in international forums.

But some areas worthy of protection could fall through the cracks if they don't meet the classification criteria, and there is a need to use socioeconomic data in developing criteria.

IMMAs could be a benefit to Palau: they would be useful in prioritization for protection, research, as a marketing tool for investment, and they could help guide local and national planning.

Small cetacean conservation – from being government-led to collaborative management – the Maui’s dolphin example

Laura Boren (New Zealand Department of Conservation, New Zealand)

Maui’s dolphin is found only on the west coast of New Zealand’s North Island. Its low abundance (latest estimate is approximately 55 individuals) makes it difficult to determine the full range of this subspecies, but individuals have a very small home range. The habitat is mainly inshore, out to 7 nautical miles, but they are sometimes found in low numbers farther offshore. Besides fishing, there are several other human activities undertaken in their habitat, including seismic surveys for oil and gas, and prospecting for mining of ironsands.

The first protection measures (fishing restrictions under the Fisheries Act) were introduced in 2003, followed in 2008 by a management plan development by the New Zealand Department of Conservation and the Ministry of Fisheries, resulting in further fisheries restrictions and the establishment of a marine mammal sanctuary. Under New Zealand’s Marine Mammal Protection Act, the Minister of Conservation can restrict activities such as mining and seismic exploration in a marine mammal sanctuary.

A Threat Management Plan, due for completion in 2013, was brought forward to 2012 because of the bycatch of a dolphin in a set net outside the then protected area. In March 2012, a revised abundance estimate was published (approximately 55, based on mark/recapture) which was about half the previous estimate based on aerial surveys. These events brought new urgency to the situation and interim measures were implemented to extend the areas closed to set-net, which were included in the review process.

The risk assessment identified a number of options for consultation. Three rounds of public consultation on various management measures were undertaken, resulting in the interim measures being upheld.

Public sightings have been critical in getting statutory extensions to the protected area where the use of set nets was prohibited.

Among the non-statutory decisions that were also made was the establishment of a collaborative research group, which began its work in June 2014. In recognition of the high number of stakeholders in the area, four regional forums were held along the West Coast of the North Island, to engage with community groups, local government, the fishing industry and other users, and to assemble their collected input on research priorities.

An initial stakeholder group meeting was held in June 2014, with representatives from each sector, and this process will result in a 5-year research plan. Various research methods may be employed; a smaller technical workgroup will assess the best techniques. The purpose of the stakeholder group is to fill data gaps and bring the community along; and to seek out potential sponsors. The

5-year research plan will incorporate science strategy, engagement and operational strategy.

Regarding size thresholds for IMMAs, the increasing size of the area in which set netting is prohibited came from public sightings, including platforms of opportunity. A study in 2013 that investigated public awareness revealed that only 5 percent of respondents could identify Maui’s dolphins, and knew how to report sightings. Consequently, if a conservation management strategy is to utilize sightings then this lack of awareness needs to be urgently addressed.

A government-led approach inevitably has trade-offs, and until now government agencies have worked in the “compromise space”, but for a successful outcome for a critically endangered species like Maui’s dolphin, these agencies need to work with partners, to move into a collaborative box.

It is unclear whether the New Zealand government will implement the recent IWC and IUCN recommendations, and whether we are moving forward fast enough to save the dolphin. But public sightings and evidence on the effectiveness of the current protected areas, and whether they need to be expanded further, will help. The public needs to be encouraged to take photos and report sightings at the earliest opportunity.

Proactive cetacean conservation in the midst of data deficiency: Progress on the Convention of Migratory Species agreement in the Pacific islands region

Cara Miller (Whale and Dolphin Conservation, Fiji)

The Pacific islands region is a biodiversity hotspot, but there are few data available about distribution, diversity and abundance of cetaceans. Several cetacean species are common across Pacific Island Countries and Territories (PICTs) but most of the information available is presence/absence data.

Some 40 species have at least one confirmed record in at least one PICT, but at least 50 percent fall into the IUCN data deficient category. Within the South Pacific there is probably only one species with substantial data – the humpback whale. The region has low regional capacity to undertake research – these are small countries with large EEZs – and it provides a perfect storm for data deficiency.

The Convention on Migratory Species (CMS) has developed an agreement on cetaceans. Discussions began in 2002 between New Zealand and Australia, followed later by the Secretariat of the Pacific Regional Environment Programme (SPREP) and CMS. In 2006 the agreement was open for signature and immediately endorsed. In 2009 the Meeting of the Signatories (MOS2) endorsed the SPREP marine species action plan to sit under the CMS agreement. Additional signatories have since joined.

Benefits of the action plan include access to a small grants program and access to expertise by small states through CMS (CMS scientific committee, technical advisory group).

One challenge is sourcing sustainable financing. However, limited resources, combined with a large management area, can push people to be synergistic, innovative and strategic to prioritize and track pertinent indicators. However, any advice from ICMMPA on strategic steps would still be welcomed.

Other issues for the region are capacity building – it takes a long time and much effort, but it is the glue that can move the region forward. However, that the CMS agreement was made with almost no data is a positive sign and good cooperation with regional organizations including SPREP will be important for the future.

In summary, we now have the CMS involved, an action plan, parties and a large marine area. Next steps include implementing the action plan, sourcing funding, building national engagement and ensuring the action plan is integrated with other relevant plans and actions such as the Coral Triangle Initiative.

Pinnipeds and bycatch: Interaction between seals and gillnet fisheries

Simon Goldsworthy (Threatened, endangered and protected species subprogramme, South Australian Research and Development Institute, Australia)

Australian sea lion (ASL) breeding is asynchronous; the species breeds every 18 months which makes survey work difficult. It is also an important factor in management as the species needs to be managed at a breeding-site level. The demersal gillnet fishery peaked in the 1980s and 1990s and then stabilized in the early 2000s. It significantly overlaps with ASL breeding sites. Eighteen years ago, pups were always fat and bred on any habitat – rock or sand. A sophisticated model was developed to allow determination of age- and sex-based foraging. This is important information for management as the risk of bycatch changes across foraging areas. Research has shown that the only population recovery of Australian sea lion so far has been in Spencer Gulf where the fishery has been closed.

The Australian Fisheries Management Authority (AFMA) became responsible for conserving the population through the Wildlife Trade Operation (WTO). They instituted spatial closures for fisheries – permanent gillnet fishing closures were implemented around all ASL colonies. AFMA set up an observer program and found that, in addition to the ASL, 50 dolphins per year were being caught. AFMA had 11 percent observer coverage in 2010 and, after 12 months of more ASL and dolphin mortalities, they had evidence that there was no compliance with reporting protected species interactions. Observer coverage was then increased to 100 percent – unprecedented in Australia – and electronic monitoring was rapidly rolled out. This has dramatically improved reporting compliance.

AFMA has now set trigger limits for bycatch – if 1-5 ASL are caught in a year, the region will be closed for 18 months (one breeding cycle). ASL are now managed at a single colony level. There has been a 70 percent reduction in fishing effort as a result



Simon Goldsworthy talks about the Australian sea lion, bycatch by gillnet fisheries, and the potential for IMMAs. Photo: Nikki Zanardo.

of these triggers and the fishery has moved back to hook and line from gillnets.

Scientific support for management was critical in this case. In addition, there was good support from conservation groups for the issue which meant that scientists did not also need to be advocates. The results led to a dynamic adaptive management approach which sets an important precedent for management in Australia and around the world. It may take a few decades to see a population response to these measures.

Would IMMAs have been relevant in this case? Knowledge of breeding sites and subpopulation levels led to a targeted management action. In this case, a specific threat was identified and mitigated, rather than a more broad-scale protected area being implemented. Data are available to identify IMMAs for pinnipeds in Australia and indeed, biologically important areas (BIAs) have been identified already for ASL. For pinnipeds, IMMAs would need to be identified at a subpopulation level to be relevant to decision-making.

The threat of anthropogenic noise and MMPAs

Chandra Salgado Kent (Centre for Marine Science and Technology, Curtin University, Australia)

Underwater noise is generated from many sources including shipping and other vessels, seismic surveys, resource extraction, dredging, and port construction, including pile driving. In locations such as the Port of Fremantle, even vehicle and train traffic over bridges crossing the port transmit noise and can be heard in the underwater environment. There are wide variations in noise in the marine environment and we currently do not know the extent of noise impacts on marine fauna, for example, how it affects populations over time. There is a need to understand



Common dolphin surfaces in the waters of South Australia. Photo: Mike Bossley, Whale and Dolphin Conservation (WDC).

the impacts of noise on physiology and behavior not only on an individual level, but also on a community, subpopulation and population level.

In considering marine mammal protected areas (MMPAs) and their management, we need to evaluate noise generated both within and outside of an MMPA, as anthropogenic noise from outside MMPAs may transmit inside MMPAs. As sound transmission varies in different environments, this will need to be considered on a case-by-case basis. For example, seismic survey noise can have long range ocean transmission, or a much shorter range on-shelf transmission.

Ship noise also has a wide range of characteristics, and the frequency bandwidth and range in which noise is made depends upon the size and type of vessel. For example, ships produce noise at lower frequencies than small vessels. It is possible to measure acoustic energy, source and received characteristics, from all classes of vessels.

Studies are being conducted on the impacts of noise, but meanwhile there continue to be large gaps in knowledge about noise sources, propagation, and potential impacts on fauna, and thus a precautionary approach is needed. It is critical that industry, regulators, researchers and the public be engaged in understanding and improving the scientific basis for management. Significant advances in current management can be made through transparency whereby resulting information from underwater noise impact studies is made available to all the stakeholders, including the local community and regulators.

Summary of Discussion

A recurring theme of the keynotes and panels on day 1 of ICMMPA 3 was the importance of stakeholders in the long-term success of MMPAs.

In the case of Palau, the enforcement community was consulted before legislation for protected areas was enacted. This led to greater buy-in from enforcement. In the case of New Zealand, community engagement was crucial for identifying the range

of the Maui's dolphin. This citizen input led to the expansion of Maui's protected areas. The involvement of citizens was important, but it was also essential to share the scientific research with the community and to continue this cycle of information sharing.

Management efforts should also keep in mind the role of social science and socioeconomic data and the importance of communicating these findings to the community.

The identification of IMMAs can be valuable in advancing more effective conservation and management of marine mammals, but this should not be limited to within MMPAs. IMMAs could play a role in informing planning and management activities, but we need to be aware that some areas could fall through the cracks if they do not meet the criteria for these site types. The benefits of IMMAs can include assisting with research and strategy prioritization, as a marketing tool for investment, and for guiding local and national planning activities.

The size threshold for IMMAs may vary for different species if the IMMA is to inform management. For example, assuming an IMMA can be designated for just one species such as the Maui's dolphin or a river dolphin, the site may then be small due to the animals' range yet cover the whole population. On the other hand, in the case of the Australian sea lion, an IMMA may need to be identified and managed for each breeding colony.

MMPAs may not always be the best or only way to protect IMMAs. In the case of the Maui's dolphin and Australian sea lion, fisheries closures were important as they targeted a specific threat. Characteristics of specific sites matter in terms of threats. For example, different sources of underwater noise will behave differently in different habitats or ocean locations. Again, MMPAs may not be the best tool to address a given threat, but IMMAs will help to prioritize locations for management actions.

Panel 5: Public Engagement: Expanding Constituencies of Support by Reaching Wider Audiences

Coordinator and Chair: Brad Barr (NOAA Office of National Marine Sanctuaries, USA)

Session Overview

Public engagement is an essential element of effective MMPA stewardship. Many MMPAs appropriately focus on their engagement with marine mammal conservation, and it is critical that this is done in an effective and efficient way. The focus on protection of marine mammals by an MMPA is necessary but perhaps insufficient. Expanding the scope of engagement to include other attributes of these special places valued by the public can help to broaden and strengthen the constituencies of support for MMPAs.

Public interest in the history and heritage is providing an awareness of sense of place. A deeper understanding of how people were connected to and shaped by the history of these places offers opportunities to not only learn from the past, but also to apply this knowledge to current management challenges.

For many MMPAs, whaling was a significant influence in shaping the history of a place. The negative contemporary narrative surrounding whaling presents some challenges in identifying and interpreting the heritage resources of the MMPA associated with this activity. However, understanding how that narrative has evolved can assist in identifying how this interpretation and outreach is best approached in engaging those who want to understand and appreciate how these places became what they are today. Placed in its appropriate historical context, whaling heritage can offer opportunities to engage, enlighten, and inform the public about not only why these special places were important in the past, but also why they are important today, and will likely be even more important in the future.

Session Objectives

- To describe current public engagement efforts in MMPAs that offer insights into engaging constituencies interested in marine mammal conservation efforts in MMPAs
- To better understand the potential for expanding outreach efforts in MMPAs to include history and heritage, and the contribution of all cultures in shaping these places
- To learn about the evolution of the contemporary whaling narrative to inform and guide effective approaches to interpreting whaling heritage in MMPAs
- To suggest possible opportunities to link whaling heritage research and engagement among the MMPAs that represent significant places in the global whaling heritage landscape



Panel 5 chair Brad Barr introduces the session on public engagement. Photo: Nikki Zanardo.

Presentation Summaries

Marine Mammals: The animals that hide the ecosystem?

Charlotte Epstein (Department of Government and International Relations, School of Social and Political Sciences, The University of Sydney, Australia)

With part of this year's conference theme invoking "A Sense of Place," I began by recalling where we were speaking from, and underlined the extent to which the world view of the Australian aboriginal people was inherently ecosystemic, long before the concept was invented. Their view exemplified a profound sense of stewardship of the environment. Speaking from my expertise in the histories of whaling and global environmental activism, I wanted to present an overview of marine mammal protection as a way of framing the protection of the environment, showing that it had been steeped in US history and projected onto the rest of the world in the 1970s. I also showed the extent to which this had sometimes obstructed local populations' particular ways of living and interacting with the whales, at a significant cost for involving these populations in international environmental protection. As such, I raised the question as to whether marine mammal conservation was the appropriate cognitive frame for generating environmental policies, and whether in fact marine mammals had not in some cases become the animals that prevented the emergence of an ecosystemic perspective.

My conclusions from whaling histories are threefold, namely that conservation has to be:

- proactively inclusive, and in a way that does not reproduce the exclusionary power relations steeped in colonial histories; this is especially true in Africa (on parallel with the elephants) – and it is essential to engage the local public;
- focused on the ecosystem as a whole, not on a privileged species; and
- localized; to engage local cultures, it is important to let the local populations develop the nomenclatures for environmental protection, rather than impose a cognitive framework or set of guidelines “from without.”

Education and interpretation in public engagement: Connecting with nature

Mike Bossley (Science and Education, Whale and Dolphin Conservation Australasia, Australia)

I used three components to teach Adelaide people about the need to protect their dolphins: emotion, place, and narrative. These three components were put into action by individualising the dolphins (transforming them from generic dolphins to individuals with names), describing their individual history, and describing their environment.

The story of the dolphin Billie illustrates this approach. Billie was a resident of Adelaide’s highly polluted Port River estuary. Billie was orphaned at about age two and lived in an area frequented by only one other dolphin, an old male called (erroneously) Big Mama. Billie became a local celebrity for her habit of swimming with racehorses. In late 1987 Billie left her normal environment and travelled about 30 kilometres down the coast where she became trapped in a lagoon. She was captured and taken to a dolphinarium where she observed the performing residents. After several weeks, she was released and swam back to her original environment.

A few years later, as an adult, Billie began tail walking on a regular basis and other wild dolphins began to perform this behavior as well, a story that received international media coverage.

Whenever possible, stories about Billie were provided to the local media. These stories included mention of the environmental and other hazards she faced.

Over the next few years, Billie had six calves and all but four of them died. One of the surviving calves narrowly escaped death when he was sucked into a factory cooling sump.

In 2009, Billie became emaciated and was eventually captured for veterinary assessment. She was found to have advanced kidney failure and was euthanised. The news of her death received widespread publicity in local media.

Billie’s story, together with similar stories about other resident dolphins, engaged the media and the public sufficiently for me to persuade the government to declare the area a dolphin sanctuary.

Gray whale watching ecotourism in Laguna San Ignacio, BCS, México: Sustainable use and conservation of a marine mammal species and its environment in El Vizcaíno Biosphere Reserve

Manual Gardea Ojeda (Ecoturismo Kuyimá, San Ignacio, Baja California Sud, México)

Developing effective natural resource management and conservation strategies for natural protected areas requires knowledge of the socioeconomics of that system in addition to understanding the natural resources being managed and conserved. Laguna San Ignacio is a place where decisions regarding sustainable use and preservation need to be informed by such knowledge.

Impact assessment methods, based on pressure-state-response models, were employed to assess and compare the socioeconomic impacts of the human uses of the Lagoon system. Stakeholders were actively engaged in this analysis, which was focused on fishing, aquaculture and tourism. An economic evaluation was also conducted, using “travel cost” methodology, identifying, among many important variables, the zones of visitor origin, routes of arrival, travel costs, visitation rates, demand curves, and estimates of consumer surplus.

Results suggest that the economic contribution of the tourism sector to Laguna San Ignacio was approximately USD \$4.8 million — somewhat higher than calculated for other areas in similar research; the mean expense, or mean cost of getting to Laguna San Ignacio, was an order of magnitude higher than the estimate for other whale watching destinations worldwide.

Observations from the results of this economic analysis were that whale watching in Laguna San Ignacio is highly valued by visitors; there was a bigger share of the economic benefits of this activity than expected, with potential to expand these benefits to the local community; and there was little impact from local expense/cost on the demand. The socioeconomic and environmental impact of tourism in the region was found to result in reducing pressure on fishing resources, and contributed to diversification and optimization of resource use. It also led to communities actively participating in management and conservation of the lagoon. In this way, the region has begun to adopt a culture of sustainability.

While effective conservation and management of the many human uses of the lagoon remain an ongoing challenge, ecotourism, instead of competing for the natural resources with fisheries and aquaculture, has become a complementary form of use. In addition to achieving greater sustainability, the increased benefits of ecotourism have driven the local community to organize in



order to practice and sort out the use, management and conservation principles of El Vizcaíno Biosphere Reserve. The diversification of activities related to whales and nature watching in general has also led to the creation and expansion of jobs in the area.

South Australia’s Marine Park Network - Places for marine mammals

Chris Thomas (Marine Parks, South Australia Dept. of Environment, Water, and Natural Resource, South Australia)

South Australia possesses rich and diverse marine ecosystems and supports many human uses of these resources. However, it is not immune to the escalating global pressures of coastal development, climate change, pollution and resource use.

What have you noticed in your lifetime? National parks have conserved the land for many decades; however, until recently, less than 1 percent of our marine environment was effectively conserved. This is where marine parks step in. Public support in South Australia for protection of plants and animals is relatively strong, ranging from 84 to 95 percent between 2006 and 2012. South Australia’s approach to ocean and coastal conservation establishes South Australia’s most significant conservation legacy. This legacy includes the establishment of 19 marine parks covering 44 percent of State waters (including 6 percent no-take). Achieving this goal over the past decade required the most extensive community engagement initiative ever undertaken in South Australia. 80 percent of no-take zones in this regional system were put forward by the communities; they complement the Commonwealth marine reserves.

The evidence from around the world is that marine parks deliver long-term benefits that far outweigh the initial establishment costs. South Australia’s experience should be no different. The South Australian government will be looking to co-deliver our

El Vizcaíno Biosphere Reserve was set up to protect gray whale breeding and calving habitat. Map by Lesley Frampton, from Hoyt, E. 2011. *Marine Protected Areas for Whales, Dolphins and Porpoises*. Routledge/ Taylor & Francis/ Earthscan, Oxford and New York.

ongoing management program with schools, universities, tourism operators, fishers and local businesses. Critical elements of this approach include: taking a coordinated “whole of government” approach, encouraging debate and community participation, identifying and correcting misinformation, creating opportunities for engagement and collaboration, building effective advocacy, and celebrating achievements.

Engaging coastal communities: Making whaling heritage work for cetacean science and conservation in developing countries

Jo Marie Acebes (Balyena.org, Ateneo de Manila University, Philippines)

Recognizing the significance of the whaling heritage and history in coastal communities can enhance the knowledge of cetaceans and also increase the engagement of communities in conservation efforts. Intimate knowledge of cetaceans gained by communities through their whaling heritage can be used for conservation as a mechanism for identifying important marine mammal areas (IMMAs) and helping to design marine protected areas (MPAs).

In a country such as the Philippines where data on cetaceans in many areas are limited, the use of the non-traditional data sources of oral history and other unpublished information should be maximized. By engaging former whaling communities in the discussion about marine mammal conservation issues and in the planning for marine mammal protected areas, scientists can gain access to local ecological knowledge and use it to design locally



Common dolphin leaps high in the air off Second Valley, South Australia.
Photo: Mike Bossley, Whale and Dolphin Conservation (WDC).

adapted conservation and management plans. Such engagement could also help raise awareness about the occurrence of cetaceans in the region as well as the importance of conserving the species. Furthermore, recognizing the significance of whaling heritage could encourage local stewardship of marine mammal protected areas and other conservation projects.

In Pamilacan Island in Bohol, the whaling heritage has been used to augment the livelihood of islanders. This former whaling community is now engaged in whale and dolphin watching tourism and the former whaling grounds are recognized as a prime habitat for cetaceans in the Bohol Sea. This program could be improved, but it serves as a case study showing how the recognition of whaling heritage can serve the benefit of science, communities, and cetacean species.

Summary of Discussion

In the brief discussion time that followed the presentations, a number of comments were offered by audience participants with regard to Professor Epstein's presentation. The first offered another perspective on the interactions between the indigenous communities and the government in New Zealand regarding the access and use of stranded whales. This commenter also insisted that the origins of the World Council of Whalers, mentioned in the presentation, had been as an industry lobbying group.

Another commenter took issue with the points Professor Epstein made regarding the global influence of U.S. anti-whaling advocacy, particularly in non-English speaking countries. The commenter also responded to Professor Epstein's concern that an emphasis on cetacean species may diminish awareness and attention to other important elements of the ecosystems in which marine mammal protected areas are located. The commenter made a spirited defense of the value of cetaceans as flagship species in MMPAs, as well as indicator species of ecosystem health and umbrella species that help spread habitat protection and other conservation results to many other species in ecosystems.

Workshop 1: Synergies between Marine Mammal Conservation and Marine Spatial Management

Convener and Chair: Tundi Agardy (Sound Seas, USA)

Participants: Approximately 20 people attended the workshop, which spanned two workshop sessions on Day 2.

Introduction and Goals

This Marine Spatial Planning (MSP) Workshop at ICMMPA 3 built on previous workshops and plenaries on the role of spatial management (MPAs and MSP) in conserving marine mammals, and the contributions of marine mammal science to effective marine spatial planning.

In light of the progress made at previous meetings, the goals of this latest ICMMPA 3 workshop were:

- to share experiences from spatial planning and management efforts targeting protection or recovery of marine mammals in MPAs both large and small;
- to address how MPAs fit in to the broader context of areas managed for multiple use, or in unmanaged areas such as the high seas;
- to distill, from case studies and discussion, the elements of success that make MSP suitable for use in marine mammal conservation; and
- to identify constraints, challenges, and potential pitfalls that planners and managers should address in order to use MSP in MPAs and beyond.

The two preceding MSP gatherings at ICMMPA 1 in Maui (2009) and ICMMPA 2 in Martinique (2011) introduced the concept of MSP and ocean zoning to marine mammal researchers and conservationists. The initial focus was on spatial planning to design MPAs, with attention given particularly to resolving user conflicts — especially between endangered marine mammals and shipping, renewable energy, and fishing. The workshop at ICMMPA 3 expanded this discussion, with a new concentration on what lies beyond MPAs. Participants agreed it was important to put marine mammal areas (whether critical habitat designations, MPAs, IMMAs, or KBAs) in the context of the condition of and activities occurring in ocean space beyond priority areas.

The ultimate objective is to use MSP to avoid marine mammal decline that might occur from uncontrolled activities creating a sea of degradation in which MMPA islands of protection sit.

Presentations

Seven case studies showed how conservationists and planners are using MSP to enhance marine mammal protection.



Chair Tundi Agardy introduces Workshop 1 on marine spatial management synergies with marine mammal conservation. Photo: Nikki Zanardo.

Brian D. Smith (Wildlife Conservation Society, Bangladesh and USA) described the work in progress in zoning the newly designated Swatch-of-No-Ground MPA in Bangladesh, an area supporting numerous cetacean species and a place that could act as a future refuge for marine mammals confronting climate-change impacts in the Indian Ocean.

Giuseppe Notarbartolo di Sciara (Tethys Research Institute and IUCN Marine Mammal Protected Areas Task Force, Italy) presented, on behalf of WWF Greece, an emerging MSP initiative aimed at protecting endangered monk seals. This project is centered on Gyaros, an uninhabited island in the Cyclades Islands of the Aegean Sea, which hosts the largest colony of monk seals in the Mediterranean (See sidebar 1).

Amelia Tandy (Australian Department of Environment, Australia) described biologically important areas (BIAs) and their use in planning and environmental impact assessment in Australian federal waters. This impromptu presentation was particularly important in that it showed that marine mammal science could steer planning decisions beyond the purview of conventional MSP processes.

Jorge Jiménez (MarViva Foundation, Costa Rica) shared the work of the LifeWeb Project in the Caribbean, which identified high threat areas for selected marine mammals in the Antillean Arc region.

Anne Littaye (French MPA Agency, New Caledonia) then presented two case studies. First was a small-scale example of MSP in the highly urbanized Arachon lagoon area along the Atlantic coast of France, where jet-ski conflict with marine mammals was reduced using MSP. Her second case study was from the other scale extreme: the PACIOCEA MSP project in the Tropical South Pacific region.

Simone Panigada (Tethys Research Institute and ACCOBAMS Scientific Committee, Italy) spoke about how MSP is being used to explore expansion and enhancement of protections being afforded cetaceans in the Pelagos Sanctuary for Mediterranean Marine Mammals and in the wider western Mediterranean region. His presentation included a discussion of the possible value of creating dynamic core areas.

Summary of Discussion and Ways Forward

The growing number of experiences in the use of MSP for marine mammal conservation has produced many commonalities of interest. All of the initiatives discussed in the case studies are early in the planning process, so it is too soon to judge success. However, all initiatives have seen the benefits that have flowed from making information about marine mammal occurrence, abundance, distribution, ecological requirements, and population status available to planners, decision-makers, and the wider public. Marine mammal science is being used in the placement and design of MPAs, in the zoning and establishment of place-based regulations within MPAs, in identifying areas of conflict or potential conflict between marine mammals and human uses of ocean space and resources, and in wider land use, coastal, and MSP initiatives. All of the case studies highlighted uncertainties, but all dealt with incomplete data in different ways.

Given the lack of robust and consistent data on marine mammal distribution and densities – let alone ecological requirements – it was agreed that MSP initiatives ought to focus on identifying areas of potentially high threat to marine mammals, and to use those hotspots to guide further, improved modeling, along with real data acquisition from marine mammal surveys and applied research. In this way, MSP can help marine mammal conservation by prioritizing where focused research needs to be done in order to acquire the kind of science needed to guide MSP and benefit marine mammals. MSP is an iterative process, so applied and focused marine mammal research should be made available to planners and those practicing adaptive management, to fine-tune marine plans and adjust MPA borders and regulations over time. Yet there is some urgency – and innovative ways of collecting data are urgently needed.

Participants also addressed the question of what to do about uncertainty, and whether MSP can proceed even in areas where there are significant data gaps. There was general agreement that marine mammal scientists need to be forthright about the strengths and weaknesses of data sources, and that uncertainties should be mapped as a kind of data layer in MSP processes.

This workshop tabled a two-part question central to MSP wherever there are marine mammals. What is the value of using MSP to help in marine mammal protection, and what is the value of marine mammal science in supporting effective MSP and management? This embodies an issue central to marine mammal scientists struggling to conserve these animals with limited information and many other competing marine uses. The answer to this dual question is behind the impetus to convene ICMMPA in the first place, and to put the marine mammal scientific community together with the marine planning and management

community. More and more examples show that marine mammal science, inserted into marine spatial planning processes, can ensure that marine mammal conservation issues are recognized and addressed in emerging MPAs, MPA networks, and broader marine spatial plans. These plans are made stronger and more beneficial when they incorporate marine mammal science and embrace marine mammal conservation issues.

Great interest was generated at the workshop (and in other sessions at ICMMPA 3) to carry these ideas forward and to create outputs that will catalyze more effective use of marine mammal information in MSP. The group discussed the need to develop sector-specific guidelines for participating in the planning processes, and by doing that, secure the sector's place at the table as trade-offs are discussed and decisions about spatial allocations are made.

From the marine mammal scientific community, those engaged in MSP processes need the best available information not only on the distribution, abundance, stock structure, migration, and ecological requirements of any marine mammals present in the planning area, but also some sense of the vulnerabilities of those species to anthropogenic pressures. For instance, if purse seining is a more potentially impactful activity than pole and line fishing, then that priority needs to be made clear so that information gathering can be efficient and focused on what matters most to marine mammal conservation. Once this priority-setting is undertaken by marine mammalogists, then the maritime sectors in question can be approached to provide information on their use of ocean space. In cases where the distribution and abundance of marine mammals are unknown, the potentially impacting uses can still be identified and mapped, in order to identify hotspots where targeted surveys need to be done.

Critical sectors that could input meaningful information about their existing and future activities and how these activities could impact marine mammals (positively or negatively) include fisheries (large-scale commercial, small-scale commercial, subsistence and aquaculture), shipping and maritime transportation, energy (renewable and oil and gas), tourism, and military. In addition, we see potential in providing explicit guidance for tapping local communities for information on their activities at sea and what they value in the marine and coastal environment. These sectors should also be approached to provide information on values and perceived values of marine mammals. The motivation for providing such information is that it ensures that community interests will be highlighted and considered within the MSP negotiation process. If we could catalyze standardized information flowing from such sectors, we believe there would be better uptake of marine mammal information in MSP, and a greater understanding not only of threats but also of risk to marine mammals. We suggest that the next ICMMPA MSP workshop aims to produce one or more examples of such guidelines, with quick subsequent replication in the other important maritime sectors.

Sidebar 1. Case Study on MSP in the Aegean Sea to support Mediterranean monk seal conservation

Giuseppe Notarbartolo di Sciara (Tethys Research Institute and IUCN Marine Mammal Protected Areas Task Force, Italy)

What is the potential for marine spatial planning (MSP) to support Mediterranean monk seal conservation? Activities were presented within the framework of “Cyclades Life,” a quadrennial project funded by the European Commission and by the Prince Albert II of Monaco Foundation. Located in the north of the Greek Cyclades Archipelago, the uninhabited island of Gyaros (23 km²) hosts the most important Mediterranean colony of critically endangered Mediterranean monk seals, as well as breeding colonies of several species of threatened seabirds, healthy *Posidonia* seagrass meadows, submerged caves and coralligenous formations. Various intense human activities occur in the area around Gyaros, including fishing, maritime traffic, yachting, tourism, and potential wind farm operations. The promotion of an MSP mechanism is at the core of the Cyclades Life project, encouraging the empowerment of a consortium of stakeholders who will be tasked with the management of the area in a way that is not only sustainable but also respectful of its valuable and delicate marine biodiversity.

A discussion was presented on how MSP could be successful in addressing marine conservation in the area, including:

- (1) linking the local monk seal “community” with neighboring individuals,
- (2) conserving both terrestrial and marine monk seal habitat,
- (3) conserving in parallel a number of important species and habitats both terrestrial and marine,
- (4) increasing local stakeholders’ support and engagement in conservation efforts,
- (5) facilitating, creating opportunities for, and promoting sustainable development of local communities,
- (6) creating new sources of income for local societies and for supporting conservation efforts,
- (7) minimizing conflicts and establishing trade-offs between monk seal conservation and fisheries and between nature conservation and human uses, and
- (8) promoting co-management of an MPA that may lead to sustainability.



Mediterranean monk seal, *Monachus monachus*, taken in Greece. Photo: MOrn/Panos Dendrinos.

On the other hand, additional possible constraints were noted which could prevent MSP from being able to contribute to effective conservation of the local marine biodiversity. These constraints include the need to:

- (1) examine a larger area which leads to a more complex setting (larger areas are more expensive to study and the multitude of human uses more complex to manage) as well as budget limitations during both the MPA design and management stages,
- (2) set up more complex management schemes (larger number and more diverse stakeholders in larger MSP areas),
- (3) develop new legislative tools (where MSP is not fully integrated into national legislation) which may lead to an extended legislative process for MPA establishment, and
- (4) develop new management procedures and tools (i.e., co-management schemes) which may also lead to an extended legislative process.

Workshop 2: Regional Cooperation

Convener and Chair: Mike Donoghue (Threatened and Migratory Species, Secretariat for the Pacific Regional Environment Programme – SPREP, Samoa)

Session Overview

Whales and dolphins are iconic features of Pacific Island cultures reflected in legends and art throughout this huge region of 30,000 islands and over 1,000 languages. Cetaceans are generally regarded as special animals and, with only a few exceptions, have rarely been taken for food or other resources. Poorly-managed commercial whaling of the 19th and 20th centuries, however, has left the countries of the Pacific Islands region with a severely depleted population of overwintering great whales.

Nevertheless, Pacific Island Countries and Territories (PICTs), most of whom are not members of the International Whaling Commission, have been in the vanguard of whale protection, including by declaring whale sanctuaries in their waters. While most PICTs have small economies by global standards, they are in fact Large Ocean States. Many have enormous exclusive economic zones (EEZs) – for example, French Polynesia, 4.77 million km² and Cook Islands, 1.96 million km². Establishing whale sanctuaries over such huge areas would be a daunting management problem for any country, but it is especially challenging for countries with a small population and limited resources.

As with other ocean management and conservation issues facing PICTs, collaborations and partnerships are essential for effective management of highly mobile marine mammals found in or migrating through their waters. The economic benefit that can be derived from well-managed and sustainable whale watching operations provides an additional incentive for regional cooperation between PICTs and their supporters, including countries, international agencies such as the Convention on Migratory Species and IWC, scientific institutions, NGOs and individuals. The regional intergovernmental agency for environmental management, SPREP, plays a central role in coordinating these efforts through their Whale and Dolphin Action Plan and the Action Plan of the CMS Memorandum of Understanding on Cetaceans in the Pacific Islands.

Session Objectives

Participants will describe the variety of approaches that have been adopted for marine mammal protection and development of MMPAs in their countries, the obstacles that have been overcome, the lessons that have been learned, and the prospects for future developments. Emphasis will be placed on the role of cooperation and collaboration with other countries, as well as engaging with expert advisers and stakeholders in developing harmonized standards across the region for whale and dolphin watching and protected area establishment.

Summary Reports

Report from Papua New Guinea

Cara Miller (Whale and Dolphin Conservation, Fiji) explained that the catalyst for the Papua New Guinea (PNG) program she led was a national workshop convened in Madang in 2007. The PNG Government's Department of Environment and Conservation (DEC) are partners with Cara, WDC and local stakeholders in the program.

A field station for research and monitoring has been established at M'buke Island near Manus Island on the western edge of the Bismarck Sea. Fieldwork was conducted in 2010 and 2013 at M'buke, primarily with a local team, using a local vessel. Local community capacity-building is essential to maintaining the momentum that has been developed.

Besides the fieldwork which has identified 12 marine mammal species in the seas around M'buke, a legislative review and gap analysis of the various Acts covering marine mammals have been completed. The key partners with DEC are the University of PNG and M'buke Peoples Association.

The recent discovery of sperm whales in the 2013 survey has given additional impetus to the need to conduct further work to clarify the distribution and behavior of sperm whales in local waters. This is urgent in light of impending deepsea mining operations at the Solwarra 1 site in the Bismarck Sea.

Report from Niue

Fiafia Rex (Oma Tafua, Niue) spoke about Oma Tafua, an influential local NGO that was established to research and protect cetaceans in Niue.

Oma Tafua led the campaign for the establishment of Niue's Whale Sanctuary (one of the whale sanctuaries covering the entire EEZ of 11 Pacific Island Countries and Territories), and has since drafted a management plan.

Whale tourism is important for the economy of Niue and features in much of their tourism publicity material. It is becoming so popular that the frequency of flights doubled in whale season from one to two per week. An estimated 97 percent of Niueans live overseas, so the locals joke that the humpback whales are more Polynesian than the humans because they at least come back every year.

Sharing experiences is important — Niue has gained a lot from sharing with organizations including SPREP, Whales Alive and the South Pacific Whale Research Consortium, and individuals, as well as through experiences from Tonga's whale watching operations.



Steller sea lions haul out off southeast Kamchatka, Russia, part of an ecologically or biologically significant area (EBSA) designated by the Convention on Biological Diversity. Photos: Erich Hoyt, Far East Russia Orca Project (FEROP, WDC)

For its part, Niue has shared its Sanctuary Plan, and the process involved in its development with PNG, Vanuatu and Tokelau.

Report from Palau

Tiare Holm (Sustainable Decisions, Palau Marine Mammal Sanctuary, Palau) explained that cetacean research began in Palau in 2010, after she attended ICMMPA 1 in 2009.

The Palau Marine Mammal Sanctuary was announced in 2010. The announcement was a catalyst for cetacean research, which has been conducted with minimal funding using volunteer participants and vessels generously provided free of charge. Line transect surveys have confirmed the presence of 12 cetacean species, but there are probably more to be identified.

Cetacean conservation in Palau is closely linked with a number of conservation initiatives including Palau's Protected Area Network, the National Shark Sanctuary, Palau's commitment to the Micronesia Challenge, and most recently, the Palau Marine Mammal Sanctuary.

Challenges faced by Palau include illegal, unreported and unregulated (IUU) fishing, requiring effective surveillance of the 604,000 km² EEZ and compliance by vessels in national waters, as well as raising community awareness of the importance of conserving marine megafauna.

Report from Tonga

Karen Stone (Vava'u Environment Protection Group, Tonga) spoke with the benefit of ten years of diving, operating a whale watching business, and involvement in marine conservation issues in Tonga.

In Tonga, a subsistence hunt for humpback whales, focusing on mother-calf pairs, took place from 1900 until 1978, when it was halted by Royal Decree. Contrary to popular perception, there is currently no whale sanctuary in Tonga, but the Fisheries Act provides significant protection. The over-wintering humpback population was taken to the brink of local extinction 40 years ago, but is now recovering, with numbers probably around 2,000 animals.

Whale watching is Tonga's main tourist industry, worth up to USD \$5 million each season. After some years of voluntary guidelines to manage the industry, a 2009 workshop developed a consensus for establishing regulations; they were finally enacted in 2013. There are now several legally binding requirements for vessels, skippers and guides, but compliance is an ongoing issue. The Government has yet to develop a serious strategy to monitor compliance.

Entanglement has become a problem in recent years — five whales on average are now sighted each season trailing rope or net. David Mattila of the IWC conducted a training course in July and there is now a cadre of trained volunteers and a disentanglement kit on site (provided by World Animal Protection).

A Rapid Biological Assessment (BioRAP) was led by SPREP in February 2014, and this may result in better protection for whales through the establishment of a protected areas network.

Report from Kaikoura, New Zealand

Gina Solomon (Te Korowai o Te Tai o Marokura, Kaikoura Coastal Marine Guardians, Kaikoura, Aotearoa/ New Zealand) described a lengthy community-led process that has resulted in the establishment of an MPA in Kaikoura, including the head of the Kaikoura Canyon where sperm whales are found year-round.

Kaikoura is a unique location on the east coast of New Zealand's South Island, where a deepwater canyon is located close to the coastline. Sperm whales are found year-round at the head of the canyon, supporting a valuable industry that is the world's premier indigenous peoples' whale-watching enterprise.

At the beginning of seven years' consultation, there was little trust between the numerous stakeholders, and it was a lengthy process to build the necessary trust to achieve consensus and an enduring commitment by all sides. The two vital elements in the process were that it was marae¹-based and was expertly facilitated.

Following the long consultation, the legislation was then debated for three years in Parliament through Select Committee hearings and various drafts. In August 2014, the Kaikoura Marine Management Act was passed through Parliament, and the Prime Minister attended a ceremony in Kaikoura to mark the establishment of the MPA.

The final result — the new Kaikoura MPA — aims to protect key habitat for seals, dolphins and whales, over a large and unique area.

Key Points of the Workshop

- Community groups can play a vital role in establishing MMPAs, both by raising public awareness and by influencing governments.
- Capacity building is vital for community groups in Pacific Island countries seeking to learn more about their marine mammals and to improve the protection available to them.

Recommendation

- NGOs, universities and other institutions, along with marine mammal biologists and regional and government agencies, can provide valuable assistance to community groups in the establishment and management of MMPAs in the Pacific Islands.

¹ In Maori culture, the marae is the meeting-house where issues are debated, often at length and with great passion. The convention is that everyone participating leaves their own prejudices and entrenched positions at the door, and enters the marae with the intention to reach a consensus.

Workshop 3: Wildlife Interpretation and Education: Connecting with Marine Mammals and Their Habitats

Conveners: **Mike Bossley** (Science and Education, Whale and Dolphin Conservation Australasia, Australia) and **Erich Hoyt** (Critical Habitat/Marine Protected Areas Programme, Whale and Dolphin Conservation and IUCN Marine Mammal Protected Areas Task Force, UK)

Chair: **Erich Hoyt**

Rapporteur: **Charlotte Foster**

Participants: Aise Kim, Maddalena Fumagalli, Nikki Zanardo, Chloe Corne, Gemma McGrath, Alastair Birtles, Tim Hunt, Tony Flaherty, Manuel Gardea, Cristina Vicente, Verity Gibbs, Astrid Frisch Jordán, Krista Nicholson, Delphine Chabanne, Charlotte Foster, Amandine Eynaudi, Laura Boren, Elke Reufels, Shelley Harrison, Tony Bartram, Phyll Bartram, Nardi Cribb, Leah Pippas, Jamie Hicks, Kate Charlton-Robb, Philippe Le Niliot, Matthew Collis, and others

Introduction and Objectives

Wildlife experiences can be greatly enhanced by providing appropriate interpretation via guides, physical facilities such as interpretive centers, pamphlets and books, and via online sources. Interpretation can help people understand the behavior and habitat needs of local marine wildlife, as well as the role and duties of the public, all of which are important for the protection of marine and coastal ecosystems. This session described a variety of approaches to interpretation, evaluated their strengths and weaknesses, and examined options provided by recent advances in technology. The session also explored how interpretive methodologies might extend their remit to the high seas and help make the public aware of important marine mammal areas, leading to a wider recognition and protection of marine mammal habitat.

Our objectives were to:

- provide an overview of the concepts and practice of interpretation in wildlife tourism,
- present case studies of interpretation centers, including their financial viability,
- evaluate the contribution wildlife centers can make to MMPAs and IMMAs, and
- explore how interpretation might be extended to the high seas situation and help make the public aware of important marine mammal areas, leading to a wider recognition and protection of marine mammal habitat.

Presentations

The management role of interpretation in wildlife tourism

Aise Kim (Tourism Management, University of South Australia, Australia)

Interpretation has been recognized as a management tool in achieving the goals of sustainable tourism. Interpretation can help people understand what kind of behavior is acceptable in a particular tourism setting and guide them to behave in a more responsible way. However, the successful outcome of the practice of interpretation has been much argued in promoting pro-environmental attitudes and behavior due to the complexity and difficulty of understanding the process of behavioral change. I would like to address this concern by proposing an alternative approach to developing effective interpretation practice. Let's assess "when" and "how" interpretation makes a positive contribution to changes in visitors' attitudes and behavior rather than asking the simple question of whether interpretation influences visitors' attitudes and behavior.

Previous research argues that simply providing visitors with information and education about environmental conservation would not be the most effective means of control. In addition, there is no consensus to generalize the best effective interpretation strategies in designing the message, delivery of the message, and target audience. It requires developing effective interpretation strategies for different types of behavioral change (e.g., short-term vs. long-term behavior; the spontaneous vs. voluntary behavior; illegal vs. inappropriate behavior) based on different theoretical perspectives (e.g., applied behavior analysis, the theory of reasoned action, the central route to persuasion). The three major persuasive models of the attitude-behavior change require application to different types of behavior while considering the active role of target receivers (e.g., low motivation and low ability to process the message vs. high motivation and high ability to process the message). Such an approach will help to determine the way in which types of message content and delivery methods are the most effective to the targeted receivers.

Thus, the desired outcomes of this multiple theoretical approach can provide helpful feedback for improvement and development of interpretation programs through identifying the strengths and weaknesses of site-based interpretive practice.

DIY ideas for community engagement in a complex and urban marine reserve

Cristina Vicente (Adelaide Dolphin Sanctuary, Australia)

The Adelaide Dolphin Sanctuary (ADS) was established in June 2005. Its 118 km² covers the Inner Port, Outer Harbour, North Haven marina, and stretches north to Port Gawler. The area is home to 30 or more Indo-Pacific bottlenose dolphins (*Tursiops aduncus*), with approximately 300 transient dolphins visiting the area. The ADS includes key habitat features such as mangroves, seagrass, saltmarsh, tidal flats and tidal creeks, all of which combine to provide habitat for the dolphins and their food resources.

The ADS is economically, socially, culturally and historically important. Located 12 km from the center of Adelaide, it may be the most intensively used marine waterway in South Australia.

The ADS was proposed by the local community who became concerned about the safety of the dolphins and the quality of their environment. Widespread consultation showed a strong local desire to protect the dolphins.

A series of initiatives have been developed to improve community engagement and to promote the environmental importance of the ADS following objectives 4 and 5 from the ADS Management Plan and ADS Act.

Community engagement and outreach include shaping values through environmental education, building knowledge and skills through outreach to communities and industry, and raising public awareness and support through targeted communication campaigns.

Working with limited resources, the ADS has developed a series of low-cost initiatives — so-called DIY or “do-it-yourself” — to achieve meaningful community engagement. These initiatives include:

1. The development of a self-guided interpretation booklet: The ADS Users Guide.
2. The development and delivery of a public open day: Dolphin Day. Dolphin Day aims to increase community participation through a series of activities and stalls. The first Dolphin Day in January 2013 attracted around 800 visitors; the second Dolphin Day in March 2014 attracted over 4,000 visitors to the area.
3. The coordination and support of a volunteer group: The ADS Action Group. Members of the ADS Action Group are proactive volunteers who give their time to help with the management of the ADS. Under the guidance of the ADS staff and in partnership with government and non-government organizations, and other community groups, the ADS Action Group helps with on the ground delivery of the objectives of the ADS management plan. The group's focus is the protection of the dolphins and engaging other community members to provide information and education to the community about the environmental importance of the Adelaide Dolphin Sanctuary.

A whale center in a past whaling community

Leah Pippos (South Australian Whale Centre, Adelaide, Australia)

Victor Harbor resident Ian Milne started the South Australian Whale Centre in a photographic shop in 1989 and was instrumental in restoring a focus on whales at Victor Harbor, a major center for hunting southern right whales in South Australia in the nineteenth century.

The South Australian Whale Centre is now housed in an historic stone building and is South Australia's largest marine-focused interpretative center. Visitors can experience the natural wonders of the deep, explore the world heritage-listed railway building, and gain further knowledge about Victor Harbor and South Australia's marine treasures. The Centre provides whale sighting information, education programs and research support services. It brings together a collection of historic treasures, including those of marine, cultural and aboriginal heritage.

The Centre recognizes Victor Harbor's whaling past but the focus is now on understanding and protecting both whales and their environment.

Scottish Seabird Centre — Watching Wildlife At Sea With No Disturbance

Erich Hoyt (Critical Habitat/Marine Protected Areas Programme, Whale and Dolphin Conservation and IUCN Marine Mammal Protected Areas Task Force, UK)

The Scottish Seabird Centre, in North Berwick, Scotland, was set up in 2000 as a Millennium project. Initial projections were 60,000 visitors a year, but nearly 200,000 people came the first year and current numbers are 270,000 per year.

The success of the Centre is partly due to constant change and reinvention and expansion into the community. It has provided local wildlife enthusiasts a place to gather as well as transforming North Berwick into a wildlife lover's paradise. Approximately £2 million per year goes into the local economy and some 70 permanent jobs have been created.

The concept of the Centre draws on the five islands situated just offshore from North Berwick, each with its own seabird and some with seal populations. The Centre has mounted solar-powered, high-resolution cameras at strategic locations on each island connected by microwave technology to the Centre where visitors can pan and zoom in on the action. The Bass Rock is the world's largest northern gannet colony, while other islands are favored by puffins and other seabirds. The Isle of May National Nature Reserve is the most distant at 16 km from North Berwick. It can be seen on the horizon with the naked eye, but in the cameras, you can watch seals being born with seabirds swooping in to take the placenta.

The Centre features permanent and flexible exhibition areas with camera stations and screens for each island, a café, gift shop, small theatre, viewing platform on the sea for visiting dolphins as well as high-power telescopes to watch the gannets arrive on the Bass Rock. The Centre also offers boat trips to the islands, but that is the only physically close observation of the seabirds. The vast majority of the visitors watch wildlife close-up on the big screens without the wildlife ever knowing or being disturbed.

The Seabird Centre is only 14 years old and already there have been several generations of cameras, lenses and projectors which have improved the quality and range of the wildlife experience. The Centre is now planning links to wildlife sites even further afield. It will be valuable for public education if the Seabird Centre's cameras or similar technology can some day reach pelagic and high seas species and ecosystems as IMMAs are identified and new MMPAs are set up in ever more remote areas of the ocean. What better way to introduce people to MMPAs as well as IMMAs!



Scottish Seabird Centre in North Berwick, Scotland.
Photo: Erich Hoyt.

A safe home for whales and dolphins — An educational initiative for interpretation centers, organizations and schools

Erich Hoyt (Critical Habitat/Marine Protected Areas Programme, Whale and Dolphin Conservation and IUCN Marine Mammal Protected Areas Task Force, UK)

By connecting children to the idea of “home”, this WDC initiative will invite them to think about whale and dolphin habitats. What does a safe home look like for whales and dolphins? What do they need to be protected from? Who cares for them?

The idea behind this initiative is to introduce local children to cetacean species found in their area. The children could be taken to the beach or board a ferry or other boat to experience the sea. They can be encouraged to investigate local conservation issues. Then, they can discuss their ideas and try to find creative ways of expressing them.

As part of this idea, WDC is developing

- educational material focussing on regional species,
- a website for the initiative with an online gallery of children's art, and
- a digital platform with an app for children from all over the world to paint creatively together to produce a global perspective of what makes the best home for whale and dolphin families.

This WDC international initiative will start in 2015. It will be made available in English, German and Spanish. WDC Kids are looking for partners to join them, contact kids@whales.org or education@whales.org.

Bringing people and dolphins onboard: Building constituencies for freshwater dolphin conservation in Bangladesh

Elisabeth Fahrni Mansur (Wildlife Conservation Society - WCS, Bangladesh), **Farhana Akhtar** (WCS, Bangladesh), **Brian D. Smith** (WCS, Bangladesh and USA)

A short film of this work was introduced and presented by **Erich Hoyt**.

The Sundarbans is the only place in the world where both Ganges River dolphins and Irrawaddy dolphins, Asia's two last remaining freshwater dolphin species, occur in the same habitat. The Wildlife Conservation Society's (WCS) Bangladesh Program conducts systematic research and monitoring of freshwater and marine cetacean populations and habitat. WCS also enhances the capacity of local scientists and resource managers to implement cetacean conservation research and interventions, and increases public awareness and support for cetacean conservation

by creating outreach networks and innovative educational outreach tools.

One of these outreach tools is the travelling boat-based exhibition called the *Shushuk Mela*. This exhibition, which has run for about one month each year between 2011 and 2014, reached over 54,000 residents living in close proximity to three wildlife sanctuaries established for the protection of freshwater dolphins in the Sundarbans, Bangladesh. The aim is to reduce dolphin entanglements and overfishing by encouraging positive behavioral changes among fisher folk. The floating exhibition also serves as a platform for information sharing through informal and formal consultations.

Before the exhibition, we conducted interview surveys in four villages that were not visited by the exhibition (202 interviewees) and 12 villages that were visited by the exhibition on 1-3 occasions (603 interviewees). Significant positive changes were documented in the knowledge, attitudes and practices of local communities near the wildlife sanctuaries for freshwater dolphins. These included an increase in interviewees from 65 to 100 percent who were aware of the presence of freshwater dolphins, 34 to 77 percent who understood that dolphins are air-breathing mammals, 23 to 71 percent who believed freshwater dolphin populations were declining, 17 to 54 percent who knew about existing laws protecting freshwater dolphins, and 83 to 98 percent among fisher folk indicating that they were willing to cut their nets to save an entangled dolphin. Documented changes also included a decrease from 23 to 0 percent of interviewees who attributed blame for declining fisheries to freshwater dolphins.

Interpreting the mysteries of the magnificent dwarf minke whales of the Great Barrier Reef

Alastair Birtles (Minke Whale Project and James Cook University, Townsville, Queensland, Australia)

All over the world, visitor centers play a vital role in connecting people with wildlife by providing informed and lively interpretation that educates and inspires their visitors to want to conserve animals and their habitats. However, marine mammals, especially cetaceans, present unique challenges for interpretation due to infrequent and relatively unpredictable encounters at remote sites with dispersed, low-density populations and species covering wide ranges that include long-distance migration routes across the high seas. How can these factors be overcome? The interpretation model developed by the Minke Whale Project (MWP) for the Great Barrier Reef population of dwarf minke whales can provide some insights. These whales aggregate in a remote area of the Great Barrier Reef in the austral winter and then migrate down the east coast of Australia along the shelf edge – but in the depths of winter when seas are rough and few vessels venture out that far.

An undescribed subspecies of the northern hemisphere minke (*Balaenoptera acutorostrata*), dwarf minke whales visit the

northern Great Barrier Reef each June and July to socialize and mate, forming the only known predictable aggregation of these whales. For 20 years the MWP has conducted multi-disciplinary research to improve our understanding of these little-known whales and to contribute to the sustainable management of the multi-million dollar swim-with-whales ecotourism industry that has developed on dive vessels from Cairns and Port Douglas.

These minke whales are fast, sleek, the most highly patterned of all the baleen whales, and they are exceptionally inquisitive. The whales' frequent close approaches and extended interactions with humans have facilitated the development of this unique industry that provides often life-changing experiences for hundreds of people each year.

Researchers from the MWP have worked closely with this industry, the Great Barrier Reef Marine Park Authority, the Commonwealth Dept. of Environment and Queensland Marine Parks managers and two international wildlife conservation NGOs (IFAW and WDC) for two decades to improve our understanding and to ensure that human interactions with the whales are managed sustainably. While research on the biology and behavior of the whales has been important, ultimately it is the people who are managed, not the whales – and hence visitor studies have been vital in helping us develop an appropriate management framework.

The remoteness of the location and absence of rangers means that the interpretation is boat-based and delivered by tourism industry personnel. Our task as scientists was to win the hearts and minds of the skippers and crews, build their sense of stewardship, empower them to manage their passengers effectively and supply them with a wide range of tailor-made interpretive material aimed at engaging their passengers and preparing them for intense and physically close, in-water encounters. The MWP Model – strongly research-based with a quadruple-bottom-line sustainability framework – uses adaptive management with the precautionary principle and detailed risk management analyses. Its inclusive, collaborative and transparent processes have helped to build trust and the ensuing long-term relationships have facilitated the development of best practice management, high levels of compliance and extraordinary wildlife experiences.

Discussion Summary and Conclusions

The first objective of the workshop covering the concepts and practices of interpretation in wildlife tourism was met by Aise Kim looking at principles of interpretation, theoretical approaches to disseminating information, interpretation strategies and reasons for community engagement. She was followed by Cristina Vicente of the Adelaide Dolphin Sanctuary talking about hands-on, low-cost approaches.

The case studies on the South Australian Whale Centre, Adelaide Dolphin Sanctuary, Scottish Seabird Centre, Minke Whale Project of the Great Barrier Reef, and the travelling Shushuk Mela Dolphin Exhibition from Bangladesh provided a look into the wide variety of interpretation projects with an inside view

on how they engage the community and spread awareness of the marine environment.

The third objective – to consider the contribution that wildlife centers can make to MMPAs and IMMAs – was realized through evaluating the success of the Shushuk Mela Dolphin Exhibition and the Adelaide Dolphin Sanctuary and their direct contribution to dolphin sanctuaries around the world, as well as the potential of remote wildlife viewing from the Scottish Seabird Centre.

The fourth objective discussed at the workshop was the potential for interpretation to be extended to the high seas. This was first explored by looking at the problems concerned with engaging the public regarding the high seas, with the example of the Minke Whale Project of the Great Barrier Reef, where interpretation is delivered in a remote location at sea (250 km away from Cairns) and in an area of little surveillance.

Many of the key points that were brought up concerned the need to connect with people and ways to create engagement.

- The telling of personal stories about animals can build stewardship and interpretation.
- Greater knowledge within the community can lead to an increased willingness to protect and conserve the environment.
- Engagement is needed with all stakeholders for successful dissemination of information and conservation of the marine environment.
- The best way to connect people with the high seas is by linking with existing stakeholders and building towards the provision of interpretation directly on the high seas.
- It is a challenge to deliver the message about the need for remote high seas conservation to the coastal-oriented public and of course from there to politicians who are on 2- to 5-year schedules.

Recommendations for how existing interpretation centers and programs can link to the high seas included the following. The International Committee on Marine Mammal Protected Areas (ICMMPA) and workshop participants should:

- investigate models of flyway initiatives for tagging telemetry – for example, the Mesoamerican Flyway – which links interpretation centers;
- investigate the possibility of linking up festivals with interpretation (e.g., OzAsia festival that celebrates the pathway of birds linked with IFAW – look at niche markets and how to link into festivals);
- promote collection and access to data (operators and companies will more likely take part in interpretation if they know their work is going to a big audience);
- investigate the use of technology to overcome issues – for example, Whales in Motion at the South Australia Whale



Bryde's whale surfaces in the new Swatch-of-No-Ground MPA. Photo courtesy Elisabeth and Rubaiyat Fahrni Mansur and Brian D. Smith, Bangladesh Cetacean Diversity Project, Wildlife Conservation Society.

Centre, created an online map that allows the public to find out where they can see whales along the coast; and

- reach out to all stakeholders on the high seas including the high seas fishing industry for the potential of educational engagement with fishing boats.

Recommendations were also developed for how to connect the public to the high seas through education from vessels at sea. The International Committee on Marine Mammal Protected Areas (ICMMPA) and workshop participants, or a specific ICMMPA-initiated committee should:

- look into existing ships crossing the high seas as “vessels of opportunity” to help facilitate making connections through technology. It would be necessary to see which companies are making long journeys and which vessels would be able to put technology on board. If vessels of opportunity are used, a comprehensive communication strategy needs to be considered and training of the people involved;
- tap into data collected by commercial merchant vessels, for example, the British Meteorological Programme records animal interactions at sea as well as weather data;
- contact cruise ships and ferry companies, as well as vaka (traditional Polynesian canoe) expeditions, as potential sources of interpretation and for special interpretation events on the high seas;
- note that the location of high seas interpretation needs to be considered – that is, ship routes should be joined or planned to get the most interactions and iconic places that can be sold to the public; and
- explore the use of technology, for example, filming and broadcasting whale and other marine species video from the vessels.



Spinner dolphins in Fernando de Noronha National Marine Park.
Photo: José Martins da Silva, Jr.

Spinner dolphins display highly predictable diurnal behavior. At night they head offshore to forage. During the morning, they move into protected spots, usually in sheltered bays and atolls, to socialize and rest for up to 10-12 hours.

Workshop 4: Protecting Spinner Dolphin Resting Areas

Convener and Chair: Lars Bejder (Cetacean Research Unit, School of Veterinary and Life Sciences, Murdoch University, Australia)

Participants: More than 25 including 7 presenters.

Session Overview

Spinner dolphins display highly predictable diurnal behavior. At night they head offshore to forage. During the morning, they move into protected spots, usually in sheltered bays and atolls, to socialize and rest for up to 10-12 hours. This predictable behavior and day-time reliance on sheltered bays/atolls that are easily accessible by people render them susceptible to human disturbance during critical resting periods. The highly specific characteristics of these resting habitats present unique management requirements and conservation opportunities.

The overall workshop objective was to compare and contrast biological, environmental and socioeconomic values in the protection and management of spinner dolphins and their resting habitats across field sites in Hawaii, Brazil, Fiji, Egyptian Red Sea, and Bali, Indonesia.

Specific objectives of the workshop were to:

- compare and contrast the daily behavioral patterns of spinner dolphins across field sites,
- compare and contrast the environmental characteristics of spinner dolphin resting habitat across field sites,
- identify non-dolphin targeted human uses of spinner dolphin resting habitats to be considered when designing and implementing protected areas (these uses include fishing, diving and cultural values, and a consideration of common-pool resource theory), and
- discuss local and national legislation frameworks under which protected areas could be implemented for each of the field sites.

Following the six presentations offering diverse geographical representation, a panel-led discussion focussed on the objectives and stimulated discussion for common concerns, differences and challenges encountered when developing and managing small protected areas for spinner dolphin resting habitats.

Presentation Summaries

Management of spinner dolphins (Stenella longirostris) in Makalati (Moon Reef), Fiji

Cara Miller (WDC and University of the South Pacific, Fiji), **Josefa Bau** (Takalana Dolphin Watch, Fiji), **Nardi Cribb** (Flinders University, Australia), **Tim Hunt** (Flinders University, Australia), **Isoa Koroi** (Dawasamu Environment Movement, Fiji) and **Samanunu Simpson** (University of the South Pacific, Fiji)

Makalati (also known as Moon Reef) (17°31.7'S, 178°30.7'E) in the Dawasamu district of Viti Levu, Fiji, serves as a daytime resting habitat for a pod of semi-resident spinner dolphins (*Stenella longirostris*). The reef has predominantly sandy substrate, maximum depth of around 15 m, two openings, and an area available for dolphin swimming of approximately 0.5km². Makalati coral reef ecosystems are in relatively good condition with the exception of a few species that are important for local livelihood that appear to have been subject to some level of exploitation.

Efforts to expand scientific understanding of Makalati have been underway since 2008. Research activities have included the following: diurnal behavioral observations, photo-identification surveys, analysis of repertoire and trends in acoustic communication (including different whistle types and echolocation clicks), and habitat description. In addition, significant capacity building of community members, dolphin watch staff, and University of the South Pacific students has been undertaken. Awareness materials and education sessions for local school children, government officers, and tourists have also been developed.

As Makalati falls within the 'qoliqoli', or traditional fishing grounds, of the Dawasamu district, any management actions must be endorsed by the Chief of Dawasamu. To provide a mechanism of support for the Chief on issues of environmental practices and sustainable use policy, the Dawasamu Environment Movement (DEM) was formed less than five years ago. Provision of advice by DEM has shown positive results to date. For example, Makalati was declared an MPA in April 2011 after research findings were provided to DEM which were in turn presented to the Chief of Dawasamu. At present this MPA designation promotes guidelines sign-boarded at the reef. Funds have now been secured to facilitate consultation and awareness sessions for development of an ecosystem-based management (EBM) plan for the entire Dawasamu district, both terrestrial and marine areas. Discussions on the Dawasamu EBM process led to an agreement that a specific management plan for Makalati would be developed as an annex within this broader district-wide plan. Specific issues which will be addressed in the Makalati management

plan include research activities, monitoring, management of community ecotourism operations, level of boat use and activity (including procedures for visiting boats), and education. The inclusion of cetacean management within a community-led EBM framework may represent a first for the Pacific region.

*Identifying the importance of Hawaiian spinner dolphin (*Stenella longirostris*) resting areas*

Julian A. Tyne (Murdoch University, Australia),
Heather Heenehan (Duke University Marine Lab, USA),
David W. Johnston (Duke University Marine Lab, USA),
Lars Bejder (Murdoch University, Australia)

Hawaiian spinner dolphins (*Stenella longirostris*) predictably rest in sheltered bays during the day. Human activities frequently disrupt their rest periods and endanger their populations. Day after day, in their resting bays in Hawaiian waters, spinner dolphins deal with disturbance. Some of the human activities are focused on dolphins while others are not so dolphin-centric but still involve access to the bays. Managers are seeking to implement a mitigation approach (time-area closures) within these bays to reduce the number and intensity of human-dolphin interactions.

Research was undertaken to obtain baseline spinner dolphin population parameters and to identify the attributes related to resting spinner dolphins. From a social perspective, common-pool resource theory was used to explore the suitability of community-based conservation measures to compliment a command and control mitigation approach. From September 2010 to August 2012, systematic boat-based photo-identification surveys were undertaken in four main resting bays along the Kona Coast of Hawai'i Island. From these data, 235 highly distinctive individuals were identified, from which survival rates and abundance were estimated. Capture-recapture models were fitted based on the monthly capture histories of these individuals. The annual survival rates for both years was 0.97 ± 0.05 SE with total abundance estimates of 631 ± 60 SE, (95% CI 524-761) in 2011 and 668 ± 62 SE (95% CI 556-801) in 2012.

To identify the attributes of resting spinner dolphins in coastal waters, a novel integration of boat-based and land-based group focal follow data was used with gradient boosting Generalized Additive Models (GAMs). Two in-bay models were developed using data collected in two resting bays and a third coastal model was developed using data collected inside and outside of four resting bays. The coastal model showed that spinner dolphins were unlikely to rest outside of bays and that when inside the bays dolphins were likely to rest over sand. All three models showed that spinner dolphins were more likely to rest between 10 am and 2 pm during the day.

Ostrom's common-pool resource theory was used to assess bays and bay users to explore questions of governance and sustainability. The analysis indicated that viewing the bay as a resource with tourism as one of the many human demands, instead of

specifically focusing on dolphins, reflects an ecosystem-based approach. Cultivating some of Ostrom's attributes among stakeholders may lead to a more productive set of arrangements that would benefit the dolphin population.

To develop an effective management approach to protect resting spinner dolphins in their resting habitats, a combination of approaches is needed including understanding the spinner dolphin population parameters, the factors that influence resting behavior as well as the human groups that use the bays. Solutions focused simply on addressing disruptive human behavior towards dolphins won't work. Instead there is a need to manage the bays, and meet the needs of all who use them including tour operators, fishermen, kayakers, swimmers and, of course, spinner dolphins.

The Egyptian Red Sea case (Part I): Spinner dolphin ecology and behavior

Amina Cesario (Swire Institute of Marine Science, Hong Kong and Hurghada Environmental Protection and Conservation Association, Egypt), **Marina Costa** (University of St. Andrews, UK and Hurghada Environmental Protection and Conservation Association, Egypt), **Maddalena Fumagalli** (University of Otago, New Zealand and Hurghada Environmental Protection and Conservation Association, Egypt), **Giuseppe Notarbartolo di Sciara** (Tethys Research Institute and IUCN Marine Mammal Protected Areas Task Force, Italy), **Leszek Karczmarski** (Swire Institute of Marine Science, Hong Kong)

Spinner dolphin populations of *Stenella longirostris longirostris* usually forage cooperatively at night over the vertically migrating mesopelagic boundary community and spend daylight hours resting and socializing in sheltered, sandy-bottom lagoons and bays. In the Egyptian Red Sea, the dolphins are known to spend their days year-round in a few semi-pelagic reef lagoons. Longitudinal research was conducted at two reefs, Samadai and Satayah, where spinner dolphin diurnal presence and resting behavior have been regularly observed. This predictable presence made spinner dolphins a major draw for tourists to these destinations. Samadai and, later on, Satayah Reef became world renowned as locations where it was possible to swim with dolphins in their natural habitat.

Research methodologies included visual and acoustic observations to describe the dolphins' spatio-temporal use of the areas and daily behavioral patterns as well as underwater photo-identification and laser photogrammetry to investigate population processes, life history traits and socio-behavioral dynamics. Behavioral responses to human impacts in Samadai and Satayah reefs were also assessed to evaluate possible disruptions in patterns due to swimmers and vessels.

This overview of our preliminary findings focuses on population dynamics and behavioral ecology of the species. Our work aims to advance knowledge about spinner dolphins in the Egyptian Red Sea and their response and resilience (or lack of it) to

anthropogenic impacts. The dolphin-based tourism in the area is likely to be ecologically, socioeconomically and culturally unsustainable: much more than science is needed to address the threat facing spinner dolphins. The realms of education, sociology, law, enforcement and management are as relevant as science in finding solutions to conservation problems. Social and economic dimensions are addressed in Part II of the presentation, below.

The Egyptian Red Sea case (Part II): Socioeconomic consideration and the Samadai model

Maddalena Fumagalli (University of Otago, New Zealand and Hurghada Environmental Protection and Conservation Association, Egypt), **Amina Cesario** (Swire Institute of Marine Science, Hong Kong and Hurghada Environmental Protection and Conservation Association, Egypt), **Marina Costa** (University of St. Andrews, UK and Hurghada Environmental Protection and Conservation Association, Egypt), **Giuseppe Notarbartolo di Sciara** (Tethys Research Institute and IUCN Marine Mammal Protected Areas Task Force, Italy), **John Harraway** (University of Otago, New Zealand), **James Higham** (University of Otago, New Zealand), **Elisabeth Slooten** (University of Otago, New Zealand),

The Egyptian Red Sea has undergone profound changes in the past 30 years. Once remote fishing villages in the 1980s, many places have become popular resorts receiving several million tourists yearly. Visitor arrivals increased from a few thousand to 4.5 million within the period considered, establishing tourism as the main economic sector in the Red Sea Governorate and Egypt's most important employment-generating sector. A lack of planning, modification of the socio-cultural framework and little (or no) sense of environmental responsibility have characterized this phase: Concerns over the use and abuse of natural resources and the sustainability of the market have been voiced since the late-1990s, but responses have been weak and inefficient.

This presentation retraces recent history, policies and legislation in the matter of tourist investment to highlight the reasons behind the observed changes. We analyzed concurrent laws, decrees, resolutions and issues related to environmental affairs and responsibility. We have also added social considerations of governance, migration flows and tourism trigger markets to fully explain the context in which nature-based tourism is currently perceived, managed and promoted.

Two key sites, Samadai and Satayah, which are subject to contrasting management regimes, are presented on a preliminary basis. Community mobilization led to the declaration of Samadai Reef as a special managed area in 2004. Since then, visits have been regulated and controlled. Satayah Reef became a tourist attraction more recently and, although included in national park boundaries, remains unregulated while being exposed to increasing tourist pressures. We have described operations, interventions and stakeholder perspectives at both sites.

These two sites, only 120 km apart and often involving the same operators, are emblematic of the inconsistency and problems that characterize the region. This Egyptian case links many local and international stakeholders in dynamics common to developing countries. A country policy geared towards full tourism expansion coupled with slow actions from the scientific and environmentally concerned community make emergency intervention the only possible approach. Although this approach is quickly formalized, it relies on the will of a few key individuals, often based on precautionary principles, and poorly addresses the long-term sustainability. We suggest that site-specific integrated collaborative management schemes with increased local stakeholder education and participation could successfully protect the site and benefit environmental conservation at large.

Designing an MPA for spinner dolphins without sufficient ecological data: Lovina (Bali) dolphin watching as a case study

Putu Liza Mustika (College of Marine and Environmental Science and College of Business, Law and Governance, James Cook University, and Whale Stranding Indonesia, Indonesia), **Helene Marsh** (James Cook University, Australia), **Alastair Birtles** (James Cook University, Australia)

Three marine mammal MPAs (MMPAs) have been designed around Bali since 2011: Lovina, Bondalem/Tejakula and the Peninsula. Dolphin watching, first established in Lovina in the late 1980s, has become an important livelihood in these MPAs. The dolphin watching industry in Lovina depends on predictable access to coastal dolphins, particularly dwarf spinner dolphins (*Stenella longirostris roseiventris*). Almost 200 dedicated traditional fishing vessels are available to take passengers to watch the cetaceans found 3-4 km from shore. During the data collection period (2007 to 2009), on average 34.5 tour boats from four dolphin associations operated for up to three hours each morning in Lovina. During the high tourist visitation season, up to about 100 tour boats per day search for the dolphins.

A single school of dolphins could be surrounded by about 83 boats. The dolphins were almost always travelling when first sighted in the mornings. No resting area or resting behavior were identified during the data collection period. Most dolphin schools were surrounded by boats, making the establishment of control units impossible. Examination of the boatmen's conduct indicated that the operations at Lovina did not conform to accepted international norms. Most boatmen attempted to get as close as possible to the dolphins (generally much closer than the recommended 50 m minimum approach distance stipulated in Australian and many other national-level regulations).

Average tourist satisfaction was low to medium. The satisfaction of Western tourists was associated with encounter management and the number of dolphins seen. Satisfaction was positively associated with the willingness of tourists to recommend the tour to

others. Western respondents who felt neutral to very comfortable with the way boatmen managed the dolphin encounters were more likely to promote the tour.

In 2007-2009, the visitors contributed up to USD \$9.5 million a year in total direct expenditures. At least 46 percent of the total direct expenditure was attributable to the dolphin watching tourism. The industry was essentially unregulated. The boatmen agreed to improve their encounter management by turning off the engine and lifting the propeller, keeping the boat's distance from the dolphins and avoiding cutting across the dolphins' route. However, they were reluctant to limit the fleet size, likely due to the economic importance of the industry to their livelihoods. Given this economic importance and limited ecological data, designing the Lovina MPA to accommodate the spinner dolphins becomes a challenge to address before the MPA zoning is finalized.

Noronha spinner dolphins, Brazil

José Martins da Silva, Jr. (Centro Mamíferos Aquáticos / Instituto Chico Mendes de Conservação da Biodiversidade/ MMA, Brazil), **Cynthia Gerling de Oliveira** (Centro Golfinho Rotador, Brazil), **José Truda Palazzo, Jr.** (Centro Golfinho Rotador, Brazil)

At Fernando de Noronha National Marine Park (03°50'S, 32°25'W), a large concentration of spinner dolphins *Stenella longirostris longirostris* has been observed since 1556 mainly at the Dolphins' Bay and Between Islands sites. From 1991 to 2013, between 2 and 2046 (Mean = 360.47; SD = 283.86; N = 4675) spinner dolphins entered Dolphins' Bay in 94.3 percent of the days, and stayed between 1 minute and 12h45m (Mean = 4h51m; SD = 3.59; N = 4349). From 2009 to 2013, groups of 10 to 1000 (Mean = 172.00; SD = 50.00; N = 1060) spinner dolphins were observed at Between Islands during 93.0 percent of the days, with a daily average stay of 4h51m (SD = 2.00; N = 1060).

Over the 24 years of research, the number of dolphins and the percentage of days of the year they are observed in both areas has remained constant, but the time spent at the Dolphins' Bay has decreased, and at Between Islands increased. At these two sites spinner dolphins are observed resting, engaging in sexual activities, caring for their young, guarding against threats and interacting with other animal species. The daily pattern of activity cycles in Fernando de Noronha is similar to that reported for Hawaiian spinner dolphins: night feeding, early hours' travel to the archipelago, arrival at sunrise and departure between early morning and mid-afternoon towards feeding areas. Since 1987, only scientific activities are allowed at Dolphins' Bay. The Between Islands area is in the process of being closed to tourism and boat traffic; currently, boats are already banned from stopping there.

The Fernando de Noronha Archipelago benefits from specific legal rules to prevent harassment of spinner dolphins from tourism and fishing boats, and diving with dolphins is also banned.

Noronha's spinners have become one of the main tourist attractions of the archipelago, which is visited by some 60,000 tourists per year, including 15,000 SCUBA divers. These together take some 50,000 boat trips a year. The gravest problem faced by these dolphins is the risk of boat strikes and increasing pressure and harassment from boat tourism. To conserve the spinner dolphins in Fernando de Noronha, there's a need to engage federal and local governments, researchers and tour operators in the development of rules to ensure sustainability for the marine tourism industry.

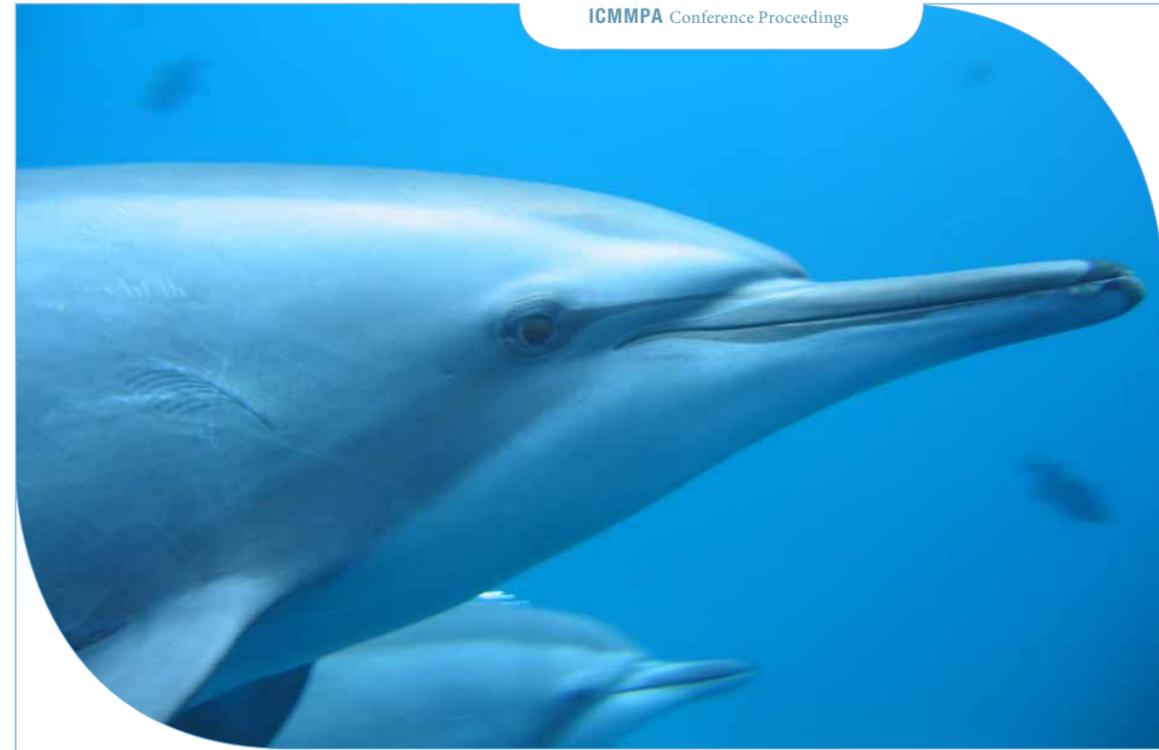
Summary of Discussion and Follow-up Actions

The workshop heard from six presenters covering a global geographical representation of five spinner dolphin study sites: Brazil (Fernando de Noronha), Indonesia (Bali), Hawaii (Island of Hawaii), South Pacific (Makalati, Fiji) and the Egyptian Red Sea. Predictable behavior and day-time reliance for spinner dolphins on sheltered bays and atolls was confirmed for all but one of the sites: Bali. Here, an obvious rest period or rest habitat has not been observed, but studies have not been specifically designed to determine resting habitat. Another explanation for the difference may be that Bali has a different species of spinner dolphin, namely *dwarf* spinner dolphins. They are known to be found in this area but are little studied. North Bali also has a different bathymetry to other sites examined. Almost all dolphins were sighted between water depths of 200-500 m, and no moon-reef shapes are found in north Bali, unlike the shallow waters and moon-reef ecosystems of Brazil, Hawaii, Fiji and Egypt. These different oceanographic features also warrant further investigations on the spinner dolphin populations in Bali.

All of the study sites had medium to intense tourism pressure focussing on spinner dolphins within important resting habitats. For all of the locations tourism was on the increase. At several locations – Hawaii, Brazil and the Red Sea – there are indications that human activity is having an effect on spinner dolphins in their resting habitats. In two cases, dolphins are spending less time in these important habitats.

Discussions highlighted different management frameworks between the five locations. However, a recurring message for effective management of spinner dolphin resting habitat was the need for strong stakeholder engagement. Common-pool resource theory is used to help manage spinner dolphin—human interactions in their resting habitats. In some circumstances, spinner dolphins were the sole “resource” that needed management, while in many scenarios, the resting habitat was the “resource” that needed management. In Hawaii, viewing resting bays as a resource with tourism as one of many non-dolphin focussed human activities (including sightseeing operators, fishers, kayakers, swimmers), instead of specifically focusing on dolphins, reflects an ecosystem-based approach and acknowledges complex management demands.

Some locations had long, multi-tier, complicated legislative processes before area management could be implemented (e.g., Hawaii). Such systems often hindered or precluded area closures which are now long overdue in several locations. In other



Spinner dolphin in Fernando de Noronha National Marine Park. Photo: José Martins da Silva, Jr.

locations, the implementation of time-area closures of spinner dolphin resting habitat has been quick and effective, such as in Fiji, Brazil and Egypt. In Fiji, the local chiefs and community have more effective ownership of habitat than government. There, government would be unable to implement habitat protection in deference to local Chiefs; government was seen as only one “stakeholder.” In Brazil, after three or four years of struggle in the 1980s, protection of spinner dolphin resting habitat was implemented. Subsequently, vessel traffic has increased adjacent to the protected area, which is thought to have caused dolphins to shift further away. In response, authorities are currently implementing additions and changes to protected areas. The latter example highlights that area protection should be a dynamic iterative process. In the Egyptian Red Sea, it was reported that the most effective manner in which to implement time-area management is to work with community groups, NGOs and local representatives of tour operators, who through personal connections are able to lobby and effectively inform and influence government.

A common theme in all studies was the lack of information on the availability and quality of prey at spinner dolphin feeding grounds adjacent to their resting habitats. It is necessary to gain information on this, too, to understand the impacts of human activities on spinner dolphins in their resting habitats.

Finally, it was agreed that each of these five locations should be used as cases to test the current draft classification scheme for inclusion as important marine mammal areas (IMMAs) currently being developed by the IUCN Marine Mammal Protected Areas Task Force (MMPATF). Each presenter will be sent the relevant information to test their respective spinner dolphin resting habitat field sites – and report back to convener Lars Bejder, who, in turn, will provide results to the Task Force.

All of the study sites had medium to intense tourism pressure focussing on spinner dolphins within important resting habitats. For all of the locations tourism was on the increase.



Photo of a humpback whale flipping his tail on a whale watching tour off Newfoundland, Canada. Photo: Debbie Young.

Public recognition of good whale watching practices by operators has also been introduced and has been successful in encouraging compliance.

Workshop 5: Marine Mammal Tourism

Convener: Yvette Blackman (Marine Policy Section, Marine and International Heritage Branch, Australian Government Department of the Environment, Australia)

Chair: Amelia Tandy (Australian Government Department of the Environment, Australia)

Participants: Karen Stone, Astrid Frisch Jordan, Cristina Vicente, Manuel Gardea-Ojeda, Mike Donoghue, Tony Flaherty, Mandi Livesey, Ryan Skinner, Chris Schweizer, Gina Solomon and others.

Introduction

The objective of Workshop 5 was for operators and managers to present their perspectives on the range of different marine mammal tourism programs. Participants were asked to consider key strategies for managing marine mammal tourism and to discuss what has been most and least effective – from the early days of establishing a marine mammal tourism program, to what is commonly practiced today.

The presentations led to an open discussion on the range of management practices applied by both tourism operators and MMPA managers.

Presentations

Marine Mammal Tourism in the Kingdom of Tonga

Karen Stone (Vava'u Environmental Protection Association, Tonga)

The whale watching industry in Tonga is valued at an estimated USD \$2 million to the Tongan economy. There are currently no marine mammal habitat sanctuaries in Tonga, but marine mammals are protected by the 1978 Royal Decree banning marine mammal hunting, the 1998 Fisheries Management Act, and the 2008 Fisheries Management Regulations.

Before 2013, unlicensed whale watching vessels were unrestricted; they could operate alongside licensed businesses. This had a detrimental impact on licensed operators. To address this issue, the Ministry of Commerce, Tourism and Labour passed Whale Watching and Swimming Regulations. These regulations were based on the outcomes of a workshop held in 2009 which brought together international scientists and conservationists, government ministries and local operators.

A key component of the Whale Watching and Swimming Regulations is education. All guides engaging in whale watching must complete the Tonga Whale Watch Course once every five years. In addition, all whale watching vessel captains must complete a one-day whale watching course.

Under the regulations, a maximum interaction time limit of 90 minutes applies to interactions with any whales. This must be followed by a break period of at least 90 minutes. Only licensed vessels are allowed to operate and engage with marine mammals. A maximum of four people (and a licensed instructor) are allowed to be swimming with a whale at any one time.

Also, under the Whale Watching and Swimming Regulations, there are heavy penalties for non-compliance, including fines from USD \$750 to a maximum of \$37,000. However, there are problems enforcing and monitoring the regulations, and whale watching operators continue to self regulate. In future, there will be a focus on the enforcement of regulations for interactions with whales to improve compliance.

Humpback whale watching in Banderas Bay, México

Astrid Frisch Jordán (Ecología y Conservación de Ballenas, Ecology and Conservation of Whales — ECOBAC, México)

Banderas Bay, on the Mexican coast, is not a marine protected area. In some ways, this makes it difficult to manage and protect marine mammals within the area. However, México's coastal waters were declared a "Great Whales Refuge Area" in 2002, providing a baseline for conservation, protection and management programs.

Regulation for whale watching was introduced in 2000, with registered operators receiving a registration flag to display on their vessel.

One issue facing Banderas Bay is that whales tend to stay in the northern sector of the bay – an area with heavy human traffic. Thus, even if a vessel does not set out to watch whales, it can still encounter cetaceans. This makes it difficult to monitor unregistered vessels which actively engage in whale watching activities. An estimated 62 percent of boats in Banderas Bay engaging in whale watching are unregistered.

Another issue is the huge turnover of marine vehicles in Banderas Bay; it is difficult to ensure that vessels are registered and crews sufficiently informed about policies and protection rules.

Outreach programs have achieved success in Banderas Bay in terms of educating operators and crews. Education sessions and workshops are held prior to each whale watching season to ensure operators are aware of the protection measures and regulations. Public recognition of good whale watching practices by operators has also been introduced and has been successful in encouraging compliance.

Success has also been achieved in a partnership with the coast guard to monitor the interactions with whales, alerting members of the public if they are in breach of regulations.

Gray whale watching in National Protected Areas vs. non-protected areas in Baja California, México

Manuel Gardea-Ojeda (Ecoturismo Kuyimá, México)

The gray whale, which populates the waters of Baja México, was seriously threatened in the 1920s due to whaling practices. The western population has now recovered to the pre-hunting figure of 25,000. This has been attributed to strong governmental intervention and stakeholder involvement.

Various strategies have been implemented to ensure the continued conservation of the gray whale population and to reduce human impacts on the species.

The allocation of permits facilitates managing whale watchers as it ensures that the operators are informed of the restrictions and associated penalties of non-compliance. Limiting the number of vessels allowed in an allocated marine space is also effective in controlling overcrowding and the associated impact on marine mammals. The way it works is that if an area is at capacity, an operator must leave the allocated area when another operator wishes to enter. This practice depends on cooperation between whale watching operators.

As with the whale watching tours in Tonga, gray whale watching operators in México may only spend 90 minutes interacting with a whale. This strategy aims to ensure that the whale is not harassed, and helps ensure cooperation between whale watching operators. There are, however, limitations to this strategy. The 90-minute time limit is applied to an operator and not an individual whale. Thus after the 90-minute period elapses, a different operator could interact with the same whale for a further 90 minutes.

There has been some success in the region highlighting other environmental features and attractions associated with whale watching. This capitalizes on the whale watching attraction but takes pressure off the whale watching operators and the whales, and spreads the economic benefit to the other marine and coastal businesses in the community. This has effectively doubled the number of visitors to the area.

Sustainability has and will continue to be more achievable as the local community and general public get more involved and assume the responsibility for the management of gray whales.

Consistent enforcement is key. A successful result is achieved by rewarding respectful and efficient users while reprimanding abusers of the system.

Dolphin watching tourism at the Adelaide Dolphin Sanctuary: Commercial tour operators and recreation

Cristina Vicente (Adelaide Dolphin Sanctuary, Australia)

The Adelaide Dolphin Sanctuary covers an area of 118 km² located less than 15 km from the center of Adelaide. The sanctuary is home to around 30 Indo-Pacific bottlenose dolphins, with over 300 dolphins visiting the area.

The sanctuary faces extreme anthropogenic pressures. It is a popular area for recreational activities such as fishing, kayaking and jet skiing, and is also the busiest port in South Australia.

The dolphin sanctuary was proclaimed in 2005, but the permit process for dolphin watching operators was only finalized in 2012. Currently there are three commercial tour operators permitted to undertake dolphin watching tours in the area - two vessel-based operators and one kayak company.

The Port Adelaide Council has developed a walking trail to provide visitors with an opportunity to watch the dolphins from the shore. Six interpretative signs have been positioned along the waterfront, each providing details about the local area and the dolphins and educating the community about the habitat and behavior of dolphins within the sanctuary.

The main issue facing the dolphin sanctuary is heavy human use of the port and the associated pollution. Currently, dolphin density and number of interactions between humans and dolphins are extremely difficult to monitor. The environmental state of the sanctuary has contributed to declining health and an increased mortality rate among the resident dolphins.

Reported offenses by river users against dolphins include interaction from kayaks, jet skis and recreational boats, and land-based offences include feeding the dolphins. There have also been cases of dolphins being shot and intentionally harmed. These issues stem from the sanctuary being placed within a busy port; it is difficult to prosecute offenders. The heavy use of the port leads to a large number of "accidental" interactions with the dolphins in the Adelaide Dolphin Sanctuary. Education programs have been devised and fact sheets distributed to educate the public about how to use the dolphin sanctuary to minimize impacts on marine mammals.



New Zealand Hector's dolphins.
Photo: Mike Bossley, Whale and Dolphin Conservation (WDC).

Summary of Discussion

In the discussion period, the marine mammal tourism workshop participants compared key points, issues and mitigation strategies outlined within the presentations. Education continues to be a highly successful strategy to manage human impacts on cetaceans, as it helps to strengthen compliance with local laws and conservation mechanisms, as well as to keep stakeholders engaged. Registration of whale watching vessels in several areas was also found to be a successful means of generating income for governments and conservation agencies.

Monitoring human interactions with marine mammals was difficult. Governments and conservation agencies struggle to catch and prosecute those who do not comply with regulations. It was highlighted in various presentations that the current laws were felt to be ineffective as they lacked adequate enforcement.

Education continues to be a highly successful strategy to manage human impacts on cetaceans, as it helps to strengthen compliance with local laws and conservation mechanisms, as well as to keep stakeholders engaged.



Blue whale mother and calf. Photo: Lucy Molleson, courtesy Whale and Dolphin Conservation (WDC).

Success depends on the value and sense of ownership from local communities adjacent to the area who want therefore to protect their resources.

Workshop 6: Making Very Large MMPAs Work for Marine Mammal Conservation

Convener: Oscar Ramírez Flores (Priority Species for Conservation, National Commission of Natural Protected Areas, México)

Chair: Lorenzo Rojas-Bracho (Instituto Nacional de Ecología – INE, México)

Introduction

Very large MPAs in general pose great challenges in terms of effective operation. Given the importance of marine mammals as subjects of conservation, several large areas have been proposed for their protection, some even as large as national exclusive economic zones (EEZs). But discussion is needed regarding the pertinence of considering such a large area as an IMMA or just a fraction of that area which would then be more relevant to the biology and distribution of the species. Linking EBSAs, KBAs, and other marine conservation tools to the IMMA criteria can bring synergy to the conservation of widely distributed and highly migratory species of marine mammals, while the more familiar designations of MPAs can promote the participation of local communities in the management and surveillance of IMMAs. There is also the possibility of incorporating new technologies for the surveillance of very large MMPAs to increase the effectiveness of conservation.

Objectives:

- Discuss the challenges for managing and operating large MMPAs
- Discuss linkages to community participation
- Discuss the use of new technologies in the surveillance and monitoring of very large MMPAs
- Assess advantages and disadvantages of very large MMPAs as IMMAs, considering the feasibility of designating fractions of large MMPAs depending on regions and species.

Summary of presentations

Making Agoa, a very large MMPA, work for marine mammal conservation: A great challenge!

Amandine Eynaudi (Agoa Sanctuary, Agence des aires marines protégées, France and French Antilles)

The Agoa Sanctuary in the French Antilles has a surface area of 143,256 km². It was declared in October 2010. In 2012, it was

recognized as a protected area under the Cartagena Convention of SPAW (Specially Protected Areas and Wildlife).

It is worth looking at the pros and cons of such a large area. The cons of the Agoa Sanctuary are:

- its very large size,
- the complex management and numerous board members,
- the small operating team with no boats, and
- that there are no specific regulations to date (only national regulations regarding marine mammal protection and a local act defining distance and speed limit when approaching marine mammals for observation).

The pros of the sanctuary are:

- that the management board is representative of stakeholder diversity,
- the strong citizen sense of ownership and expectation for the sanctuary,
- the good recognition of the sanctuary by the French state services, and
- that it is part of a network and works together with small coastal MPAs.

The challenge is to build the network to develop a close working relationship with all the partners and to involve the management board members in the sharing and generation of information about effective management measures.

México's protected areas and great whales refuge

Astrid Frisch Jordán (Ecología y Conservación de Ballenas, Ecology and Conservation of Whales — ECOBAC, México)

In 2002, México's national waters, its EEZ, were declared a Great Whale Refuge, consisting of 3 million km². The National Commission for Natural Protected Areas (CONANP) strategy for managing this vast area is by using a small-scale approach based on conservation plans for each individual whale species. These species are considered umbrella species for the Ecosystem. In this way, CONANP hopes to promote partnerships with stakeholders, researchers and NGOs in order to have good management plans for the EEZ Whale Sanctuary

Useful tools include a Protection Plan for the Protection of Species (PACE) that provides all the scientific data about each species (humpback, fin and blue whale) and the management

needs, hot spots, threats and smaller protected areas. As well, Regional Protection Programs (PPR) are being generated. PPRs provide guidelines and encourage partnerships to work with multidisciplinary groups.

A CONANP-sponsored meeting in October 2014, before ICMMPA 3, promoted national and regional meetings including MMPA managers, NGOs, researchers and stakeholders in order to have a more global exchange of ideas and input.

Making large MMPAs (LMMPAs) work for marine mammal conservation

Jorge Jiménez (MarViva Foundation, Costa Rica)

Several lessons can be drawn from the creation of large MMPAs:

Lesson 1: The involvement of all stakeholders is critical from the start of the idea. Conflicts between different sectors might paralyze the management of the site. Participation in the design of the area and its management plan must go beyond consultation.

Lesson 2: Habitat range matters and the area, though large, might not be large enough. Species with large migratory patterns will move beyond the LMMPA boundaries. Management of fishing practices and maritime traffic beyond the LMMPA is also necessary. Governance schemes of regional or hemispheric scope need to be agreed to address these situations.

Lesson 3: The development of governance structures for LMMPAs expanding through EEZ and high seas is lagging far behind. LMMPAs in the high seas are needed but there is a legal vacuum for their establishment. Regional multi-state bodies, however, can help advance the management of these critical areas on the high seas.

Lesson 4: The development of management plans may be more complex and require more time to acquire and synthesize information for LMMPAs. The knowledge base and monitoring effort required are greater in LMMPAs. Connectivity issues become more relevant and involve many species. The number of users, and thus the number of stakeholders, tends to increase under LMMPA scenarios.

Lesson 5: Be creative at the enforcement level. Even under cooperative enforcement schemes (like AIS), measures are necessary to reduce attempts to cheat or subvert the system.

Without such measures, enforceable regulations for high seas areas would need to help place-based and therefore expensive in LMMPAs. Port State measures are an alternative to high-cost enforcement.

Summary of Discussion and Conclusions

Very large MMPAs (LMMPAs) in general pose great challenges in terms of creating effective operations. The issues are:

- the viability of effective surveillance and enforcement,
- the management costs (both economic and human), and
- the problems of governance due to complex interactions with human activities, considering the number and diversity of economic activities.

Several large areas have been proposed for the protection of marine mammals around the world including the EEZs of various countries such as México, state marine territories such as in the French and Dutch Caribbean, and 11 Pacific island states. These designations are mainly being made for political reasons, but it is arguably better to have them than not as the designation can raise awareness, and can be a starting point for additional marine conservation measures. However, it should be recognized that we currently lack scientific studies to show the benefit or the effectiveness of LMMPAs.

The involvement of stakeholders is fundamentally important. Success depends on the value and sense of ownership from local communities adjacent to the area who want therefore to protect their resources. Agoa Sanctuary provides an example of this in the nascent stages.

The next challenge is for the LMMPA managers to develop partnerships and networking opportunities with other MMPAs, especially other LMMPAs as much as possible. It is also important to develop partnerships with the private sector and civil society and to encourage citizen science. Local efforts can be important in terms of managing large areas and one way to do that is to create small MPA units with connectivity within the larger LMMPA. This option might be possible nationally as well as internationally in the Pacific Islands. Management plans should then be developed both for the small connected MPAs as well as for the larger umbrella LMMPA.

Many developing countries lag behind in the development and implementation of governance structures that would allow establishment of LMMPAs expanding through EEZs to the high seas. In fact, the management of LMMPAs requires an extensive knowledge base with complex management plans and reviewing process. It will be necessary to be creative in terms of enforcement in view of the cost of enforcement technologies, although some of these new technologies, such as drones, could, in fact, be much cheaper than traditional means of enforcement.

Workshop 7: Program of Work for the Delivery of Important Marine Mammal Areas



Margi Prideaux helps guide the discussion in Workshop 7 at ICMMPA 3. Photo: Nikki Zanardo.

Conveners: **Michael Tetley** (Critical Habitat/Marine Protected Areas Programme, Whale and Dolphin Conservation and IUCN Marine Mammal Protected Areas Task Force, UK), **Kristin Kaschner** (University of Freiburg and IUCN Marine Mammal Protected Areas Task Force, Germany), **Giuseppe Notarbartolo di Sciara** (Tethys Research Institute and IUCN Marine Mammal Protected Areas Task Force, Italy), **Brad Barr** (NOAA Office of National Marine Sanctuaries, USA) and **Erich Hoyt** (Critical Habitat/Marine Protected Areas Programme, Whale and Dolphin Conservation and IUCN Marine Mammal Protected Areas Task Force, UK)

Working Group Participants: **Alastair Birtles** (James Cook University, Australia), **Cara Miller** (WDC, Fiji), **Charlotte Boyd** (NMFS-SWFSC, USA), **Heiko Schmidt** (University of Freiburg, Germany), **Helene Marsh** (James Cook University, Australia), **Jeff Ardron** (Institute for Advanced Sustainability Studies – IASS, Germany), **Mike Donoghue** (Threatened and Migratory Species, Secretariat for the Pacific Regional Environment Programme – SPREP, Samoa), **Amina Cesario** (Cetacean Ecology Lab, University of Hong Kong, China), **Bob Brownell** (IWC Scientific Committee and NOAA, USA), **Brian D. Smith** (Wildlife Conservation Society – WCS, USA, Bangladesh), **Chloe Corne** (Department of Conservation – DOC, New Zealand), **Christophe Lefebvre** (IUCN and Agence des aires marines protégées, France), **Lora Reeve** (University of Hawaii, USA), **Lorenzo Rojas-Bracho** (Instituto Nacional de Ecología – INE, México), **Maddalena Fumagalli**

(University of Otago, New Zealand), **Margi Prideaux** (Wild Migration, Australia), **Randall Reeves** (IUCN-CSG, Canada and Marine Mammal Commission, USA), **Sharon Livermore** (IFAW, Australia), **Tiare Holm** (Sustainable Decisions, Palau Marine Mammal Sanctuary, Palau)

Additional Open Forum (Part 1, Day One) Participants: **Lars Bejder** (Murdoch University, Australia), **Jorge Jiménez** (MarViva Foundation, Costa Rica), **Tundi Agardy** (Sound Seas, USA), **Alex Brown** (Murdoch University, Australia), **Daniella Hanf** (Murdoch University, Australia), **Liz Slooten** (University of Otago, New Zealand), **Rob Williams** (Oceans Initiative, Canada), **Rochelle Constantine** (University of Auckland, New Zealand).

Introduction

Workshop 7 was designed to be an “IMMA Strategic Planning Workshop Assessment” drawing on the broad range of expertise available at the ICMMPA 3 conference. As such, a number of participants were specifically invited but others eager to participate were also welcomed. The workshop aimed to gain a consensus from participants on appropriate stages for progressing the IMMA concept for delivery in 2015 and beyond. The workshop was split into two halves. An open forum discussion formed Part 1 on Day One and a guided discussion with three working groups formed Part 2 on Day Two.

Part 1 (Day One): Open Forum Discussion

This opening afternoon discussion enabled participants to raise comments and questions about the IMMA concept. The session began with a short introduction about the IMMA concept, its origins in the IUCN Marine Mammal Protected Areas Task Force (MMPATF, or “Task Force”) and included a brief summary of outputs from a pre-conference technical workshop to test IMMA criteria. The session allowed participants freedom to explore and present both regional and internationally relevant information to assist with developing the IMMA concept as well as highlighting misunderstandings and exploring various interpretations of the IMMA concept.

Part 2 (Day Two): Guided Discussion With Working Groups

This half-day morning portion of the workshop began with a presentation of a series of common questions and points raised from the open forum the previous day. These were discussed briefly by the whole group with three pertinent questions being considered vital for successful delivery of the IMMA concept, as follows:

- Q1.** *Who would place value on the use of the IMMA classification scheme and how best can we integrate this into existing processes and ways of thinking?*
- Q2.** *Who should we enlist short- and long-term to facilitate the support and champion the wide acceptance of the IMMA classification scheme?*
- Q3.** *What materials, methods and management are needed to ensure the successful acceptance and use of the IMMA tool?*

The participants were divided into three working groups (Tables 1, 2 and 3) each of which had 40-50 minutes to consider each question and provide a list of ideas, recommendations and information using flipcharts and brainstorming pages. Each working group discussion was led by a MMPATF member. Outputs were summarized and the consensus between groups was derived from the flipcharts and brainstorming pages and, in addition, were also visualised using “Wordle Plots” of common phrases and words (Figures 3-6).

Summary of Discussions

Part 1 (Day One):

The big group discussion moved slowly with many participants expressing concern over not having more time to digest the results of the pre-conference workshop (p. 73) or not having access to the developing criteria. However, after concerns over the preliminary, incomplete status of the criteria were allayed, the discussion focused more broadly upon the value of IMMAs. This took two divergent courses. First, what is the value of IMMAs in existing designations to the conservation of marine mammals and processes already in progress? In terms of conservation, the participants agreed that the term “important” needs to be

addressed and defined as it may be confusing to certain users. It was deemed necessary to frame the IMMA as a data layer for consideration in future ecosystem and strategic conservation planning processes and not simply as a pre-requisite for movement to governance such as by MPA designation or site management prioritization. This layer would then be promoted to be used in combination with other layers such as those representing other taxa and various ecological processes.

The second issue concerned socioeconomics: What socioeconomic considerations should be made in selecting IMMAs? What is the socioeconomic value such designations might have for countries and communities associated with the areas and species they contain? The group concluded that, considering that IMMAs are solely an information layer to be used as a tool in a subsequent conservation and management process, the focus of IMMA selection must be ecological, not socioeconomic. Representatives from tourism and other sectors may be important end-users of the IMMA layers but in such activity should be independent of the IMMA process.

The group then shifted focus to talk about the data used for designation of IMMAs and how this affects the rationale for a site. It was recommended that a standardised process was needed to keep track of the data being used and applied in real world settings. Participants suggested middle- and end-users including governments, regional agreements and treaties as well as businesses (e.g., shipping companies concerned about ship strikes of whales) which may need information on mitigation activities and for insurance. Business decision-support tools such as BirdLife’s Integrated Biodiversity Assessment Tool, IBAT, could be made available to help businesses. IBAT is designed to facilitate access to biodiversity information to support development decisions that help or have reduced impact on the environment.

Recommendations were made to investigate the possible value — and weighed against the difficulty — of integrating IMMAs into law to add further legitimacy or institutionalization within conservation “soft law” agreements (e.g., through regional seas agreements). It was also recommended that within the program of work some mechanisms for external review or evaluation be sought to allow the building of credibility for IMMA sites. Effort should be made to highlight notional examples or real life success stories of IMMAs becoming practical conservation tools. This credibility will help build confidence and therefore also increase the speed and efficiency by which IMMA evidence can be found, submitted or sourced from research and conservation networks.

Another point: Participants recommended that while developing the IMMA it is also important to think about the areas outside of IMMAs — especially in relation to industry plans, requirements and desires. It is also essential to consider the gaps in our knowledge and how to compensate for these data gaps. Finally, if a regional approach is used — arguably the easiest way of putting IMMAs on the map — then regionally applicable criteria may need to be developed.

Part 2 (Day Two):

The main comments that developed out of the questions posed to the three working groups are summarized below and in the Wordle Plots in figures 3-9.

Q1. *Who would place value on the use of the IMMA classification scheme and how best can we integrate this into existing processes and ways of thinking?*

The three working groups identified a number of IMMA users and beneficiaries who would place value on the IMMA designation in the business, political, military, education and NGO sectors.

In the business sector, the participants divided the users and beneficiaries into direct value (such as coastal and cruise tourism and insurance) companies and indirect value (shipping, fishing, mining, energy) companies. In terms of integration into business activities to ensure ease of application and appropriate marketing, it was recommended to work through a suitable forum such as the World Ocean Council.

From a political perspective, a range of inter-governmental treaties were identified as seeing value in the IMMA process and viewed as essential to its integration including the Convention on Biological Diversity (CBD) and the CBD EBSA process; the IUCN Key Biodiversity Area (KBA) process; the Ramsar Convention; Convention on Migratory Species (CMS) ecological networks and species groups; UNESCO World Heritage Sites; UNEP and other regional seas program (e.g., OSPAR, Indian Ocean Commission, SPREP, Oceanscapes, Micronesia Challenge); the International Maritime Organisation (IMO) particularly sensitive sea area (PSSA) process; regional and national processes for MMPA networks, ecosystem-based management (EBM), marine spatial planning (MSP) and MPAs (the Agoa Sanctuary was mentioned); and local community planning such as the locally-managed marine area (LMMA) network in the Indo-Pacific.

The value of IMMAs to military, in particular the world’s navies, lies in the identification of IMMAs for those marine mammal species susceptible to sonar and other noises (e.g., Cuvier’s and other beaked whales) and ship strike (e.g., large baleen whales and sperm whales). The IMMA process will offer new tools to NGOs working on marine habitat conservation in terms of educating the public as well as gaining traction with politicians and businesses. To ensure suitable integration into these processes, the groups reminded the Task Force of its mandate, that planning needs to include all marine mammals, including pinnipeds, sirenians, polar bears, otters as well as the more high profile cetaceans and including the river dolphins and oceanic dolphins that live in fresh water ecosystems.

Other recommendations related to this question include:

- to consider adopting a regional approach involving expert and user networks for building, testing and implementing IMMA evidence to potential users;
- to think about funding of the scheme to be phased in over 1-, 3- and 5-year intervals with prioritization of

tasks needing support at the development, delivery and implementation stages; and

- that other expert groups should be identified to seek additional support for finalizing criteria, creating toolkit resources and gaining credibility among the wide variety of users, including CMS and IUCN working groups.
- Q2.** *Who should the Task Force enlist short- and long-term to facilitate the support and champion the wide acceptance of this classification scheme?*

The working groups provided a number of examples and recommendations of possible supporting bodies. However, before approaching potential partners or supportive groups, it was emphasised that there should be a clear understanding about the nature of the IMMA as an information layer and flexible tool. IMMAs are neither MMPAs, nor MPAs, and they should not be assumed to be advocating or leading necessarily to formal legal protection as an MPA.

Conversely, MMPAs are not necessarily IMMAs in terms of their boundaries. The clarity of the messaging on these points will help maintain scientific credibility for the IMMA process.

Examples of potential supporters include: intergovernmental organizations such as the Convention on Biological Diversity (CBD), the International Maritime Organisation (IMO), and the Convention on Migratory Species (CMS) with its family of special agreements (ACCOBAMS, ASCOBANS, the Pacific Islands Cetaceans MOU, the Mediterranean Monk Seal MOU, the Western African Aquatic Mammals MOU, the Wadden Sea Agreement, the Dugong MOU); scientific societies such as the Society for Marine Mammalogy, European Cetacean Society (ECS), and Society for Conservation Biology (SCB). Other professional bodies willing to engage in the IMMA review process which will help bolster integrity are the Marine Mammal Commission (MMC), IUCN Species Survival Commission (SSC), World Commission on Protected Areas (WCPA), and the Center for International Environmental Law (CIEL), as well as national marine mammal organizations and focal points; national MPA partnership organizations; strong local community partnerships and prominent conservation champions and Ocean Elders (such as Leonardo DiCaprio). GOBI is certainly an important scientific partner in the championing of IMMAs, particularly on the high seas in combination with support from the Watershed Management Committee (WMC) and the Global Environmental Fund (GEF).

The Task Force needs to create an overall IMMA steering committee and far-reaching network with an assigned coordinator to help draft and implement a suitable work plan (role and skill set may evolve over time from technical to networking). As part of this steering committee and network, there would be a number of sub-groups assigned the tasks the finalization of criteria, delivery of an IMMA Toolkit, establishing regional expert networks and planning of regional workshops on IMMA identification, followed by potential moves to governance.



Dolphin research in the Adelaide Dolphin Sanctuary where citizen science helped create public engagement. Photo: Barbara Saberton.

Citizen science should be encouraged where appropriate because it can be valuable for both data collection and community engagement.



Australian sea lions, *Neophoca cinerea*, endemic to South and Western Australia. Photo: © Michael Patrick O'Neill.

Workshop 8: Citizen Science and Important Marine Mammal Areas

Convener and Chair: Mike Bossley (Science and Education, Whale and Dolphin Conservation Australasia, Australia)

Session Overview

As the scientific work to identify important marine mammal areas (IMMAs) proceeds, a huge role opens up for conservation groups and citizen scientists to use this knowledge to influence politicians and the wider public to protect marine mammal habitats, create ocean zoning and corridors, and to protect marine mammals from ship strikes, noise, bycatch and the effects of pollution.

Various presentations will be followed by a panel discussion focussing on the objectives below and making recommendations for when and how to use citizen scientists, with suggestions for further work on the potential role for citizen science in terms of marine mammal habitat conservation.

Session Objectives

- Gain an overview of the various ways citizen science (CS) can contribute to research, management, advocacy and education in relation to MMPAs and IMMAs
- Identify potential issues of concern regarding CS-generated data, including data verification, observer effort, curating, warehousing, analysis and publication
- Explore technological developments of relevance to CS (e.g., new sighting and shipstrike apps)
- Identify research areas where CS could be valuable
- Identify and promote educational opportunities for citizen scientists to improve the quality of their contributions

Presentation Summaries

Citizen science contributions to southern right whale research in the Great Australian Bight, South Australia

Claire Charlton (Centre for Marine Science and Technology, Curtin University, Australia)

A long-term, land-based photo-ID research study on southern right whales at the Head of the Great Australian Bight began in 1991. For the past two years this study has been augmented by boat-based surveys at Fowler's Bay, to the east of the Bight and also by the collection of acoustic data. There is a research

partnership with the Venus Bay whale watching cruise. Both researchers and citizen scientists contribute photo-ID, sightings data and acoustic records via data loggers. Researchers contribute education and public engagement to the whale watching tours.

Land-based citizen scientists registered and coordinated by the South Australia Whale Centre contribute sightings and photo-ID from Encounter Bay, just south of Adelaide. These data are entered into the South Australia Museum sightings database and is cross matched with photo-IDs of individuals from the Head of the Bight Catalogue to assess coastal connectivity. A calf ("Milky Way") born at the Head of the Bight in 2010 has since been recorded at Encounter Bay in 2011 and 2012. The Encounter Bay citizen scientists also provide monitoring for compliance which has led to two convictions for whale harassment.

Data collected by citizen scientists help address the objectives in the Conservation Management Plan for southern right whales and the Great Australian Bight Marine Park Management Plan, including: monitoring the recovery of the species; evaluating the connectivity between the SE and SW population; assessing movement of southern right whales in and out of the marine reserve; and assessing abundance in small established calving grounds outside of marine protected areas.

Public photo shots to whisker spots: Identifying Australian sea lions through citizen contributions to science

Sylvia Osterrieder (Centre for Marine Science and Technology, Curtin University, Perth, Australia; College of Engineering and Science, Victoria University, Melbourne, Australia), **Chandra Salgado Kent** (Centre for Marine Science and Technology, Curtin University, Perth, Australia), **Carlos Anderson** (Department of Ecology and Evolutionary Biology, University of Michigan, Ann Arbor, USA), **Iain Parnum** (Centre for Marine Science and Technology, Curtin University, Perth, Australia) and **Randall Robinson** (College of Engineering and Science, Victoria University, Melbourne, Australia)

Improved management of marine protected areas can be achieved through knowledge of habitat use, residency patterns, and population demographics. Obtaining such data requires the ability to recognize individual animals. The aim of this study was to test a new, noninvasive photo-ID method using photographs of whisker spot patterns of Australian sea lions, *Neophoca cinerea*. This species is endemic to South and Western Australia with approximately 14 percent of the population occurring in Western

Australia. Citizen scientists were engaged to collect data to help increase community awareness and with the hope of obtaining more data samples at low cost.

Software was developed and tested to aid in the identification of unique sea lion whisker spot patterns. This software standardizes photographs using the animal's eye, nose and corner of mouth and then provides a similarity score. Photographs to be matched need to be taken at a 90° angle to the animal and have no tilt. A statistical simulation using 53 photographed individuals indicated that patterns were unique enough for identifying 99 percent reliably in a population of 50 animals but decreased to 88 percent for 1,000 animals.

To test photos taken by the community, we launched a "Whisker Patrol" project blog in May 2013 and publicized it using social media, conventional media and brochures. By 21 October 2014 there had been 3,777 visitors to the Whisker Patrol site (whiskerpatrol.org) and 939 photos had been uploaded by citizen scientists. As in any citizen science program, we included guidelines and recommended minimum distances for approaching wild sea lions in the training, as well as information on the importance of adhering to them to avoid impacting animals and managing risk to participating citizen scientists.

The main difficulty with using citizen scientist photographs is in obtaining photos with the required 90° angle. An algorithm is currently being tested to allow for greater variability in the angle. If the alternative approach proves successful, public submissions will prove a valuable contribution to the research.

Coastal walkabout: Citizen science in coastal, marine and estuarine environments

Lars Bejder (Cetacean Research Unit, School of Veterinary and Life Sciences, Murdoch University, Australia)

Traditional biological science has its limitations. Sampling can often be hindered by financial constraints, making it inadequate in terms of sample size, frequency of sampling and the geographic scale at which samples are collected.

At the same time, technology has made citizen science easier, instantaneous and more accurate. Smart phones are now almost ubiquitous and incorporate a global positioning system, high resolution camera and wireless radio for transmitting data.

Coastal Walkabout is an open-access citizen science initiative which utilizes smartphone technology to engage local communities to gather scientific observations within the coastal, estuarine and near-shore environments. It can provide both generic and project-specific smartphone apps for data collection for effort-based or incidental sightings. There are social media platforms (Facebook and Twitter) and a website (www.coastalwalkabout.org) for uploading open access data. Since December 2013 there have been more than 4,000 sightings of 91 species including an

opportunistic southernmost sighting of the newly described Australian humpback dolphin.

A case study of dolphins in the Swan-Canning river system compared a transect-based traditional science data set with a citizen science data set. Between March and August 2014, the traditional science team completed 67 hours of survey time (259 dolphins sighted) and the citizen scientists 1342 hours (1150 dolphins sighted). The conclusions from the case study were that citizen science can provide useful data for important marine mammal areas but it requires repeated and continuous training and high levels of engagement. Citizen science has the additional benefit of providing community education, mitigation of environmental hazards such as monofilament fishing line entanglements and monitoring for general compliance.

Kangaroo Island Dolphin Watch / Victor Harbor Dolphin Watch: Citizen science in action

Tony Bartram (Citizen Scientist, Kangaroo Island Dolphin Watch, Australia)

Kangaroo Island / Victor Harbor Dolphin Watch runs a highly successful citizen science project which began on Kangaroo Island, South Australia, and has been replicated in other centers in South Australia and Queensland with the support of Whale and Dolphin Conservation (WDC). This project engages the wider community in baseline data collection to inform management and conservation practices with respect to the welfare of cetaceans and their habitat. Significant elements demonstrated were the ability of this program to include volunteers of all ages, nationalities, and backgrounds, and to collaborate with ecotourism operators and other entities to engage tourists and visitors in data collection, to add value to their wildlife experience as well as to inform and persuade them of the value of marine conservation.

Role of geographic citizen science in marine management: Knowledge building through engagement

Eleanor Bruce (Geocoastal Research Group, School of Geosciences, University of Sydney and University of Sydney Institute of Marine Science — USIMS, Australia), **Scott Sheehan** (Marine Mammal Research, Jervis Bay, Australia) and **Michelle Blewitt** (University of Sydney Institute of Marine Science — USIMS, Australia)

Analysis of broad-scale species distribution patterns, in particular the movements of migratory species, requires extensive monitoring data, as outlined by Rick Bonney and his colleagues. The collection of such data is often challenged by logistical constraints; for example the ecotourist data collected by operators reported from whale shark operators in Thailand by Michelle Theberge and Phil Dearden. Janis

Dickinson and her colleagues have explored the challenges and benefits of using citizen science as an ecological research tool to achieve the geographical reach needed to address spatial ecological questions at scales relevant to species migration patterns.

Citizen science involving the collection of explicit geographic information also overlaps with Volunteered Geographic Information (VGI). The term "geographical citizen science" is being used to refer to projects in which the collection of locational information is integral to the study.

Citizen science has various levels of participant engagement ranging from citizens as sensors (marine mammal sighting apps) to collaborative science projects contributing to marine management and policy-making. The recent emergence of spatially enabling technologies is altering the way geographic information is produced and shared. These include Web 2.0, burgeoning user-generated content disseminated via the internet, and proliferation of locational-acquisition devices. Data generated from these new information sources offer new opportunities for understanding spatial distribution patterns of marine species, facilitate large-scale citizen science initiatives, and, at the same time, challenge traditional scientific practices.

Despite the recognized value and impact of geographical citizen science and VGI, acceptance within the scientific community is dependent upon an understanding of the inherent biases within these data. This is particularly relevant for projects that involve surveillance, as opposed to targeted monitoring and opportunistic sampling methods, as are often adopted in volunteer tourism-based marine mammal surveys. This highlights the need for spatial analysis approaches that quantify the uncertainties of citizen science data and provide insight into the reliability of citizen science results which may be used to inform marine management decisions.

¹ References for further information: Bonney, R., C. B. Cooper, J. Dickinson, S. Kelling, T. Phillips, K. V. Rosenberg & J. Shirk (2009) Citizen Science: A Developing Tool for Expanding Science Knowledge and Scientific Literacy. *BioScience*, 59, 977-984; Theberge, M. M. & P. Dearden (2006) Detecting a decline in whale shark *Rhincodon typus* sightings in the Andaman Sea, Thailand, using ecotourist operator-collected data. *Oryx*, 40, 337; Dickinson, J. L., B. Zuckerberg & D. N. Borter (2010) Citizen Science as an Ecological Research Tool: Challenges and Benefits. *Annual Review of Ecology, Evolution, and Systematics* 41, 149-172.

² Haklay, M. (2013) Citizen Science and Volunteered Geographic Information: Overview and Typology of Participation, pp105-122.

³ Connors, J. P., S. Lei & M. Kelly (2012) Citizen Science in the Age of Neogeography: Utilizing Volunteered Geographic Information for Environmental Monitoring. *Annals of the Association of American Geographers* 102, 1267-1289.

Summary of Discussion and Conclusions

The main discussion issues arising from the presentations included the following:

- Training and follow-up training is essential for maintaining data quality.
- Good volunteer management skills are necessary.
- It is important to provide feedback to citizen scientists on how their data has been used.
- It is necessary to be mindful of overzealous citizen scientist behavior which can result in harassment of the animals

- Some citizen scientists have felt they are treated as second-class citizens by career scientists.

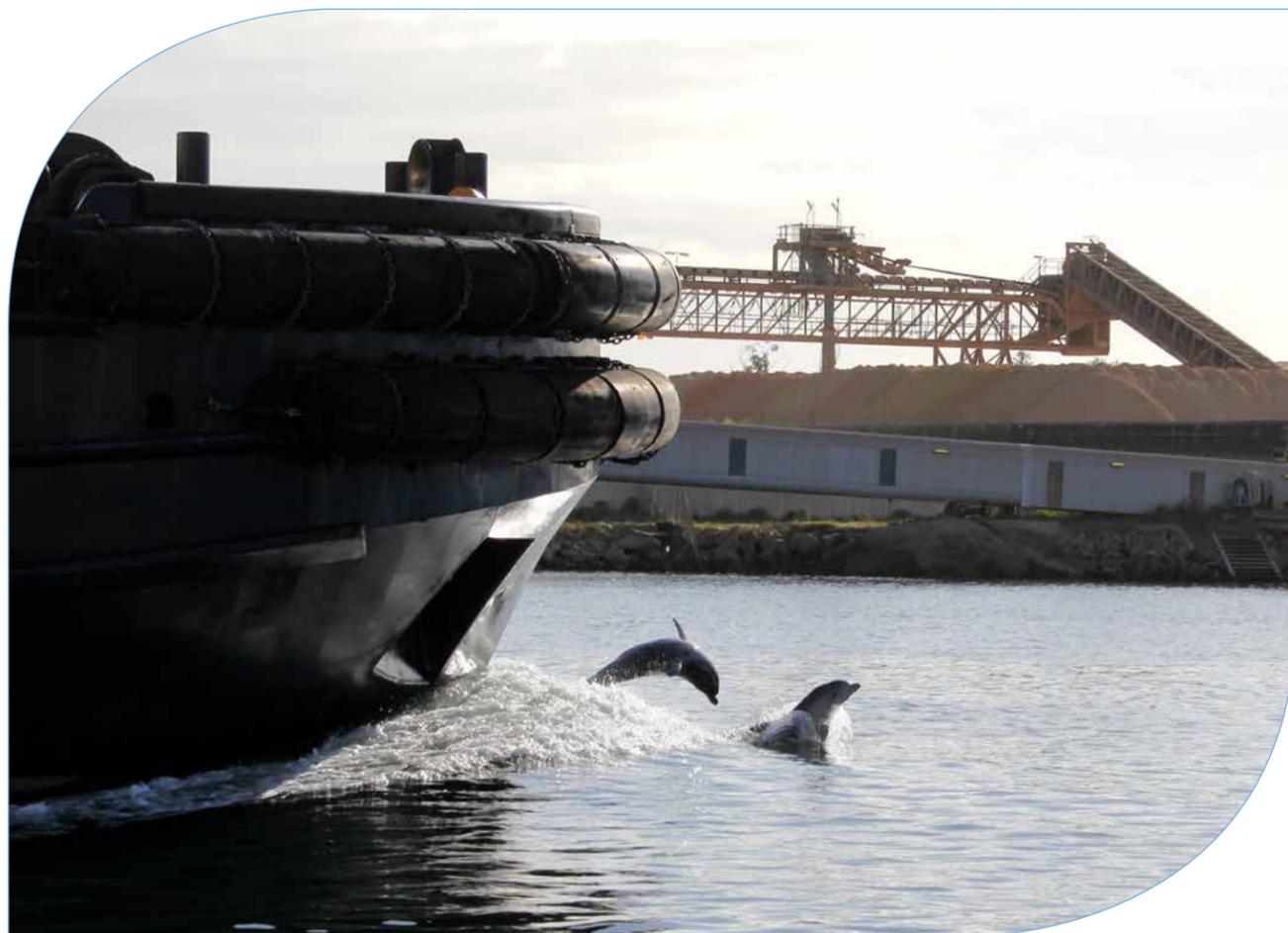
Recommendations

- Citizen science should be encouraged where appropriate because it can be valuable for both data collection and community engagement.
- Courses should be established to help professional scientists maximize the effectiveness of citizen science projects.
- Citizen science is particularly relevant for conducting baseline studies which are normally difficult to obtain funding for.
- Citizen science projects should make an attempt to include all stakeholders, for example, indigenous people, the fishing industry, the navy, among others.
- An informal network of people who use (or want to use) citizen science should be established.
- There should be a citizen science workshop at the next ICMMPA.



Citizen scientists and friends at ICMMPA 3.
Photo: Nikki Zanardo.

...technology has made citizen science easier, instantaneous and more accurate. Smart phones are now almost ubiquitous and incorporate a global positioning system, high resolution camera and wireless radio for transmitting data.



Bottlenose dolphins live in an industrial waterway in Adelaide.
Photo: Mike Bossley, Whale and Dolphin Conservation (WDC)

In response to widespread support for increasing protection for the dolphins and their environment, the government developed an Act of Parliament. The Adelaide Dolphin Sanctuary Act was proclaimed in June 2005.

Workshop 9: Examining the Unique Threats in Small Coastal MMPAs along Heavily Developed Coastlines

Convener and Chair: Rob Williams (Oceans Initiative, Canada)

Participants: Brad Barr, Verity Gibbs, Putu Liza Mustika, Simone Panigada, Margi Prideaux, Catherine Kemper and others

Introduction

This workshop examined the considerable threats particular to MMPAs in heavily developed coastlines. The workshop considered case studies looking at a range of species and problems from ship strikes which affect right whales in U.S. waters as well as fin whales in the Mediterranean to dolphins affected by tourism boats in Indonesia and industrial use of an urban waterway that is home to dolphins in Adelaide, South Australia. Another case study considered local as well as international approaches to dealing with the constant exposure to noise faced by a population of killer whales.

Session Overview

The workshop explored the following questions:

- What are the special challenges facing these MMPAs with regard to potential identification as IMMAs?
- Are there particular criteria that should apply to such sites in consideration of potentially identifying small coastal MMPAs in heavily developed coastline areas as IMMAs?
- Are there any specific benefits from considering the identification of such sites as IMMAs (when they otherwise meet or exceed the IMMA criteria) in terms of being “urban-adjacent IMMAs” (e.g., outreach, education, volunteers, public interest)?
- Do such sites have particular value with regard to place attachment and identity?

Presentation Summaries

Spatial management for cetaceans in high-use (human and marine mammal) areas: Examples of ship-strike reduction efforts from the U.S. National Marine Sanctuary System

Brad Barr (NOAA Office of National Marine Sanctuaries, USA)

Threats to cetaceans present challenges for MMPA managers in sites near or adjacent to human populations centers. Fishing, coastal and offshore development, shipping and other vessel traffic in waters near these MMPAs – and the noise generated by these activities – represent potential threats to effective conservation and management of these protected areas, which are usually established because they are important feeding areas or sites essential to maintaining reproductive viability of the populations. These threats, particularly ship strikes, are relatively rare events, but when large whale populations are still recovering from historic over-exploitation (e.g., right whales in both the North Atlantic and North Pacific), the loss of even of a few individuals can result in population level effects.

MMPAs in the U.S. National Marine Sanctuary System, on both coasts and in the Pacific Islands, have addressed ship strikes by establishing speed limits, identifying areas to be avoided, altering traffic lanes to avoid areas where whales are known to seasonally aggregate, and informing passing ships with real-time identification of whale presence in these high vessel traffic areas. This has been done through collaboration with the U.S. Coast Guard, local port authorities and the shipping industry, implemented through the International Maritime Organisation to ensure that all ships are aware of the threat and are complying with these conservation measures.

The approaches to management of international shipping and reducing the threat of ship strikes that have been implemented by the U.S. National Marine Sanctuaries can serve as models for other MMPAs located in places with similar management challenges. Given the rarity of ship strike events, it will take many years before any of these approaches – which theoretically have great potential to reduce the incidence of ship strikes – will be proven truly effective. More monitoring and evaluation is required to document success. However, as precautionary management actions, such strategies are likely to have some positive effect, and can be improved over time through adaptive management.

Case study of the Adelaide Dolphin Sanctuary

Verity Gibbs (Adelaide Dolphin Sanctuary, Department of Environment, Water and Natural Resources, South Australia, Australia)

The Port River and Barker Inlet Estuary, located 15 km from the City of Adelaide, South Australia, is home to a resident population of 30-40 Indo-Pacific bottlenose dolphins *Tursiops aduncus*. Another 400 transient dolphins have been recorded visiting the area.

This environmentally significant area has mangroves, seagrass, saltmarsh, tidal flats, creeks and estuarine rivers — all comprising the necessary habitat for dolphins and their food sources. The Port River and Barker Inlet is also South Australia's busiest shipping port with over 2000 annual commercial vessel movements. The port has electricity power plants, a maritime industrial precinct and other waterfront businesses. It is the site of European and Aboriginal cultural and historical relationships and recreational activities including fishing, boating, kayaking, water sports and bird watching.

Despite the environmental impact from these activities, the area manages to sustain an ecosystem which supports a diversity of marine life, including the population of bottlenose dolphins.

In 2001 community concern arose for the safety of dolphins and the quality of their environment following the intentional harming and death of several resident dolphins. In response to widespread support for increasing protection for the dolphins and their environment, the government developed an Act of Parliament. The Adelaide Dolphin Sanctuary Act was proclaimed in June 2005. The term “sanctuary” was chosen by the government as it resonated strongly with the local community at the time. The sanctuary is a multi-use marine mammal protected area. The ADS Act provides a mechanism for the integrated management of activities by defining specific environmental outcomes for the protection of dolphins and their habitat. The ADS Act sets out what will be achieved and how, through six objectives outlined in the management plan. It also holds other government agencies accountable through the integration of 11 other Acts of Parliament in South Australia including fisheries, environmental protection, mining, development, harbors and navigation, and coastal protection.

The ADS Act sets out penalties for harming a marine mammal at AUS \$100,000 (or two years imprisonment). Rangers patrol the sanctuary's waters, with a coordinated approach to assessing cumulative activities in the area. There are actions to address specific issues of water quality, key habitat features, ecological sustainable development and community participation.

Living within this modified and highly utilized environment is not without its effect on the resident dolphins. There are issues of thermal water pollution, exotic pest species, historic industrial use and heavy metal contamination of sediments with impacts on the ecosystem and wildlife. There have been

dolphin entanglements in fishing gear, a vessel propeller strike, and entrapment in an industrial sump through a water intake pipe. High rates of infant mortality have been linked to pollution levels. Long-term studies have revealed dolphins found in ADS have substantially higher PCB levels than other South Australian dolphins.

The ADS Act provides for a process to assess a range of diverse human activities to determine their combined, long-term environmental impact. The ADS multi-use management approach is a collaboration with all users of the area.

Few MPAs for cetaceans offer a similar level of protection with cooperation between government and the local community. The South Australian government is committed to ensuring that all existing and future activities within the ADS, whether social, recreational or industrial, are ecologically sustainable.

Ship strikes in the Mediterranean Sea: Assessment and mitigation measures

Simone Panigada (Tethys Research Institute and ACCOBAMS Scientific Committee, Italy)

Over the past 50 years, shipping has greatly expanded in the Mediterranean Sea, making the basin susceptible to ship-associated impacts due to the large number of shipping routes, long history of use, sensitive deep sea ecosystems, and genetically and reproductively differentiated cetacean populations. Over 220,000 ships (>100 tons) cross the Mediterranean basin every year and 30 percent of worldwide seaborne volume originates from or is directed towards the 300 ports in the Mediterranean Sea. These numbers are forecast to grow three- or four-fold in the next 20 years.

Ship strikes in the Mediterranean Sea are common and most likely represent the main anthropogenic threat for fin whales (*Balaenoptera physalus*) and sperm whales (*Physeter macrocephalus*), with high fatality rates reported every year.

Besides the increasing levels of commercial marine traffic, other threats faced by cetacean populations in the Mediterranean Sea include noise, chemical pollutants, increasing disturbance, interactions with fisheries, prey depletion, habitat degradation and global climate change.

What's needed is a comprehensive basin-wide conservation strategy, focused on ship strike mitigation measures, such as real-time monitoring of whale presence and distribution to relocate ferry routes to areas of lower cetacean density, reducing ship speed in high cetacean density areas, and designation of exclusion areas. In addition, crucial missing data on the occurrence of ship strikes throughout the Mediterranean basin must be collected regularly and systematically. The International Whaling Commission (IWC) has developed a standardized global database to report collisions between vessels and whales. This database is available for anyone to submit data and includes information on the whales (e.g., species, size, observed injuries) and on the vessels.

The objectives of the database are to obtain accurate estimates of mortality and injuries, to help detect trends over time, to allow better modeling of risk factors (e.g., vessel type, speed, size), and to identify high risk or unsuspected problem areas.

Among the management measures currently being taken in the Mediterranean Sea are the Notice to Mariners to protect cetaceans from the risk of ship collisions in the Strait of Gibraltar and the IMO designation of the “Cabo de Gata” Traffic Separation Scheme. The Gibraltar Strait Notice to Mariners was published in 2007 by the Instituto Hidrográfico de la Marina (Spanish Navy Hydrographic Institute under the Ministry of Defence); it established a security area characterized by high densities of sperm whales, where crossing ships are recommended to limit their speed to a maximum of 13 knots and to navigate with particular caution. Regarding the Cabo de Gata IMO designation, the waters around the Natural Park of Cabo de Gata-Nijar were set aside as a Special Area of Conservation for the bottlenose dolphin (*Tursiops truncatus*), as well as for the loggerhead turtle (*Caretta caretta*) within the framework of the European Union Habitats Directive. Working within IMO, the Spanish Maritime Authorities promoted the repositioning of the TSS of Cabo de Gata from five to 20 nautical miles off the coast.

The Agreement on the Conservation of Cetaceans of the Black Sea, Mediterranean Sea and contiguous Atlantic area (ACCOBAMS), the International Whaling Commission (IWC) and Mediterranean scientists are joining efforts to assess and suggest conservation and mitigation measures to address ship strikes affecting large cetaceans within the Mediterranean context. An ultimate goal of this effort will be to identify potential higher risk areas, and to map the temporal and geographic distribution and abundance of large cetaceans in relation to similar information on vessel traffic. The results will be used to develop models to explain and predict cetacean distribution and abundance in relation to maritime traffic.

A mismatched MPA for a busy tourism region: The case of Bali's southern peninsula

Putu Liza Mustika (College of Marine and Environmental Science & College of Business, Law and Governance, James Cook University, and Whale Stranding Indonesia, Indonesia)

The island of Bali in Indonesia is famous for tourism, with approximately 3 million foreign visitors in 2013. Most tourism occurs in south Bali: Kuta, Seminyak, Sanur, and the southern Peninsula (including Jimbaran, Uluwatu and Nusa Dua). As of November 2014, the Peninsula had at least 240 hotels, 11 surfing sites (many are world-class) and four diving sites. In the waters off the Peninsula harbor live at least nine species of cetaceans: spinner (both *Stenella longirostris* and *Stenella longirostris roseiventris*), pantropical spotted, Risso's and bottlenose dolphins, as well as false killer, killer, humpback, sperm and Bryde's whales (possibly *Balaenoptera edeni*). Several tour companies, notably

Bali Hai Cruises, promote day tours to view the dolphins off the Peninsula.

Tourism is not the only activity around the Peninsula. Around the northeastern tip of Benoa Harbour, the main harbor in Bali, is a busy marine highway, with boats ranging from artisanal fishing boats, yachts, live-aboards, as well as larger cruise, navy and tanker ships. In addition, Benoa Bay may soon be subjected to a reclamation project, which has been delayed due to protest from the Balinese community. Sand mining also takes place a few nautical miles offshore, southeast of the mainland.

Shipping and dredging are two of the activities threatening local cetacean populations. Other threats to these cetaceans are solid waste from land and delivered by currents, sewage (mostly from land), shipping noise, vessel collision, habitat degradation due to coastal development as well as the offshore sand mining. The dolphin watching industry itself does not seem to be a problem.

In 2012, the local government initiated the establishment of the Badung MPA, which covers parts of peninsular waters. Whales and dolphins were not the original focus for establishing the Badung MPA, which might partly explain the mismatch between the draft zoning design and current knowledge of cetacean diversity and its threats. Suggestions have been made to accommodate cetaceans in the MPA design, but authorities have not yet taken them into account. In the mean time, controversies over a reclamation project at Benoa Bay adjacent to the proposed Badung MPA have delayed its establishment. This delay has provided conservation planners with time to obtain more data to improve the MPA design. Data for input include cetacean abundance, residency patterns and threat analysis, particularly for potential vessel collisions and shipping noise.

Urban killer whales & quiet(er) MMPAs: A tale of two resident killer whale populations

Rob Williams (Oceans Initiative, Canada)

One of the main goals of a marine mammal protected area (MMPA) is to separate vulnerable species from threatening anthropogenic processes (e.g., bycatch in fishing nets, or exposure to anthropogenic noise). What do we do when the threatening process occurs everywhere throughout a population's range? This is exactly the case along some heavily industrialized coastlines. The parapatric northern (NRKWs) and southern resident killer whales (SRKWs) of the northeastern Pacific provide contrasting case studies to illustrate the degree of human impact on important whale habitats.

Any spatial planning effort or risk assessment will require spatially explicit data on both animal distribution and threats. In the cases of well-studied killer whale populations, critical habitats have been defined by both Canada and the U.S., and distribution maps are available from long-term photo-ID studies and spatial models from snapshot line transect surveys. Canada identifies

anthropogenic noise in critical habitat as a threatening process to killer whale recovery.

Two studies, involving university-NGO partnerships, were presented to illustrate (1) model predictions of cumulative noise levels (predicted from ship traffic patterns), and (2) empirical measurements on autonomous recording devices. Designated critical habitats for both NRKWs and SRKWs were found to be among the noisiest in the studies, but many parts of the range of northern resident killer whales were relatively quiet. The entire summertime core habitat of southern resident killer whales was noisy.

What do we do in a situation like the SRKWs, in which the entire range is noisy? We could:

- in the context of ocean noise, look for opportunities for separation or mitigation in the spatial, temporal and frequency domains;
- build smart MMPAs around vulnerable behaviors. MMPAs placed in feeding hotspots will do more conservation good for SRKWs than those that protect high-use areas that are used for socializing, resting or travelling (i.e., activities in which SRKWs are comparatively tolerant of boat traffic);
- impose speed restrictions (ships get quieter as they slow down, and this has worked to reduce ship strike risk for endangered whales, but could also work to reduce chronic ocean noise levels);
- replace the noisiest ships; and/or
- set allowable harm limits for individual species or at the population level.

The CONCEAL (Chronic Ocean Noise: Cetacean Ecology & Acoustic habitat Loss) Project is an interdisciplinary approach that aims to set population-level limits of the amount of harm to a population that managers are willing to accept.

Population models are useful tools to explore consequences of noise, but if we're honest about uncertainty in all parameters and linkages, we can generate useless projections: Either the effect is negligible, and populations can grow infinitely, or the effect is catastrophic, and the population will go extinct. The new trend toward making these problems more tractable include modular models (e.g., Population Consequences of Acoustic Disturbance) but they require a lot of data.

For data-sparse examples, the CONCEAL framework turns the question on its head. Therefore, the question goes from "How big could a cumulative effect be?" to: "How big would an effect have to be to reach agreed-upon definition of unsustainable?"

In the CONCEAL project, historical population-level responses of fin, humpback and killer whales to natural, inter-annual variability in prey abundance were used to predict how a population might respond in future to anthropogenic prey reduction. The CONCEAL models showed that it takes much more reduction in prey to cause unsustainable declines in humpback whales than

in killer whales. Killer whale populations have little tolerance for prey reduction.

Where do we go from here? How does this apply in other, heavily industrialized regions?

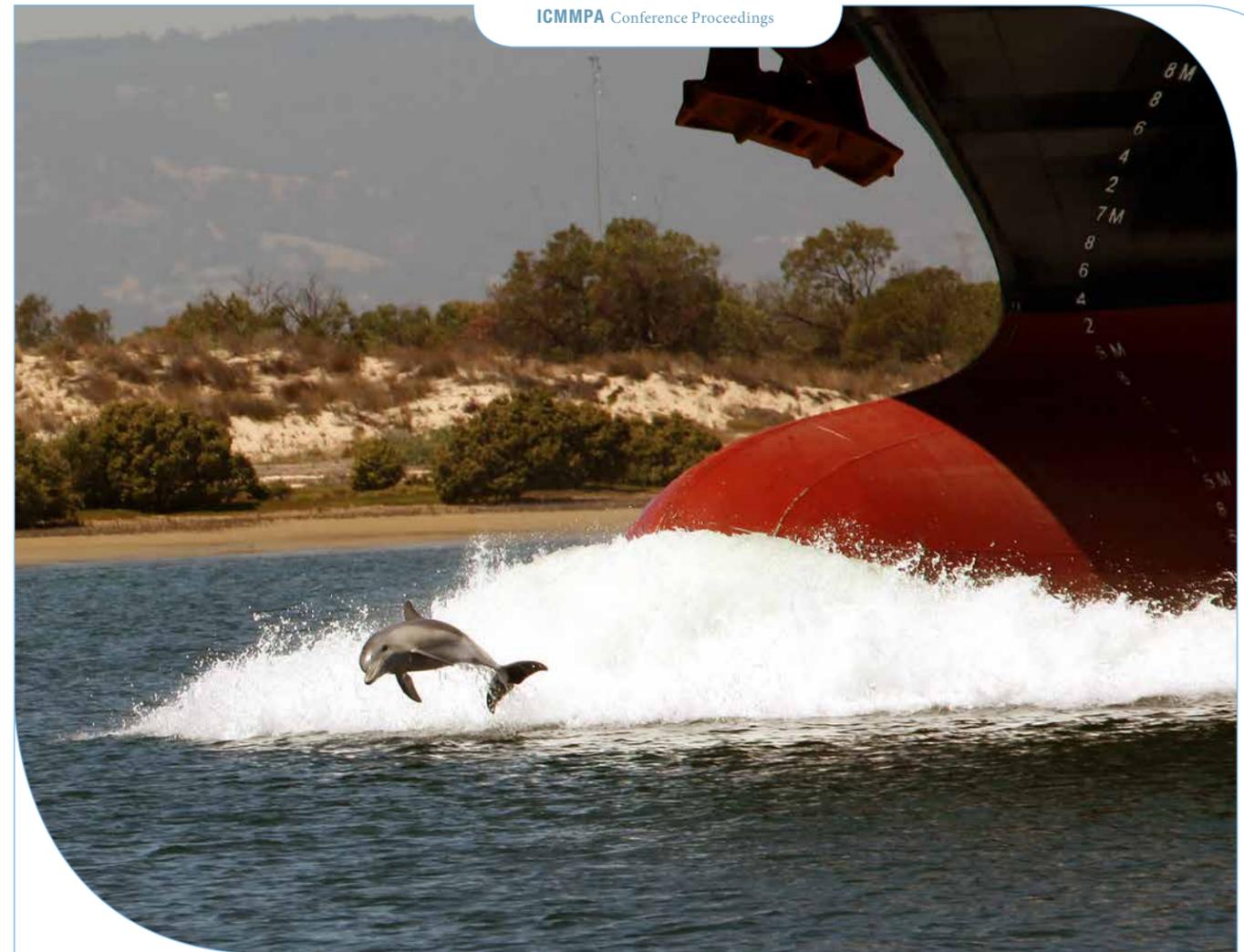
- Use a simple model (e.g., CONCEAL) to estimate rough allowable harm limits; assess the likelihood that human impacts are exceeding these limits; and if so, discuss mitigation options
- How can we keep habitat degradation to levels below those that would cause population-level harm?
- Buy or reduce fishing quotas (biodiversity offsets)
- Areas to be avoided or speed restrictions
- Incentives to replace the noisiest ships
- Produce more fish (hatcheries, spawning habitat restoration)
- Is there a way to deal with contaminants?

We can make progress. The IMO resolution on ship noise pledges to reduce shipping contribution to ocean noise by half in this decade. It's non-binding but there's strong support from industry. The noisiest individual ships need technical work. There are major business opportunities for building quieter ships. The next step is not a scientific but a policy question. We need to set ocean noise targets: how much noise or acoustic masking of a whale's world will we tolerate?

Summary of Discussion about Ways Forward

In general, the workshop participants touched on a set of common themes and take-home messages.

- (1) We need to state objectives clearly, to say what our MMPA is and is not. The Dolphin Sanctuary may not satisfy strict, no-take definitions of MMPAs, but calling it a sanctuary was key to getting something done. Building community support for and awareness of cetaceans is a valid objective. Equally valid objectives are preventing extinction, reducing bycatch, protecting killer whale rubbing beaches, promoting research, or slowing the rate of biodiversity loss.
- (2) We need to understand the basic biology of the target species. We need data from systematic line transect surveys, tags, acoustic recorders (archival or real-time), and local knowledge. We need to utilize strandings. Carcasses tell a story: with the right pathologist and necropsy team, each carcass tells a story both about life-history and about threats. We should build pre- and post-implementation monitoring into the MPA design/management plan, in order to (a) detect change, and (b) know whether our MMPA is achieving the desired effect. We need to anticipate changes in animal distribution and behavior, or anthropogenic threats, and have an adaptive management plan that allows for change.



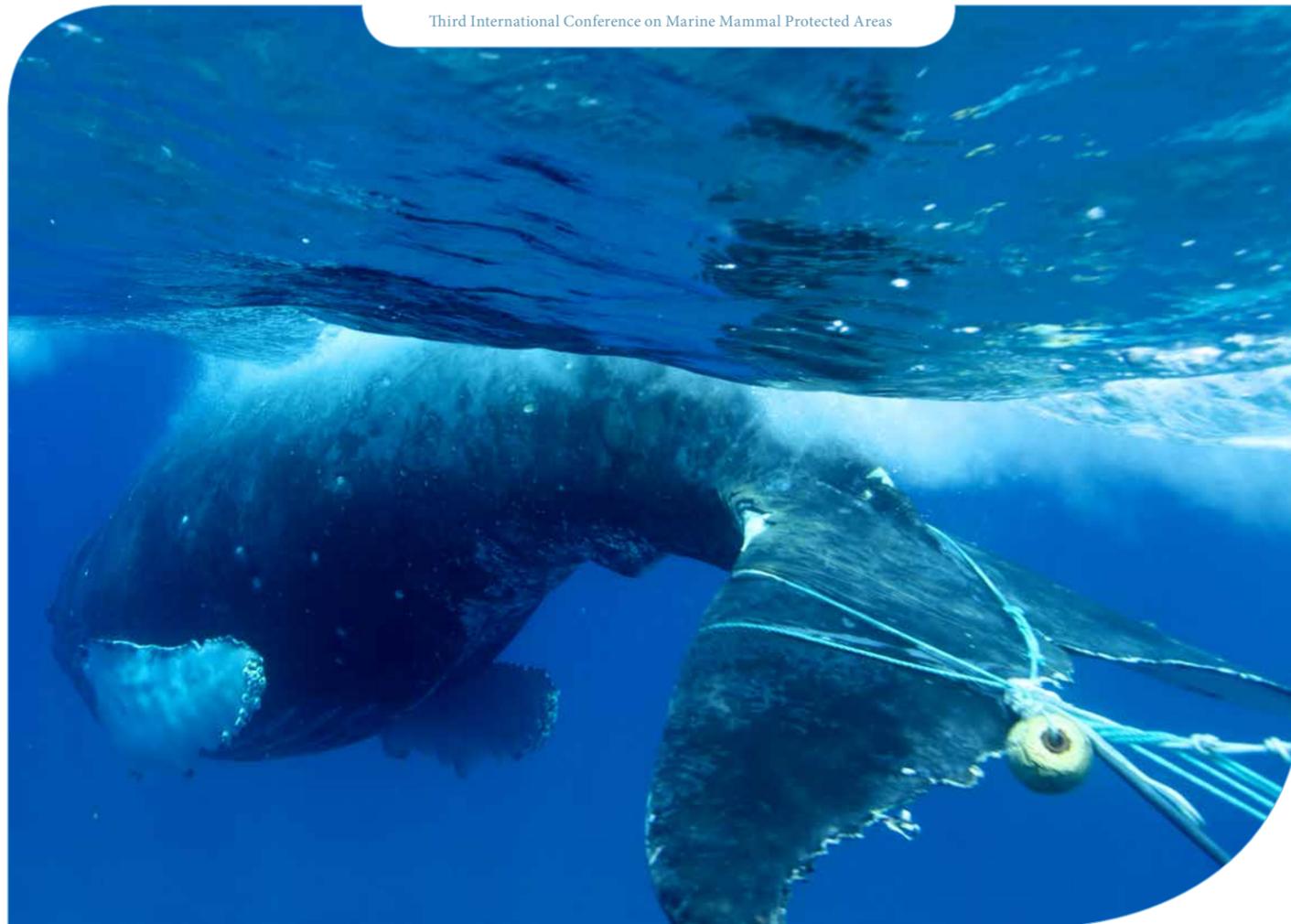
Bottlenose dolphin bowrides in the Adelaide Dolphin Sanctuary where large ships and industrial activities are common. Photo: Mike Bossley, Whale and Dolphin Conservation (WDC)

- (3) We need to quantify threats. Passive acoustic monitoring, for example, gives information about animal usage and anthropogenic noise simultaneously. Noise is an important threat to control inside and adjacent to an MPA located in a heavily developed coastline. Having noise as an MPA indicator may leverage conservation gains outside the MPA (but there are jurisdictional issues). AIS data give great information on ships (risk of ship strike, oil spill and chronic ocean noise), but it misses out small boats. The prey base is a key element of an MMPA, but information is usually lacking. We need to rank objectives. Reducing ship strikes of fin whales may increase ship strike risk for sperm whales. Long-term photo-ID showed that MMPAs worked to reduce bycatch of Hector's dolphins (Gormley *et al.* 2014).
- (4) We should look for allies. Community members and stakeholders can be the biggest barrier and the biggest allies. Once they're onside, they can tell us what's working and not. Citizen scientists can tell us when there's a carcass on the beach, but we need a team of pathologists, fisheries managers, MPA managers and mariners to monitor threats over time. It's a good idea to identify allies early, in order to collect baseline data on animals and threats before implementation.

- (5) We must be clear about the limitations of MMPAs in heavily degraded habitats. We need to have an iterative, adaptive MMPA management plan in place, but know that it's contentious to revise management plans too frequently. Try to get it right the first time! The community, stakeholders, industry may all spend more time on the water and beach than we do, so make friends and keep them. We shouldn't be territorial. We'll need all the help we can get. Find an institution with longevity: a museum has more capacity than we do, and will outlive all of us.

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Humpback whales feed and breed in inshore waters and sometimes become entangled in fishing gear—in this case, off the coast of Hawaii. Photo: Edward Lyman/Hawaiian Islands Humpback Whale National Marine Sanctuary, Large Whale Entanglement Response, from research conducted pursuant to Permit No. 932-1905/MA-009526.

I have observed that MMPAs are often taking the lead or acting as a catalyst for initiatives which then have conservation benefits outside of their boundaries.

Keynote 3: MMPAs Take on New Responsibilities and Roles Beyond Their Borders

David Mattila

Technical Adviser, Human Impact Reduction, Secretariat: International Whaling Commission, USA

Since the second International Conference on Marine Mammal Protected Areas (ICMMPA 2), I have been working for the Secretariat of the International Whaling Commission as a technical adviser on non-deliberate human impacts to whales, especially the conservation and welfare issues associated with entanglement and ship strike. At its last meeting in 2014, the IWC decided (through Resolution 2014-2) to seek enhanced collaboration in the conservation of migratory cetaceans, and requested the Secretariat to conduct consultations with regard to sharing data and research priorities. This process has begun and includes recent cooperation with regard to workshops on shared topics of interest (e.g., ship strikes and marine debris) and has also resulted in partnerships to increase the effectiveness of capacity building on some of these issues. From this capacity-building work, I have observed that MMPAs are often taking the lead or acting as a catalyst for initiatives which then have conservation benefits outside of their boundaries.

At our previous ICMMPA conferences in Maui and Martinique, we promoted the idea that MMPAs could act as a catalyst for initiatives that address specific threats to marine mammals. One suggestion was that MMPAs could host and help coordinate marine mammal rescue networks. During the three years between ICMMPA 2 and 3, in my IWC role, I have organized seminars and training in entanglement response for more than 500 scientists, conservationists and government personnel from 20 countries; in many countries the training has been organized and hosted by key MMPAs. Examples include the Peninsula Valdés (Argentina) and San Ignacio Lagoon (México) World Heritage Sites, along with the Agoa Sanctuary (French Caribbean) and the Marine Mammal Sanctuary of the Dominican Republic. All of these MMPAs hosted training that has already had a positive impact both within and outside of their boundaries.

Another example of MMPA management actions having an impact beyond their borders is the moving of shipping lanes within the Stellwagen Bank National Marine Sanctuary's borders off Boston, Massachusetts, USA. In this case Stellwagen Bank managers used decades of whale distribution data within its boundaries to propose a movement of the existing Traffic Separation Scheme (TSS) for shipping, to a new position which traversed a part of the sanctuary with lower whale densities. Not only did this likely reduce the risks to whales in the Sanctuary, but it served as an example and template for the investigation of whale and shipping density patterns at the Pacific entrance to the Panama Canal, and a subsequent proposal of a TSS that would minimize the risk of ships colliding with whales in that heavily trafficked area.

And so, at this third ICMMPA Conference, I would like to point to existing and emerging themes which highlight the important, tangible role that MMPAs are playing both inside and outside of their boundaries. MMPAs and the community of practitioners working inside each MMPA are:

- forming partnerships to accomplish more together than they could alone,
- becoming catalysts for conservation both inside and outside of their borders,
- engaging stakeholders and nurturing stewardship for sustainability,
- working to build capacity and to do mentoring
- trying to “think global, but act local” — with the idea that it may also have a global impact.



Tropical dolphins surfacing in the new Swatch-of-No-Ground MPA.
Photos courtesy Elisabeth and Rubaiyat Fahrni Mansur and Brian D. Smith, Bangladesh
Cetacean Diversity Project, Wildlife Conservation Society.

Keynote 4: The International Committee on Marine Mammal Protected Areas: Reflecting on What We're Learning after Three Conferences in Six Years

Naomi McIntosh

Chair, International Committee on Marine Mammal Protected Areas – ICMMPA, and NOAA Office of National Marine Sanctuaries, Pacific Islands Region, Hawaii, USA

The goal of this concluding presentation is to highlight key developments and accomplishments since the first ICMMPA in Hawaii in 2009. How can they help us to inform and guide the way forward? Following are some of the valuable lessons I have learned throughout the years working on these conferences.

Purposeful, meaningful engagement — *Laulima*

In Hawaii, the word Laulima means many hands working together in cooperation and harmony towards a common goal.

In 2006, an international group of marine mammal scientists, managers and policymakers recognized the growing number of MPAs around the world in which marine mammals played a significant but challenging role.

At the time, more than 375 MPAs for marine mammals existed or were being proposed in some 90 countries around the world. And yet, there had never been a dedicated venue for or gathering of marine mammal and MPA experts and practitioners with the intent of sharing common challenges and solutions.

In 2008, the group formed a Steering Committee and developed a proposal for the First International Conference on Marine Mammal Protected Areas.

It has been my experience that people often enter your life when you and they need each other the most. We exist to learn from one another no matter how distant or unlikely the bonds may appear, no matter how fleeting or permanent the ties may be. My advice to you is build relationships with each other that are meant to last for life.

First Conference - Be ambitious in your thinking and remember to keep your priorities straight — *Alaka'i*

Alaka'i is the willingness to assume the responsibilities of leadership. To lead with initiative and with your good example.

The objective of the first conference was to convene a forum for researchers, managers, policy makers and NGOs to share information and varying perspectives on approaches to marine mammal management and conservation.

The theme of that first conference was “networks: making connections”, both between the individuals who study, manage and set policy for MPAs, and between the MPAs and MPA networks themselves, especially when they share common populations, species, and issues. The goal was simple, bring people together and get them talking to one another.

The Committee also worked hard to ensure “international” meant the involvement of delegates representing more than just a few countries. In addition, the Committee strived to raise funds to support the participation and involvement of as many delegates as possible from developing countries.

Indo-Pacific humpback dolphins in the waters off Bangladesh. Photo courtesy Elisabeth and Rubaiyat Fahmi Mansur and Brian D. Smith, Bangladesh Cetacean Diversity Project, Wildlife Conservation Society.



In 2009, the First International Conference on Marine Mammal Protected Areas was held in Maui, Hawaii. Over 200 marine mammal scientists, marine protected area managers and other experts from 40 countries attending the conference validated and agreed that this gathering in Hawaii was long overdue and extremely valuable. Participants urged the Steering Committee to continue the momentum built by the conference to help address the common challenges and share solutions for the management of marine mammal protected areas around the world.

Demonstrate Leadership and Never Give Up Hope — Kuleana

Kuleana is to view responsibility as a privilege and an honor, not in pursuit of reward, but because it is the right thing to do.

At the closing of the first conference, the newly formed French Marine Protected Area Agency took up the challenge and announced they would host the next ICMMPA conference.

The second International Conference on Marine Mammal Protected Areas convened in Martinique in the French Caribbean in November 2011 and focused on protecting endangered species and their spaces. Special attention was given to the plight of the vaquita, the most endangered, space-restricted marine mammal in the world.

News about the vaquita was, and is, bleak, yet there were many inspirational stories shared by the presenters. In particular, I and most likely others were left speechless when Tiare Holm announced to the delegates that after just one year of effort, Palau had designated a whale sanctuary in their waters. In comparison, designations of MPAs in the USA on average can essentially take a decade or more to be approved.

Sharing Capacity by Setting up the IUCN SSC and WCPA Marine Mammal Protected Areas Task Force — Kokua

Hawaiians call this Kokua which simply means to help, aid and lend assistance.

The IUCN Marine Mammal Protected Areas Task Force (MMPATF) was created by ICMMPA and IUCN in 2013 to facilitate mechanisms within the MMPA community to share information, experience and access to tools for establishing,

monitoring and managing MMPAs and for promoting marine mammal conservation.

The Task Force strives to bolster capacity within the MMPA community by exposing it to state-of-the-art tools from the wider MPA and place-based conservation world.

The Task Force has devised the new global tool of important marine mammal areas (IMMAs) which are envisioned as a global tool to identify marine mammal habitats to help with conservation efforts in national waters and on the high seas of the world ocean.

Finally: Be Inspirational – do what you love and love what you do — Po'okela

Po'okela means to strive for excellence setting your sites to the highest level of achievement.

Today I am delighted to ask Brian Smith to share with you an inspiring story from Bangladesh.

Announcement: Protection for Swatch-of-No-Ground, Bangladesh

Brian D. Smith (Wildlife Conservation Society, USA and Bangladesh)

The 1st International Conference on Marine Mammal Protected Areas, held in Maui in March 2009, highlighted work from Bangladesh and our efforts through local scientists of the Wildlife Conservation Society's Bangladesh Cetacean Diversity Project to gain protection for freshwater dolphins. This was achieved in part by the declaration in January 2012 of three wildlife sanctuaries for Ganges River and Irrawaddy dolphins in the Sundarbans mangrove forest in Bangladesh. At that time we also talked about the need to protect cetaceans in coastal waters, where large populations of Irrawaddy dolphins, finless porpoises and Indo-Pacific humpback dolphins occur, and in a submarine canyon called the Swatch-of-No-Ground, where Bryde's whales, Indo-Pacific bottlenose, pantropical spotted and spinner dolphins are found. Today we are pleased to announce that in October 2014 the Swatch-of-No-Ground and adjacent coastal waters, proposed for protection by the Wildlife Conservation Society, and supported by ICMMPA, WDC, the IUCN CSG and others, was declared as Bangladesh's first offshore MPA.

Pre-Conference ICMMPA 3 Workshop: Regional Expert Workshop to Test the Draft Criteria Used in the Identification of Important Marine Mammal Areas (IMMAs)

Adelaide, Australia, 8 November 2014, 12-8pm

Conveners: **Michael Tetley** (Critical Habitat/Marine Protected Areas Programme, Whale and Dolphin Conservation and IUCN Marine Mammal Protected Areas Task Force, UK), **Kristin Kaschner** (University of Freiburg and IUCN Marine Mammal Protected Areas Task Force, Germany), **Giuseppe Notarbartolo di Sciara** (Tethys Research Institute and IUCN Marine Mammal Protected Areas Task Force, Italy), and **Erich Hoyt** (Critical Habitat/Marine Protected Areas Programme, Whale and Dolphin Conservation and IUCN Marine Mammal Protected Areas Task Force, UK)

Chairs: **Michael Tetley** (Critical Habitat/Marine Protected Areas Programme, Whale and Dolphin Conservation and IUCN Marine Mammal Protected Areas Task Force, UK), **Kristin Kaschner** (University of Freiburg and IUCN Marine Mammal Protected Areas Task Force, Germany)

Participants: **Alastair Birtles** (James Cook University, Australia), **Alex Brown** (Murdoch University, Australia), **Cara Miller** (WDC, Fiji), **Charlotte Boyd** (NMFS-SWFSC, USA), **Daniella Hanf** (Murdoch University, Australia), **Heiko Schmidt** (University of Freiburg, Germany), **Helene Marsh** (James Cook University, Australia), **Jeff Ardron** (Institute for Advanced Sustainability Studies – IASS, Germany), **Lars Bejder** (Murdoch University, Australia), **Liz Slooten** (University of Otago, New Zealand), **Mike Donoghue** (Threatened and Migratory Species, Secretariat for the Pacific Regional Environment Programme – SPREP, Samoa), **Rochelle Constantine** (University of Auckland, New Zealand), **Tim Hunt** (Flinders University, Australia), **Putu Liza Mustika** (College of Marine and Environmental Science & College of Business, Law and Governance, James Cook University, and Whale Stranding Indonesia, Indonesia)

Introduction

Important marine mammal areas (IMMAs) are discrete portions of habitat, important for one or more marine mammal species, which have the potential to be delineated and managed for conservation. This classification scheme is currently under development by the IUCN SSC-WCPA Marine Mammal Protected Areas Task Force (MMPATF).

The purpose of this workshop was to use regional and global expertise from researchers attending ICMMPA 3 or living in the wider Australasian and South Pacific region to test the capability of emerging draft IMMA criteria for identifying areas of interest (AoIs) and candidate important marine mammal area sites (cIMMAs) within a test region using collated evidence from data or expert knowledge. Additional background on the development process of IMMAs can be found in the Workshop for the Development of Important Marine Mammal Area (IMMA) Criteria, Marseille, France, October 2013 (Hoyt and Notarbartolo di Sciara 2014) and in Annex 1 of this report.

Regional and global marine mammal experts were invited to a full-day workshop on the day preceding the start of the ICMMPA 3 conference to assist with testing draft IMMA criteria in a subset portion of the Australasian, Melanesian and Antarctic region (Figure 7). Experts were contacted in advance of the workshop and provided with an online resource containing workshop documents and a call for relevant information and potential AoIs against which to test IMMA criteria (see Figures 8-11). Information provided to participants included:

- a working definition of the important marine mammal area (IMMA) classification and the overarching goals of the IMMA program of development;
- draft criteria for IMMAs, both threshold- and non-threshold-based, with information about the rationale for their development; the present criteria were developed by workshop conveners drawing on experiences within the following processes: mainly CBD ecologically or biologically significant areas (EBSAs) and IUCN marine key biodiversity areas (marine KBAs) as well as U.S. and Australian biologically important areas (BIAs);
- a live database of regionally relevant contextual information (158 data layers including various habitats, IUCN RedList range maps, AquaMaps predictions, OBIS presence and richness indices);
- a proposal for a possible analytical approach to assess available evidence (based on thresholds);

- options for assessing AoIs using the draft criteria provided; and
 - sample and blank proforma and instructions for testing the draft criteria.

Participants were provided background presentations about the MMPATF as well as the progress to date on the evolving IMMA designation, synergies with the EBSA and KBA processes and a preliminary technical proposal for the development of appropriate IMMA protocols and identification methodologies. After an opportunity to ask questions about the IMMA program of work, participants were divided into three breakout groups to assess common questions or areas of interest.

Group 1: Expert-led proforma

Group 1 focused on identifying a new list of potential AoIs to test from their gathered knowledge of the species and habitats within the region. The group then selected a few of the areas to investigate in more detail against the draft IMMA criteria using data which they personally held or had been gathered for the workshop.

Group 2: Assessment of existing designations

This group decided to investigate the list of existing designations in the region of interest which included marine mammals as a feature and could be candidate IMMAs. These included MPAs, Australian BIAs and EBSAs. Group 2 would then select a short list of sites to examine the evidence used in their designation against the draft IMMA criteria.

Group 3: Evaluation of the criteria wording and definitions

The final group decided to further investigate the selection and rationale behind the criteria being examined and its suitability for application at regional scales.

Main Outputs

Breakout Group 1 participants proposed to investigate 26 AoIs. Four sites – Shark Bay, southwest New Zealand Shelf, Bird's Head Peninsula and dwarf minke whales in the Great Barrier Reef Marine Park – were tested against the draft IMMA criteria using best available evidence. Overall the group found that the criteria were relevant in most cases in terms of investigating a range of sites but noted that data gaps would be a significant issue for many criteria. The group also expressed concerns and confusion over how large an IMMA could be and explored the scenarios of fitting evidence and criteria covering three different options for a southern right whale IMMA – one large and two small.

Breakout Group 2 participants proposed 43 AoIs and then chose three sites – Fiji EBSA, Vava'u EBSA and Kimberly BIA – to evaluate against the IMMA criteria using the supplied proforma to test the evidence used in their original designation. This group encountered some issues regarding the nature of evidence employed in the designation of these sites for testing. Marine

mammals were often included by known presence, without details cited, or with site boundaries being loosely drawn around AoIs. For the Fijian EBSA example, if we presume that IMMAs will sometimes cover overlapping areas of multiple marine mammal species representing importance for a range of species, the site could qualify against IMMA non-threshold criteria but only if the boundaries were extended to the north to encompass further empirical evidence from sperm and humpback whale data rather than simply the knowledge of their distribution in the area. For the Kimberly BIA, much of the evidence available did not match the site boundaries investigated but it might qualify as an IMMA using the draft non-threshold criteria. Furthermore, when investigating the threshold criteria against the evidence available for snub-fin dolphins, the BIA even when redrawn would not qualify as an IMMA due to too high a threshold on aggregation even for threatened and endangered species.

Breakout Group 3, after much consideration of the draft criteria, concluded that the criteria listed, in terms of the headings, were sufficient for meeting the need of identifying IMMAs, but that the text and terms used should be redrafted to be clearer and more precise. Time was spent trying to develop a conceptual hierarchical framework for nesting criteria, but the group felt that many of the terms and definitions used in the criteria document (e.g., "aggregations", "important", "resident", "distinctiveness") would need to be defined and explained in more detail before the criteria could be finalized. The consensus was that there is an urgent need to set up a writing group that would include members from the different taxonomic IUCN Species Survival Commission (SSC) groups and would also require some back and forth with organizations or institutions representing the marine mammal community. The group also concluded that the draft thresholds for IMMA criteria, currently matching proposed KBA criteria thresholds, should be investigated again because it is presently unlikely that the thresholds would be considered suitable for marine mammals and would exclude many obviously important areas for marine mammals. However, it was agreed that – as a first step in the development of threshold criteria – more rigorous systematic testing of KBA thresholds for marine mammals would be required to quantitatively determine the extent of this potential mismatch.

Recommendations and Conclusions

The workshop provided various recommendations for how to proceed more effectively with finalizing the draft IMMA criteria. These included:

- Potential AoIs which could successfully meet IMMA criteria that currently cannot be assessed due to lack of evidence or gaps in knowledge should not be lost but catalogued for informing future work or research.
- EBSAs or other site designations from different processes do not necessarily fully represent the geographic range or ecological aspects of potential IMMAs. However, there is great benefit in investigating these sites as AoIs for marine mammals for planning future assessments both regional and global.

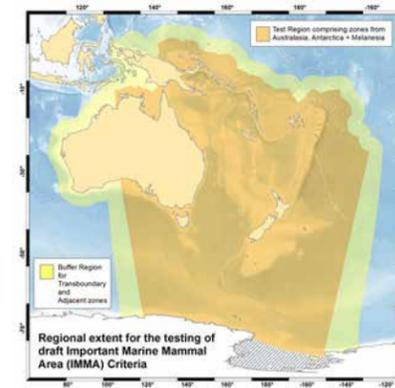


Figure 7. Extent of Workshop Test Region

- A special writing group should be charged with re-drafting and improving the criteria. This exercise could benefit from expertise from the various IUCN SSC groups. Furthermore, this group could help come up with concepts, terms and overarching text for use when circulating the criteria.
- A number of select test cases in data-rich and data-poor areas should be investigated to assist with planning efforts for future regional IMMA workshops as well as for use as examples provided to potential IMMA criteria users. Suggested test cases might include those potentially carried out by IUCN species groups (piggybacking on other expert meetings).
- The criteria should be restructured and the categories levelled with the associated evidence provided for systematic evaluation, perhaps employing decision-tree approaches.
- The identification of IMMAs should be an iterative process and not just a one-off scheme. A staged approach should be recognized, starting with qualitative and leading to quantitative assessment.

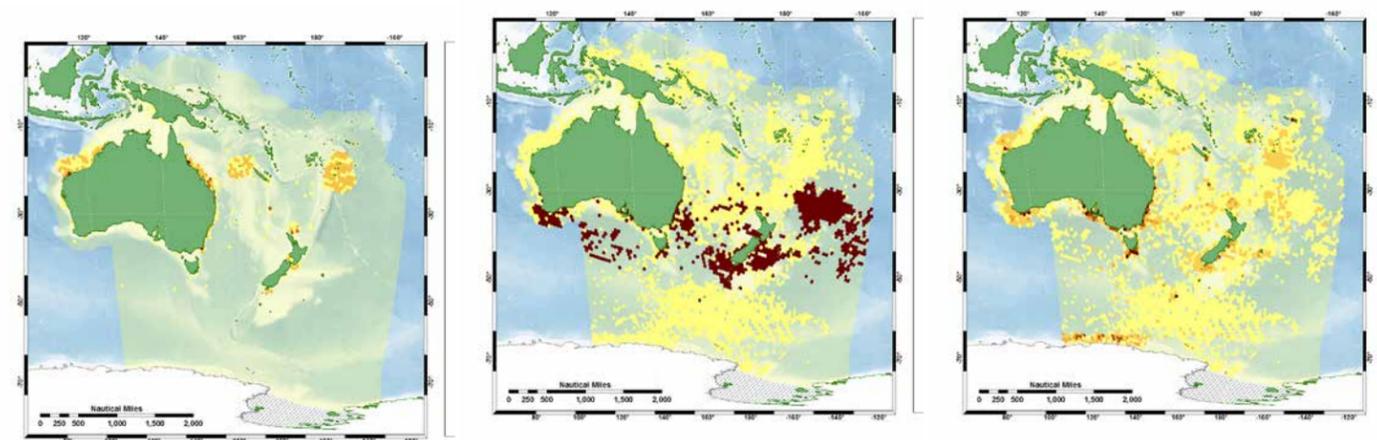


Figure 8. Example figures of OBIS records summarized by 0.5 degree hex cells for number of humpback records, presence and pseudo-absence of southern right whales and marine mammal species richness

- An IMMA Toolkit should be developed, similar to the BirdLife Marine IBA Toolkit, with guidelines for considering the range of data types available and their suitability as evidence (with caveats and limitations). This should take place alongside work on finalizing the criteria.
- The building of capacity for a body or collective should be set up to manage the outputs of the IMMA process including sites and the cumulative evidence being generated. This body could take the lead on methodological development as well as any infrastructure surrounding data and evidence management.
- Appropriate guidelines are needed to describe the approaches and rationale for the delineation of boundaries around evidence available which is concurrent with ways of best practice for other similar designation types.
- A process of peer-review and evaluation of candidate IMMAs, or cIMMAs, which are nominated by an expert professional body, will be necessary to help build confidence and integrity around the designation and the overall aims of the IMMA program of work.

The choice of this test region aimed to provide a representative selection of habitats and species to give the workshop a contextual frame of reference for testing draft criteria in the identification of IMMAs. The outer boundary of the region was subject to be amended during the workshop to represent the expertise and evidence presented. It was not expected that participants would cover any more than a few habitats and species within the test region.

In total, 158 data layers were compiled and made available to participants. These included species distribution and richness from observation records (OBIS), range maps (IUCN RedList), AquaMaps predictions as well as a range of sociopolitical and ecogeographic habitat parameters. Samples of the data presented at the workshop are included in Figures 8-11.

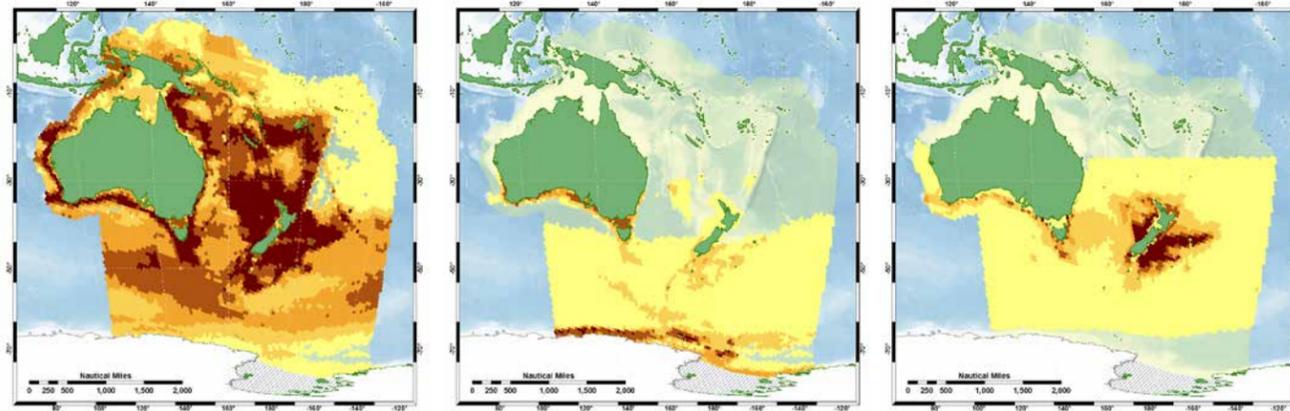


Figure 9. Example figures of AquaMaps predictions summarized by 0.5 degree hex cells for species richness of marine mammals, richness of pinniped species, and habitat suitability for long-finned pilot whales

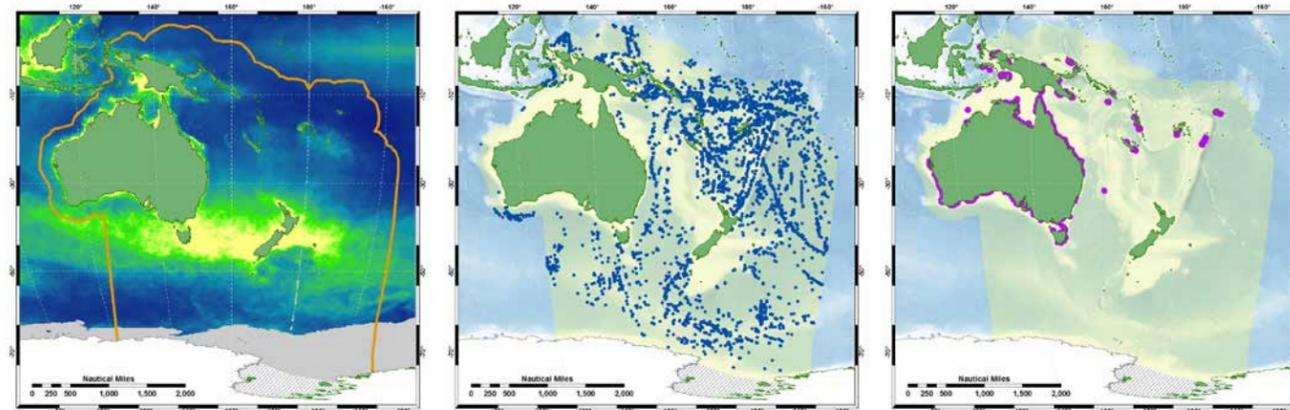


Figure 10. Example figures of marine mammal habitat data including surface productivity, distribution of seamounts and knolls, and distribution of sea grass beds

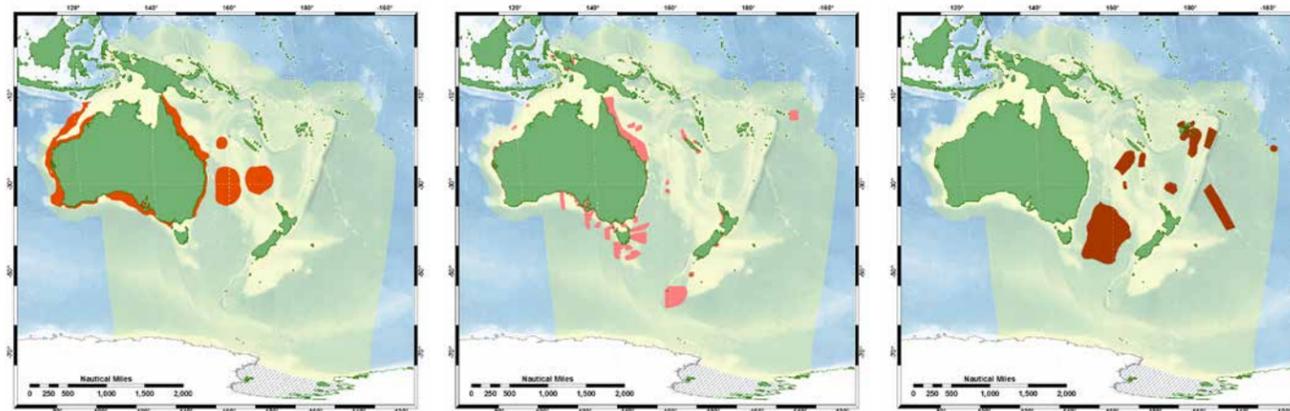


Figure 11. Range of sites tested against as areas of interest (Aois) for IMMAs including Australian biologically important areas (BIAs), marine mammal protected areas (MMPAs) and CBD ecologically or biologically significant areas (EBSAs) with marine mammals as primary criteria

Annex 1: Agenda and Background: Regional Expert Workshop to Test the Draft Criteria Used in the Identification of Important Marine Mammal Areas (IMMAs)

Adelaide, Saturday 8 November 12pm – 8pm
Stamford Grand Hotel, Glenelg, SA 5045



Mike Tetley leading workshop participants at ICMMPA 3. Photo: Nikki Zanardo.

Background and Aims

Following the successful example of the important bird areas (IBAs) process as a template, important marine mammal areas (IMMAs) are a classification scheme currently being developed by the IUCN SSC-WCPA Marine Mammal Protected Areas Task Force (MMPATF). The goal is the development and global application of a standardized process for the collation, categorization and advocacy of evidence relating to discrete portions of habitat of specific importance to one or more species of marine mammal, which may benefit from appropriate conservation measures to enhance their protection.

It is expected that the developing IMMA process will aid the identification and protection of marine mammal habitats mainly through the existing tools and processes of the Convention on Biological Diversity (CBD) ecologically or biologically significant areas (EBSAs) and IUCN marine key biodiversity areas (marine KBAs).

IMMA classifications will also be useful for:

- the design and management of marine mammal protected areas (MMPAs) and regional MMPA networks;

- addressing marine mammal conservation concerns in marine spatial planning (MSP) exercises;
- identifying areas where guidelines or regulations may need to be implemented, for example, in reference to the risk of oil spills, ship strikes (particularly for large whales) or to mitigate effects of underwater noise pollution; and
- prioritizing areas identified as important for monitoring the effect of climate change on marine mammal habitats.

IMMAs will be determined through an expert-led process of collation, assessment and review of available evidence deemed best for the purposes of meeting robust criteria for the identification of specific geographic areas and times. Experts are those marine mammal scientists, conservationists, naturalists and other professionals with knowledge, experience and skills considered necessary for the adequate determination of candidate sites using the IMMA criteria.

The workshop will be the first full day expert and practitioner led test of the draft IMMA criteria and protocols used for identifying key IMMA triggers from datasets collated for a sub-region of Australasia, Antarctica and Melanesia. This workshop and

preparatory material circulated in advance of the ICMMPA 3, will seek to bring together key regional experts and knowledge in marine mammal science to determine if the draft IMMA criteria are suitable for the identification of candidate IMMA sites. Furthermore, the workshop will gather consensus on the process for IMMA nomination and the evidence base requirements needed to adequately support IMMAs for wider use in the conservation and advocacy of marine mammals at a global standard.

The primary goal of the workshop will be to test the capability and capacity of IMMA draft criteria to identify candidate sites against the evidence available for a subset region containing areas in Australasia, Melanesia and Antarctica.

Currently the list of criteria for identifying IMMAs being tested for wider use consist of the following eight draft criteria, representing many critical aspects of marine mammal biology, ecology and population structure: i) aggregations, ii) small and resident populations, iii) distinctiveness, iv) diversity, v) threatened species, vi) reproductive areas and times, vii) feeding areas and times, and viii) migration routes and times.

These draft criteria were initially based upon others developed in parallel from the IUCN for key biodiversity areas (KBAs), Convention on Biological Diversity (CBD) for ecologically or biologically significant areas (EBSAs), and the separate Australian and U.S. NOAA biologically important area (BIA) processes, as identified at the Workshop for the Development of Important Marine Mammal Area (IMMA) Criteria, Marseille, France, October 2013 (Hoyt and Notarbartolo di Sciara 2014).

Specifically, IMMA criteria selection and development were based on:

- (a) the emerging KBA thresholds and evolved criteria as resulting from the Recommendations from the KBA Thresholds Workshop in Rome, Italy, 1-5 Dec 2013, from the IUCN WCPA/SSC Joint Taskforce on Biodiversity and Protected Areas (2013);
- (b) the EBSA criteria as applied to marine mammals at the recent 2014 EBSA workshops (Ardrone *et al.* 2009; CBD 2012, 2014a, b and c);
- (c) 2012 NOAA application of BIA criteria to Known Biologically Important Areas for Cetaceans in Hawaii (NOAA Cetacean Mapping Working Group 2012).

Agenda

Introduction - IMMAs and the draft criteria.

Evidence - Overview of methods used to collate, interpret and present available evidence for test region.

Methods - Developing methods for the robust identification of IMMAs.

Breakout Session 1. Considering identified IMMA areas of interest (AoIs) in light of evidence bases and newly compiled information.

- (a) AoIs based on expert knowledge

- (b) Existing BIA, EBSA and MPA designations used as AoIs

- (c) Considering suitability of draft IMMA criteria

Breakout Session 2. Testing a range of candidate IMMA (cIMMA) nomination examples using standardised IMMA proforma.

- (a) Expert knowledge of IMMA evidence bases

- (b) Evidence bases collated in support of existing BIA, EBSA and MPA designations

- (c) Recommendations on finalizing of IMMA criteria

Overview of workshop results and next steps in IMMA process.

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NOAA Cetacean Mapping Working Group (2012) Known Biologically Important Areas for Cetaceans in Hawaii, Robin Baird of Cascadia Research Collective, with review and revisions contributed by the Cetacean Mapping Working Group members. 48pp.

Concluding Thoughts: Where We Have Been and Where We Go From Here

ICMMPA 3 has built on the momentum of previous conferences, extending the scientific basis for place-based marine mammal conservation. Central to all plenaries was the question: “Are we using MMPAs to their maximum potential?” Related are the questions: “How can MMPAs be best designed, in terms of location, size, scope of management, shape?” “How can we think systematically about networks of MMPAs, or linked MMPAs?” And finally, “Can we do anything beyond MMPAs to enhance conservation of marine mammals, including by designating additional MPAs, working through MSP, embracing and expanding the IMMA tool, or through awareness-raising?”

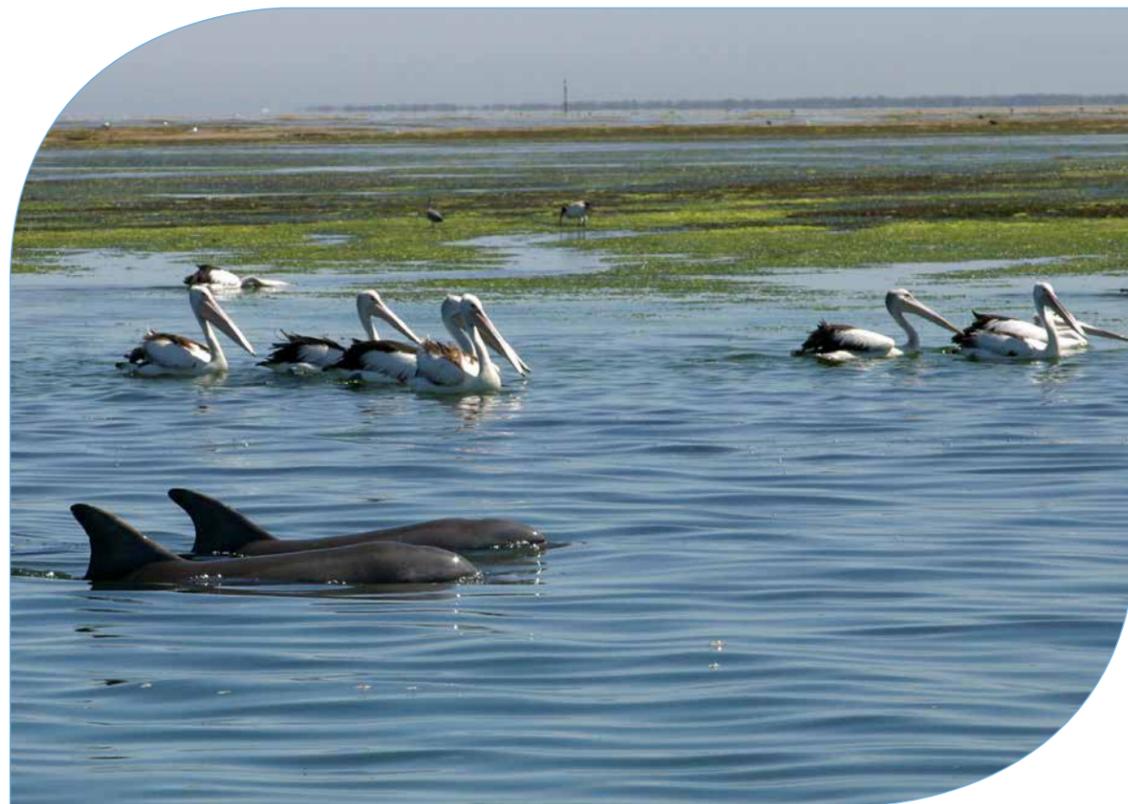
A recurring point made in many of the sessions was the fact that the marine mammal community, and marine mammals themselves, will be well-served by greater awareness of the changing policy landscape, including international efforts to identify important areas (EBSAs, IBAs, and now IMMAs), negotiations to protect the high seas or to manage activities therein, and the burgeoning MSP and ocean zoning happening all around the world.

But we in the ICMMPA community are also asking: “What constrains us from doing better?” The answers which emerged in the panel talks and workshops include lack of political will, lack of resources to plan and manage, lack of standardized scientific information (or lack of information altogether), and lack of agreement on how to move forward. ICMMPA has been instrumental in diminishing the latter constraint, as we have achieved consensus among more and more of the scientific and management community on the utility of MMPAs and the new tool of IMMAs.

There has been much agreement on terms, approaches, tools and the overall importance of spatial management for marine mammal conservation, and we've evolved a common agenda.

The ICMMPA community has come a long way since ICMMPA 1 in Maui. Lessons have been learned, and the body of knowledge has grown immensely. There has been much agreement on terms, approaches, tools and the overall importance of spatial management for marine mammal conservation, and we've evolved a common agenda. We've agreed on the need to move forward in establishing MMPAs, and improve management in existing MPAs, even in data-poor areas. We realize we need to better engage stakeholders, and undertake more training. We need to make information (scientific, citizen science-based, and user information) more accessible to planners, and share the widening knowledge base with the broader public. Finally, we need to find ways to reconcile the myriad and dispersed threats to wide-ranging marine mammals with the fact that the most effective marine management is most often local in nature. If we are able to achieve these things, we will be using MMPAs to their maximum potential, presenting a powerful tool for conserving endangered marine mammals across the globe.

The Adelaide Dolphin Sanctuary was proposed by members of the local community who became concerned about the safety of the dolphins and the quality of their environment.



Bottlenose dolphins and pelicans in the Adelaide Dolphin Sanctuary.
Photo: Mike Bossley, Whale and Dolphin Conservation (WDC).

Public Event: Talks by Tony Flaherty and Erich Hoyt

Hosted by Mike Bossley
10 November 2014, Stamford Grand, Adelaide, Australia

Introducing the Adelaide Dolphin Sanctuary

Tony Flaherty (Coast and Marine, Natural Resources Adelaide & Mt. Lofty Ranges, Australia)

The Adelaide Dolphin Sanctuary (ADS) was established in 2005, under state legislation, to protect the resident population of Indo-Pacific bottlenose dolphins (*Tursiops aduncus*) in the Port River and Barker Inlet area of Adelaide, the capital city of South Australia. The Sanctuary is an area of 118 km² covering the Inner Port, Outer Harbour, North Haven marina, and stretches north to Port Gawler. There are around 30 resident Indo-Pacific bottlenose dolphins within the sanctuary, with about 400 transient dolphins that visit at various times. These dolphins are wild animals and come here to eat, play, socialize and live.

While the dolphins are a wild population, over the years researchers and volunteers have learned to identify them using distinctive dorsal fin patterns. Dolphin identification helps researchers monitor the health of the population.

The Adelaide Dolphin Sanctuary was proposed by members of the local community who became concerned about the safety of the dolphins and the quality of their environment. The Sanctuary faces threats to its mangrove communities, seagrass beds, estuarine riverine system and tidal flats. Potential threats include physical habitat loss through development, pollutants and nutrients; invasion of pest plants and animals; and by the effects of turbidity and sedimentation.

Human activities that impact on the Sanctuary include dredging, boat-generated wave action, anchoring, bait digging, illegal rubbish dumping, human foot traffic, industrial discharges, storm water runoff, construction of wharves and shore reclamation.

“Sanctuary” was a term adopted by the community. In terms of the IUCN Protected Area Management Categories, the ADS probably best fits within the IUCN Category IV — Habitat/Species Management Area. A primary objective is to maintain, conserve and restore species and habitats. There is also a strong focus on public education and appreciation of the dolphins and their habitats within an active urban port environment. The area contains mangroves, seagrass, saltmarsh, tidal flats and creeks. The sanctuary is part of a busy, living, city port. It contains significant major industries like electricity stations; recreational activities like fishing and boating; housing estates; and cultural and historical heritage. Two large cruise boats operate in the harbor’s shipping channel and promote themselves as “dolphin

cruises” and the dolphins are also a focus of a commercial kayak tourism operation. The dolphins are also readily observed by the public from land and recreational vessels.

Widespread consultation showed a strong desire in the community to protect the dolphins leading to the Adelaide Dolphin Sanctuary Act 2005. The ADS Act contains six clearly defined objectives:

- (1) Protect the dolphins from physical harm.
- (2) Maintain, protect and restore key habitat features.
- (3) Improve water quality.
- (4) Ensure the interests of the community are taken into account.
- (5) Promote public awareness of the importance of a healthy environment to the prosperity of the area.
- (6) Promote the principles of ecological sustainable development.

Natural Resources Adelaide and Mt Lofty Ranges is responsible for managing the sanctuary and implementing the ADS Management Plan which sets out how the Government of South Australia intends to achieve the actions identified within the ADS Act. Rangers and other Natural Resources staff patrol the Sanctuary regularly. They have powers under the ADS Act and Marine Mammal Regulations under the state’s National Parks and Wildlife Act 1972.

Of Orcas, Ants and Creatures of the Deep

Erich Hoyt (Critical Habitat/Marine Protected Areas Programme, Whale and Dolphin Conservation and IUCN Marine Mammal Protected Areas Task Force, UK)

I keep these questions on a card pinned above my desk: “What’s the story? What can I learn here that’s new and exciting? Has this story been told before? Is there the chance of carving out some new ground with this? What can I do to help?”

I want to talk about the sparks that led to the writing of my various books — how I obtained the story which in a few cases turned into a 10-year digression (ants, MPAs).

I was always looking for stories and lucky to join in a killer whale expedition in 1973. It was a sailing adventure with no engine,

and we had no experience but when we had a man overboard, put the boat on the rocks, and got caught in the biggest storm of the season, there was the start of a story.

We came to know three families or pods of orcas and began to have experiences with individual orcas — watching predator-prey interactions, resting and playing, finding a rubbing beach and also seeing orcas being captured for aquariums.

When the killer whale habitat was threatened by an ill-planned logging port, it made me think that there was a book here. In *Orca: The Whale Called Killer*, we came to know the orca families so powerful yet social and inspiring in their way of life and now in danger.

After my *Orca* book came out, I researched and wrote *The Whale Watcher's Handbook*. The publishers' idea was a simple guidebook, but looking back to Aristotle, I found that he was a dolphin watcher so I developed it into more of a world guide and put it into the context of human and whale history.

That led to eventually trying to use the commercial value of whale watching to argue against whaling within the IWC. But with the extraordinary growth of the industry in recent years, problems have developed with too many boats in some areas of the world. We need to get back to the original ethic of watching without disturbing — the ethic that bird watchers actively pursue.

Taking a break from whales, I had a fellowship for independent study at the Massachusetts Institute of Technology and Harvard University and spent time trailing around E.O. Wilson in the jungles of Costa Rica. I was fortunate to be on an expedition with Wilson's oldest colleague Bill Brown from Cornell who had first brought Wilson out of the wilds of Alabama to Harvard's Museum of Comparative Zoology. They hadn't been in the field together for 30 years; they let me take down everything that happened including all the jokes, barbs and scientific gossip. And I thought that if you could get down to ant level and see and experience life as an ant experiences it, it could be interesting. But I also wanted to show life from the entomologists' point of view. I thought the dual point of view could make a good story with parallel action. I called it *The Earth Dwellers. Adventures in the Land of Ants*.

I learned a few things from the ant world:

- Ants like whales, like most animals, are identified taxonomically by how many teeth they have, by their mouths, by the business of hunting and eating.
- That you can study entire societies and species in situ. You might have 50 ant species, equivalent to the number of dolphin species in the world, on a single log in the rainforest. Ants unlike whales organize themselves around smells, pheromones, and with 15-20 of these chemical scents, fight or flight and more, the daily business of the entire work force, mediated through the queen, is communicated throughout the colony.

- That entomologists are good writers, not just E.O. Wilson but many others; perhaps it's the attention to detail that comes with working at a microscopic level.

The latter discovery led to working with Ted Schultz from the Smithsonian whom I had met while working on *The Earth Dwellers*. We put together excerpts from scientific and popular literature as well as illustrations, cartoons, and movie scripts that illuminated *Insect Lives*, subtitled "Stories of Mystery and Romance from a Hidden World".

Then came *Creatures of the Deep*, a journey to the bottom of the sea with a blend of biology, geology, ecology, history, and literary scholarship that includes stories of 507-year-old clams and yeti crabs newly named at the hot thermal vents.

We have affinity for whales and dolphins but the acorn worm, or enteropneust (*Yoda purpurata*), which feeds on seafloor sediment and was discovered in 2010 above the Mid-Atlantic Ridge may be our ancestor. The enteropneust shares anatomical features of both invertebrates and vertebrates. Some evolutionary biologists think it may have given rise to the vertebrates.

Through my exposure to the insect worlds, organized by smells, I marveled at the way widely varying groups of animals evolved independently — convergent evolution — to solve the problems of living in different environments, needing to communicate with each other, as well as to hunt and mate in these environments.

The whales use sound from the blue whale's infrasonic song to the ultrasonic calls and echolocation of dolphins. The ants employ smell: about 20 or so scents are used to organize everything going on in a colony.

And in the sea, below the topmost layer, there is no light. You enter this world where the fish and squid have eyes along with light-producing organs all over their bodies called photophores and chromatophores, and they communicate and interact with their world, hunting prey and deceiving both predators and prey with complex bioluminescent light shows. The cast of characters in *Creatures of the Deep* includes a wide range of brightly lit animals, many of them discovered on Census on Marine Life expeditions of the past decade: five new species a day, 2,000 a year, 20,000 a decade.

And for me, getting to know these animals from ants to whales and creatures at the bottom of the sea, and glimpsing their lives, makes me want to protect their habitat, the ecosystem that sustains them, and all of us living on planet Earth.

Brief Reports from the IUCN World Parks Congress Ocean+ Pavilion

Companion Events to ICMMPA 3 organized by ICMMPA 3 Participants

14 November 2014, Sydney, Australia

Putting important marine mammal areas (IMMAs) on the global map

Erich Hoyt (Critical Habitat/Marine Protected Areas Programme, Whale and Dolphin Conservation and IUCN Marine Mammal Protected Areas Task Force, UK) and **Giuseppe Notarbartolo di Sciara** (Tethys Research Institute and IUCN Marine Mammal Protected Areas Task Force, Italy)

This session introduced to the world conservation community the work of the Marine Mammal Protected Areas Task Force to put "important marine mammal areas" (IMMAs) on the world map. The talks by Giuseppe Notarbartolo di Sciara and Erich Hoyt, introduced by Naomi McIntosh, highlighted the contribution of marine mammals in EBSAs, MPAs and as part of MSP, and explained the rationale for developing IMMAs. IMMAs are scientific tools which may lead to MPAs, and will be useful in MSP exercises and in consideration of areas for reducing noise, areas to avoid or take caution for shipstrikes, and areas to monitor in terms of climate change. The presentations focused on various regions of the world ocean to show the effort of identifying IMMAs and linking them functionally into key biodiversity areas (KBAs) and EBSAs. The talks demonstrated a) the importance, political and ecological, of the EBSAs, and how KBAs and IMMAs will support the EBSA process and the attainment of Aichi Target 11; and b) how the Task Force thinks that marine mammal conservation and wider marine ecosystem conservation will be mutually reinforcing. The talks pointed out ways forward, by identifying gaps that obstruct progress and suggesting solutions. An attractive poster map showing EBSAs, marine mammal MPAs and potential IMMAs was distributed to participants, along with copies of the criteria workshop document (both available for download from mmpatf.org).

The IUCN Marine Mammal Protected Areas Task Force work and presentations at the World Parks Congress were supported by the International Committee on Marine Mammal Protected Areas and the Animal Welfare Institute.

For more information about the IUCN MMPATF, see mmpatf.org and http://www.iucn.org/about/work/programmes/species/who_we_are/ssc_specialist_groups_and_red_list_authorities_directory/task_forces/

Connecting marine mammals: MMPAs, a question of network and scale

Christophe Lefebvre (IUCN and Agence des aires marines protégées, France), **Amandine Eynaudi** (Agoa Sanctuary, Agence des aires marines protégées, France and French Antilles) and others

This session was convened by the Agence des aires marines protégées to focus on MMPAs in French territorial waters. The panel discussed the results and recommendations from ICMMPA 3 and celebrated the signature agreement between the Saguenay-St Lawrence Marine Park and the French Antilles Agoa Marine Mammal Sanctuary, as well as the Pelagos action plan and other MMPA topics.

Regional MPA Networks: Seascapes and Ecologically Important Areas

Convened by MedPAN and NOAA, with **Erich Hoyt**, **Giuseppe Notarbartolo di Sciara**, and others

This session examined the role of regional MPA human networks in meeting the Aichi targets and the role of ecological networks of MPAs in contributing to the MSP process. The key concepts addressed during this exchange covered:

- how regional networks contribute to meeting the Aichi targets,
- moving from EBSAs to MPAs,
- the value of the new tool of important marine mammal areas to enhance EBSAs, MPAs and MPA networks,
- how the seascape approach relates to MPA networks and supports overall conservation planning, and
- the lessons learned from regional MPA network development and future challenges and opportunities for regional MPA networks.

Steering and Program Committee, International Committee on Marine Mammal Protected Areas – ICMMPA

Tundi Agardy (USA), Executive Director, Sound Seas; Director, Marine Ecosystem Services (MARES) Program, Forest Trends; author *Ocean Zoning: Making Marine Management More Effective*

Brad Barr (USA), NOAA Office of National Marine Sanctuaries

Arne Bjørge (Norway), Senior Scientist, Institute of Marine Research, University of Oslo; International Whaling Commission Scientific Committee

Mike Bossley (Australia), Science and Education, Whale and Dolphin Conservation Australasia

Douglas DeMaster (USA), Director of NOAA/AFSC, U.S. Deputy Commissioner to the IWC

Mike Donoghue (Samoa/New Zealand), Threatened and Migratory Species, Secretariat of the Pacific Regional Environment Programme – SPREP

Amandine Eynaudi (France), International Relations, Agence des aires marines protégées (French MPA Agency) and Manager, Agoa Sanctuary, French Antilles

Scott Gende (USA), Coastal Ecologist, National Park Service, Glacier Bay National Park, Alaska

Erich Hoyt (England, UK), Head, Global MPA Programme, Whale and Dolphin Conservation Society; co-chair, IUCN SSC-WCPA Marine Mammal Protected Areas Task Force; Author, *Marine Protected Areas for Whales, Dolphins and Porpoises*

Miguel Iñiguez (Argentina), Fundación Cethus; Whale and Dolphin Conservation Latin America

Michiko Martin (USA), Director, Conservation Education, U.S. Forest Service; formerly Education, Outreach & New Media Chief, NOAA-ONMS

David Mattila (USA), Technical Adviser, Human Impact Reduction, Secretariat, International Whaling Commission

Naomi McIntosh (USA), NOAA, Office of National Marine Sanctuaries, Pacific Region; chair, ICMMPA

Giuseppe Notarbartolo di Sciarra (Italy), President, Tethys Research Institute; Deputy Chair, IUCN/SSC Cetacean Specialist Group; co-chair, IUCN SSC-WCPA Marine Mammal Protected Areas Task Force

José Truda Palazzo, Jr. (Brazil), Truda Palazzo & Associates

Oscar Ramírez Flores (México), Director, Comisión Nacional de Áreas Naturales Protegidas (CONANP)

Vincent Ridoux (France), Centre de Recherche sur les Mammifères Marins, Université de La Rochelle-CNRS; IWC Scientific Committee

Lorenzo Rojas-Bracho (México), Instituto Nacional de Ecología – INE; IWC Scientific Committee

Lisa Van Atta (USA), North Central Coast Office Supervisor, NOAA Fisheries West Coast Region

Background on ICMMPA

In 2006, the International Committee on Marine Mammal Protected Areas (ICMMPA) (pronounced eye-COM-pa) was established as an informal group of international experts dedicated to the conservation of marine mammals and their habitats. Members of the Committee represent various geographic regions, as well as a wide range of expertise within the fields of marine mammal biology, ecology and the design and management of marine protected areas and other marine planning initiatives. Members include scientists, managers, representatives of government agencies and NGOs.

Since its founding in 2006, the Committee has worked to promote marine mammal conservation through marine protected areas and other area-based management measures, informed by the best available science and to provide a mechanism by which the “community of practice” — comprised of managers, natural and social scientists, decision makers, and other stakeholders — could collaborate, share information and experiences, and disseminate knowledge and tools for establishing, monitoring, and managing MPAs. The primary activity of the Committee has been organizing periodic MMPA conferences. The three conferences to date have been held in Maui, Hawaii (2009), Fort de France, Martinique in the Caribbean (2011) and the latest in Adelaide, Australia in November 2014.

Critical habitats for marine mammals range from the tropics to the poles, extending from shallow river and estuarine areas, coastal caves, rocky islets, ice cap areas and the high seas. Despite this wide range of habitats, the threats to the vital activities of marine mammals are often remarkably similar including commercial fishing, resource extraction activities such as oil and gas, commercial shipping, and water and noise pollution. The application of marine protected areas (MPAs) as an effective conservation tool for marine mammals has been demonstrated in a number of areas. Worldwide, at least 700 marine and land-based protected areas (MPAs and PAs for marine mammals which we call MMPAs) have been specifically designated for, or contain populations of, marine mammals. Yet MMPAs often fall short of their mandate and considering the breadth of the ocean, they are poorly represented in the waters of most countries and on the high seas.

Organization and contacts

ORGANIZERS

International Committee on Marine Mammal Protected Areas

Whale and Dolphin Conservation



CONTACT

Naomi McIntosh, Chair, International Committee on Marine Mammal Protected Areas

c/o NOAA Office of National Marine Sanctuaries Pacific Islands Region
1845 Wasp Boulevard, Bldg. 176, Honolulu, Hawaii 96818, USA

Email: naomi.mcintosh@noaa.gov

Web: <http://icmmpa.org>

Acronyms

ABNJ – areas beyond national jurisdiction

ACCOBAMS – Agreement on the Conservation of Cetaceans in the Black Sea, Mediterranean Sea and contiguous Atlantic area (CMS)

Aols – areas of interest (related to IMMAs)

ASCOBANS – Agreement on the Conservation of Small Cetaceans in the Baltic, North East Atlantic, Irish and North Seas (CMS)

BIA – biologically important area (used in Australia and USA)

CBD – Convention on Biological Diversity

CIEL – Center for International Environmental Law

cIMMAs – candidate IMMAs

CMS – Convention on Migratory Species (abbreviated name)

EBM – ecosystem-based management, or ecosystem management

EBSA – ecologically or biologically significant area (under CBD)

EEZ – exclusive economic zone

ICMMPA – International Committee on Marine Mammal Protected Areas (ICMMPA) (pronounced eye-COM-pa) and International Conference on Marine Mammal Protected Areas when used with a number indicating the conference, such as ICMMPA 1, ICMMPA 2, ICMMPA 3 and ICMMPA 4.

IMMA – important marine mammal area

IMO – International Maritime Organisation

ISA – International Seabed Authority

IUCN – International Union for Conservation of Nature

IWC – International Whaling Commission

KBA – key biodiversity area (IUCN)

LMMPA – large marine mammal protected area

MMPA – marine mammal protected area

MMPATF – Marine Mammal Protected Areas Task Force

MPA – marine protected area

MSP – marine spatial planning

NGO – non-governmental organization

PA – protected area

PSSA – particularly sensitive sea area (IMO)

RAC-SPA – Regional Activity Centre for Specially Protected Areas (Barcelona Convention)

RSCs – Regional Seas Conventions

RFMOs – regional fisheries management organizations

SPAMIs – Specially Protected Areas of Mediterranean Importance

SSC – Species Survival Commission (IUCN)

UNCLOS – United Nations Convention on the Law of the Sea

UNEP – United Nations Environment Program

WCPA – World Commission on Protected Areas (IUCN)

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**PROCEEDINGS OF THE
THIRD INTERNATIONAL CONFERENCE
ON MARINE MAMMAL PROTECTED AREAS
ICMMPA 3**

Important Marine Mammal Areas — A Sense of Place, A Question of Size

November 9 – 11, 2011

Adelaide, Australia

<http://icmmpa.org>



**INTERNATIONAL COMMITTEE
ON MARINE MAMMAL PROTECTED AREAS**