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The Director  
Division for Ocean Affairs  
and the Law of the Sea  
Office of Legal Affairs  
United Nations  
New York, NY 10017

Reference: LOS/SG report/2013

Dear Sir,

I am writing in response to a letter of 12 December 2012 from the Assistant Secretary-General in charge of the Office of Legal Affairs of the United Nations inviting IUCN the International Union for Conservation of Nature to provide information relevant to the Informal Consultative Process and the topic entitled “Impacts of ocean acidification on the marine environment”. In response to this invitation, IUCN provides the following information:

**Summary:**

Ocean acidification – a direct consequence of increased human induced carbon dioxide (CO<sub>2</sub>) concentrations in the atmosphere – is a threat to the integrity and diversity of the ocean and the sustainable management, conservation and equitable use of natural marine resources.

IUCN’s members are deeply concerned about ocean acidification and have adopted resolutions that reference this concern. In a resolution urging implementation of Aichi Target 12 of the Strategic Plan for Biodiversity 2011–2020 our members called “on the scientific community to conduct research on threats that cannot currently be controlled in the wild, such as...ocean acidification, to develop practical management options to mitigate their impact on threatened species, to enable them to survive in viable populations while the long-term drivers of loss (such rising CO<sub>2</sub> levels) are brought under control.”

IUCN works to link science with policy advisors and decision makers. To this end, IUCN has raised awareness of ocean acidification and provided information to stimulate discussion aimed to develop solutions to address ocean acidification. IUCN has participated in a number of fora to this end, drawing the attention of the United Nations General Assembly to the threat that ocean acidification represents to sustainable development in statements and providing information at relevant meetings, including the UNFCCC Conferences of the Parties (COPs). The Chair of the IUCN World Commission on Protected Areas-marine also chairs the International Ocean Acidification Reference User Group (iOA-RUG), which builds on successful work through the European Project on Ocean Acidification (EPOCA) project. The results from relevant research efforts have been presented to the non-scientific community to inform about the risks and solutions to ocean acidification.

IUCN has been involved with relevant recent publications to include:

- “Ocean acidification - the knowledge base 2012”, provides an overview of major scientific studies underway or in advanced stages of planning, available at <http://www.epoca-project.eu/index.php/what-do-we-do/outreach/rug/ocean-acidification-the-knowledge-base-2012.html> in English, French, Spanish, Portuguese and German;
- “Ocean acidification - acting on evidence” is available at <http://www.epoca-project.eu/index.php/what-do-we-do/outreach/rug/oa-aoe.html> in English and Portuguese;
- “Ocean acidification - questions answered” is available at <http://www.epoca-project.eu/index.php/what-do-we-do/outreach/rug/oa-questions-answered.html> in English, French, Spanish, Arabic, Chinese and German;
- “Ocean acidification - the facts” is available at <http://www.epoca-project.eu/index.php/what-do-we-do/outreach/rug/oa-the-facts.html> in English, French, Spanish, Arabic and Chinese;
- “Updating what we know about ocean acidification and key global challenges”, available at [http://www.iucn.org/about/work/programmes/marine/marine\\_our\\_work/climate\\_change/publications.cfm?11147/Updating-what-we-know-about-ocean-acidification-and-key-global-challenges](http://www.iucn.org/about/work/programmes/marine/marine_our_work/climate_change/publications.cfm?11147/Updating-what-we-know-about-ocean-acidification-and-key-global-challenges) in English, French, Spanish, Portuguese and German;
- “Ocean acidification - Making it clear”, available at <http://data.iucn.org/dbtw-wpd/edocs/2010-058.pdf> in English, French, Spanish, Arabic and Chinese;
- “The Ocean and Climate Change: Tools and Guidelines for Action”, available at [http://www.iucn.org/about/work/programmes/marine/marine\\_our\\_work/climate\\_change/publications.cfm?4269/oceanandclimatechange](http://www.iucn.org/about/work/programmes/marine/marine_our_work/climate_change/publications.cfm?4269/oceanandclimatechange) ;
- “Mediterranean Seagrass Meadows: Resilience and Contribution to Climate Change Mitigation, A Short Summary”, available at <http://data.iucn.org/dbtw-wpd/edocs/2012-005-EnFr.pdf> in an English/French bilingual report.

### **Background:**

Ocean acidification – a direct consequence of increased human induced carbon dioxide (CO<sub>2</sub>) concentrations in the atmosphere – is a threat to the integrity and diversity of the ocean and the sustainable management, conservation and equitable use of natural marine resources. The ocean absorbs around 25% of total human emissions to the atmosphere each year, leading to acidification at a rate exceeding any known to have occurred for the past 65 million years. Since the industrial revolution, the acidity of the surface ocean has increased by 30%. This rapid acidification rate jeopardizes the health of ocean species and ecosystems.

Ocean acidification affects the formation and dissolution of calcium carbonate shells and skeletons in a range of marine species, including corals, mollusks such as oysters and mussels, and many phytoplankton and zooplankton species that form the base of marine food webs. Ocean acidification can also induce changes in species growth and reproduction, including fish, as well as structural and functional alterations in ecosystems. This may threaten food security by harming fishing industries. In addition, reducing the health of coral reefs will increase the risk of inundation and erosion in low-lying areas by weakening natural shoreline protection, hence increasing the vulnerability of local livelihoods. Ocean acidification adds to already existing pressures such as unsustainable fishing practices, pollution and rising sea water temperatures. Combined, this threatens marine and coastal ecosystem resilience and hence the ability of both humans and natural systems to adapt to ongoing changes.

### **Information regarding the activities currently undertaken related to the impacts of ocean acidification on the marine environment:**

IUCN's members are deeply concerned about the potential harmful effects of ocean acidification on the world's oceans. At the most recent World Conservation Congress, held in Jeju, Republic of Korea in September 2012 four resolutions were adopted by our members that referenced ocean acidification. In a resolution urging implementation of Aichi Target 12 of the Strategic Plan for Biodiversity 2011–2020 our members called “on the scientific community to conduct research on threats that cannot currently be controlled in the wild, such as...ocean acidification, to develop practical management options to mitigate their impact on threatened species, to enable them to survive in viable populations while the long-term drivers of loss (such rising CO<sub>2</sub> levels) are brought under control.” At the World Conservation Congress in Barcelona in 2008 two resolutions made reference to ocean acidification, thus ocean acidification has been of concern to our members for some years.

IUCN works to bridge the space between sound science and end-users, including policy advisors and decision makers, by raising awareness of ocean acidification; informing on present and projected impacts and creating a broad dialogue needed to develop necessary solutions to address ocean acidification.

- IUCN has repeatedly drawn the attention of the United Nations General Assembly to the threat that ocean acidification represents to sustainable development in its statements to the General Assembly from 2009 to the present during the annual debate on Oceans and Law of the Sea.
- IUCN participated in the Expert Panel Discussion on the theme "Our oceans, our responsibility" to mark the first observance by the United Nations of World Oceans Day on 8 June 2009 and noted with regret that ocean acidification did not appear at that time to be a subject on the agenda of United Nations Framework Convention on Climate Change (UNFCCC) talks.
- At the invitation of the United Nations Foundation with the Department of Economic and Social Affairs and the Office of Legal Affairs, Division for Ocean Affairs and the Law of the Sea IUCN was honored to participate in a lunch and expert panel on Ocean Acidification to raise awareness and highlight options to avoid adverse impacts on marine life and ecosystems on 3 September 2009. IUCN drew attention to harmful effects that ocean acidification will have on organisms that fix calcium and carbonate, but also noted potential other harms to include the threat that acidifying oceans are likely to conduct noise more effectively, thus further interfering with marine life that depends on sound to communicate. It is also feared that acidifying oceans will cause the blood of some marine organisms to acidify, thus affecting its ability to carry oxygen.
- IUCN held and participated in side-events at relevant meetings, including the UNFCCC Conferences of the Parties (COPs). For example, in December 2008 IUCN published a briefing paper entitled “Ocean Acidification: Seas turning sour” for information at the UNFCCC COP. The paper noted the threat to corals, calcareous benthic invertebrates and planktonic calcifiers and thus to marine ecosystems and fisheries. In 2010 IUCN organized a panel at a UNFCCC COP 16 side-event on ‘Taking action on Ocean Acidification: opportunities under UNFCCC’.
- The Chair of the IUCN World Commission on Protected Areas-marine also chairs the International Ocean Acidification Reference User Group (iOA-RUG), which builds on the great

success of the RUG initiated through the European Project on Ocean Acidification (EPOCA) project. The results from relevant research efforts have been presented to the non-scientific community (governments, business leaders, and the general public) to inform about the risks and solutions to ocean acidification. Relevant publications include:

- “Ocean acidification - the knowledge base 2012”, provides an overview of major scientific studies underway or in advanced stages of planning, available at <http://www.epoca-project.eu/index.php/what-do-we-do/outreach/rug/ocean-acidification-the-knowledge-base-2012.html> in English, French, Spanish, Portuguese and German;
- “Ocean acidification - acting on evidence” is available at <http://www.epoca-project.eu/index.php/what-do-we-do/outreach/rug/oa-aoe.html> in English and Portuguese;
- “Ocean acidification - questions answered” is available at <http://www.epoca-project.eu/index.php/what-do-we-do/outreach/rug/oa-questions-answered.html> in English, French, Spanish, Arabic, Chinese and German;
- “Ocean acidification - the facts” is available at <http://www.epoca-project.eu/index.php/what-do-we-do/outreach/rug/oa-the-facts.html> in English, French, Spanish, Arabic and Chinese<sup>1</sup>.
- IUCN has made publicly available several documents done in collaboration with others to inform the public and policy makers, including:
  - “Updating what we know about ocean acidification and key global challenges”, available at [http://www.iucn.org/about/work/programmes/marine/marine\\_our\\_work/climate\\_change/publications.cfm?11147/Updating-what-we-know-about-ocean-acidification-and-key-global-challenges](http://www.iucn.org/about/work/programmes/marine/marine_our_work/climate_change/publications.cfm?11147/Updating-what-we-know-about-ocean-acidification-and-key-global-challenges) in English, French, Spanish, Portuguese and German;
  - “Ocean acidification - Making it clear”, available at <http://data.iucn.org/dbtw-wpd/edocs/2010-058.pdf> in English, French, Spanish, Arabic and Chinese;
  - “Ocean Acidification: The Facts”, see above and also available at [http://www.iucn.org/about/work/programmes/marine/marine\\_our\\_work/climate\\_change/publications.cfm?4338/oceanacidificationenglish](http://www.iucn.org/about/work/programmes/marine/marine_our_work/climate_change/publications.cfm?4338/oceanacidificationenglish) in English, Spanish, Arabic and Chinese;
  - “The Ocean and Climate Change: Tools and Guidelines for Action”, available at [http://www.iucn.org/about/work/programmes/marine/marine\\_our\\_work/climate\\_change/publications.cfm?4269/oceanandclimatechange](http://www.iucn.org/about/work/programmes/marine/marine_our_work/climate_change/publications.cfm?4269/oceanandclimatechange) ;
  - “Mediterranean Seagrass Meadows: Resilience and Contribution to Climate Change Mitigation, A Short Summary”, available at <http://data.iucn.org/dbtw-wpd/edocs/2012-005-EnFr.pdf> in an English/French bilingual report.

**Matters which may require further consideration on this issue, with an emphasis on areas where coordination and cooperation at the intergovernmental and inter-agency levels could be enhanced.**

*United Nations General Assembly*

IUCN was gratified that in “The Future We Want” World Leaders and as endorsed by the General Assembly supported initiatives to address ocean acidification and the impacts of climate change on marine and coastal ecosystems and resources. Further work will be urgently required to this end, including through efforts to prevent further ocean acidification, to enhance the resilience of marine ecosystems and of the communities whose livelihoods depend on them, and to support marine scientific research, monitoring and observation of ocean acidification and particularly vulnerable ecosystems.

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<sup>1</sup> See <http://www.epoca-project.eu/index.php/what-do-we-do/outreach/rug.html>

IUCN notes that General Assembly working groups, such as the Ad Hoc Open-ended Informal Working Group to study issues relating to the conservation and sustainable use of marine biological diversity beyond areas of national jurisdiction, could provide a venue to also consider the effects of ocean acidification on marine biological diversity. The First Global Integrated Marine Assessment of the Regular Process for Global Reporting and Assessment of the State of the Marine Environment, including Socioeconomic Aspects could also provide information on ocean acidification and its effects on the marine environment, including socioeconomic aspects.

*UNFCCC - Ocean Acidification and Climate Change*

Ocean acidification is a direct consequence of anthropogenic carbon dioxide emissions. Increased ocean acidification will reduce the ability of the ocean to further absorb carbon dioxide, acting as a climate change feedback, and decreases the important role of the ocean to buffer climate change. To combat the most severe effects of ocean acidification, carbon dioxide emissions must be significantly and immediately cut at the source which would also help to mitigate the effects of climate change. Climate change and ocean acidification are linked by a common driver and common solutions.

*Other relevant policy fora*

Currently there would appear to be an accountability gap in international environmental law through diffused responsibilities, legal uncertainties, policy inconsistencies and externalities. Policy coordination for addressing ocean acidification among relevant bodies, conventions and policy processes, to include the United Nations General Assembly and entities established under the United Nations Environment Programme, the United Nations Framework Convention on Climate Change, the Convention on Biological Diversity, the International Maritime Organization, the World Meteorological Organization, the International Civil Aviation Organization, the London Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter 1972 and 1996 Protocol Thereto and the United Nations Educational, Scientific and Cultural Organization's Intergovernmental Oceanographic Commission is needed.

*National level coordination and coherence*

Many national climate change mitigation and adaptation strategies as well as natural resource management policies and practices do not adequately integrate ocean acidification and its effects into their plans and activities. Consistent with implementing the provisions of the UNFCCC and other international commitments, these strategies and policies should take full account of the threat posed by ocean acidification to biodiversity and coastal livelihoods.

Thank you very much for this opportunity to provide this information.

Sincerely yours,

Harlan Cohen