SPREP
Secretariat of the Pacific Regional Environment Programme

PO Box 240, Apia, Samoa
E: sprep@sprep.org
T: +685 21929
F: +685 20231
W: www.sprep.org

Natural Solutions for Island Resilience

The Pacific environment, sustaining our livelihoods and natural heritage in harmony with our cultures.

Twenty Fifth SPREP Meeting of Officials

Majuro, Marshall Islands
30 September – 2 October 20014

Agenda Item 11.1: **Items Proposed by Members:**

Ocean Acidification – Update on international efforts to address ocean acidification

(Paper presented by the United States of America)

Government of the United States of America

Background Paper

Purpose of Paper

1. The purpose of this paper is to inform SPREP Members about global efforts to understand and monitor increasing ocean acidification and to mitigate and adapt to its impacts. The paper offers an introduction to the challenges that ocean acidification presents and suggests opportunities for SPREP Member participation and involvement in efforts to address those challenges.

Background

2. The ocean regulates our climate and our weather and is essential for cycling water, carbon, and nutrients. Since the start of the Industrial Revolution, the ocean has absorbed nearly 30 percent of human-generated carbon dioxide from the atmosphere. As ocean water absorbs carbon dioxide, it becomes more acidic. Since the beginning of the Industrial Revolution, the ocean has become approximately 30 percent more acidic, a trend that is projected to continue[1]. This rapid rate of carbon dioxide uptake means that the chemistry of the ocean is changing 10 times faster than at any other time in the past 50 million years.

3. Such a rapid change in ocean chemistry has already had and will continue to have broad and significant impacts on marine ecosystems, the services they provide, and the coastal economies that depend on them. Calcium carbonate is a skeletal component of a wide variety of organisms in the ocean. Ocean acidification has the potential to undermine dramatically the growth, behavior, and survival of numerous marine organisms with calcium carbonate skeletons and shells, including oysters, clams, urchins, corals, and calcareous plankton. The chemical changes to the balance of carbonate in the ocean, as a result of acidification, make it more difficult for these living things to form and maintain calcium carbonate shells and skeletal components[2]. This, in turn, could put the marine food web at risk.

4. The changes brought about by ocean acidification also increase the erosion of coral reefs, resulting in alterations in marine ecosystems that will become more severe as present-day trends in acidification continue or accelerate. Tropical corals are particularly susceptible to the combination of ocean acidification and ocean warming, which could threaten the rich and biologically diverse coral reef habitats.

5. Polar ocean waters are also particularly prone to acidification because of colder water temperatures and lower salt content, which enable more carbon dioxide to dissolve into seawater, leading to greater acidification.

[1] "The Challenge of Ocean Acidification." (Office of Science and Technology Policy, The White House, June 2014. <http://www.whitehouse.gov/sites/default/files/microsites/ostp/the_challenge_of_ocean_acidification_june-2014.pdf>.
[2] "The Challenge of Ocean Acidification." (Office of Science and Technology Policy, The White House, June 2014. <http://www.whitehouse.gov/sites/default/files/microsites/ostp/the_challenge_of_ocean_acidification_june-2014.pdf>.

6. Despite recent efforts to elevate awareness and increase international collaboration on ocean acidification research and observations, much more is required to understand the process of ocean acidification and its impacts. The impacts of ocean acidification on most marine organisms remain unknown. Small Island Developing States, including those in the Pacific, could be vulnerable to impacts of ocean acidification on fisheries and coral reefs. Many regions of the world lack monitoring instrumentation and trained personnel to collect the data required to understand this growing problem. In addition, the general public in most nations has little awareness of ocean acidification. Most significantly, the international community has yet to take enough action to reduce the root cause of ocean acidification – carbon dioxide emissions.

7. The fast pace of increasing acidification demands attention. The first steps involve monitoring acidity levels and conducting research to understand how marine organisms respond to ocean acidification and how their physiology responds to other stressors in the ocean environment. The international community is working together to advance common goals on ocean acidification that include expanding the Global Ocean Acidification Observing Network (GOA-ON) and coordinating international activities and dialogues through the Ocean Acidification International Coordination Center (OA-ICC) hosted by the International Atomic Energy Agency (IAEA) in Monaco.

8. The Global Ocean Acidification Observing Network is a collaborative international approach to document the status and progress of ocean acidification in open-ocean, coastal, and estuarine environments; to understand the drivers and impacts of ocean acidification on marine ecosystems; and to provide spatially- and temporally- resolved biogeochemical data necessary to optimize modeling for ocean acidification. The United States and the United Kingdom co-chair the GOA-ON, and countries are encouraged to join the network to contribute expertise and data, deploy instrumentation, and/or participate in the governance process.

9. The Ocean Acidification International Coordination Center works to promote, facilitate and communicate global activities on ocean acidification that include training sessions for students and scientists on ocean acidification, mentoring networks to strengthen capacity-building, and opportunities for international cooperation on experiments about ocean acidification[3]. The establishment of an international coordination platform on ocean acidification was suggested by the SOLAS-IMBER (Surface Ocean - Atmosphere Study and Integrated Marine Biogeochemistry and Ecosystem Research) Ocean Acidification Working Group and the international Ocean Acidification Reference User Group. In response to this recommendation, the IAEA announced at the June 2012 Rio+20 UN Conference on Sustainable Development the launch of the OA-ICC, operated by the IAEA Environment Laboratories in Monaco beginning in July 2012. The OA-ICC is supported by several IAEA Member States through the IAEA Peaceful Uses Initiative (PUI). In-kind and cash support to date totals more than US$2 million.

[3] "International Atomic Energy Agency (IAEA)." IAEA: OA-ICC. International Atomic Energy Association, n.d. Web. 29 July 2014. <http://www.iaea.org/ocean-acidification/page.php?page=2193>.

10. Policymakers, ocean scientists, thought leaders, entrepreneurs, environmentalists, and philanthropists from nearly 90 countries – as well as viewers from around the world – joined U.S. Secretary of State John Kerry for the June 16-17, 2014 "Our Ocean" Conference. Held in Washington, D.C., the conference included a panel discussion on ocean acidification, during which Ove Hoegh-Guldberg from the University of Queensland and Carol Turley from the Plymouth Marine Laboratory presented on the science behind ocean acidification. Alexis Valauri-Orton, a Thomas J. Watson Fellow, described her experiences in Norway, Hong Kong, Thailand, New Zealand, the Cook Islands, and Peru, where she learned that there is a general lack of understanding about ocean acidification around the world. Bill Dewey of Taylor Shellfish Farms, Yimnang Golbuu of the Palau International Coral Reef Center, and Phil Williamson from the UK Natural Environment Research Council also presented on potential innovative solutions to ocean acidification challenges. The panel was well-received as an effort to incorporate ocean acidification as a prominent topic in international ocean-related dialogues. Dr. Carol Turley pinpointed the main purpose of the panel: to urge all countries and populations to contribute to efforts to prevent ocean acidification.

11. The outcomes of the Our Ocean Conference included an Action Plan that the United States Government intends to undertake domestically and to pursue with other nations and stakeholders at the international level. Included in the Action Plan are two actions related to ocean acidification:

1. Stem the increase in ocean acidification by reducing carbon emissions, including in the context of a new agreement that will be applicable to all under the United Nations Framework Convention on Climate Change.
2. Create worldwide capability to monitor ocean acidification: Achieve worldwide coverage of the Global Ocean Acidification Observing Network and significantly increase the number of trained monitors and managers by 2020.

12. As follow-up to the Our Ocean Conference, the U.S. Government intends to advance these actions by engaging bilaterally and multilaterally with other governments and in key international meetings, including and in addition to the SPREP Annual Meeting (September 30-October 2), the Pacific Islands Forum (July 29-August 1), the APEC Ocean-related Ministerial Meeting (August 27-28), the Small Island Developing States High-Level Meeting (September 1-4), Regional Fisheries Management Organization Meetings (as appropriate), the United Nations Post-2015 Development Goals process, and at other UN fora.

13. A number of efforts to build scientific and industry partnerships to tackle the challenge of ocean acidification have already been initiated in the Pacific region. In December 2013, the United States Embassy in Wellington co-sponsored a workshop with the New Zealand Government that enabled experts from the United States to share lessons learned on ocean acidification in the Pacific Northwest with counterparts in New Zealand. Ocean acidification has implications for both United States and New Zealand shellfish aquaculture and the economy.

14. The United States and New Zealand are also leading ocean acidification efforts at international and national levels. One year ago, both Nations were represented as panelists at the 14th Meeting of the UN Open-ended Informal Consultative Process on Oceans and the Law of the Sea. Panelists from all over the world, including Monaco, Palau, , Singapore, Sri Lanka Thailand, , the United Kingdom, the United States, Vietnam, spoke about the impacts of ocean acidification on coastal and open ocean waters and the ecosystems found there.

15. In partnership with SPREP, the United States and New Zealand are jointly organizing and funding "An International Workshop on Ocean Acidification: Considerations for Small Island Developing States (SIDS)," to be held August 28-29, in Apia as an official parallel event to the September 1-4 Small Island Developing States (SIDS) Conference in Samoa. It is an invited workshop to build capacity and help catalyze and leverage existing and new resources, networks, and partnerships within and among regional, national and international levels to address ocean acidification issues for SIDS. The workshop will bring together technical and policy experts with frontline experience in ocean observing, and seek ways to address the impacts of ocean acidification through identification of requirements for globally-integrated baseline observation and monitoring for SIDS, as well as regionally-relevant, practical adaptation measures. The goal of the workshop is to identify emerging best practices applicable to SIDS, as speakers and participants share adaptation and monitoring experiences and develop a network for experts to disseminate this critical information across all SIDS regions. Details about outcomes of this event will be provided at the SPREP meeting.

16. The [draft] report findings of the Mid-Term Review of the SPREP Strategic Plan 2011-2015 indicate there are opportunities for SPREP to work with partners in the area of ocean acidification. The report also highlights that ocean acidification links with SPREP's expertise and current areas of emphasis.

Recommendations

17. The meeting is invited to:

- **note** the forward progress of the international community on raising awareness about ocean acidification;
- **urge** SPREP and Member countries to support international ocean acidification monitoring networks; and
- **encourage** SPREP and Member countries to explore opportunities to pursue the recommendations and actions arising from the workshop on ocean acidification that took place as a parallel event to the September 2014 Small Island Developing States Conference in Samoa.

---

14 August 2014