



Asia-Pacific  
Economic Cooperation

# APEC Marine Sustainable Development Report

APEC Ocean and Fisheries Working Group  
August 2014



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Economic Cooperation**

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The part 1 of this report is written by the core expert group and their supporting teams, reviewed by all the APEC economies and endorsed by the 3rd OFWG meeting in May, 2014, Qingdao. Part 2 of this report is submitted by the APEC economies on a voluntary basis.

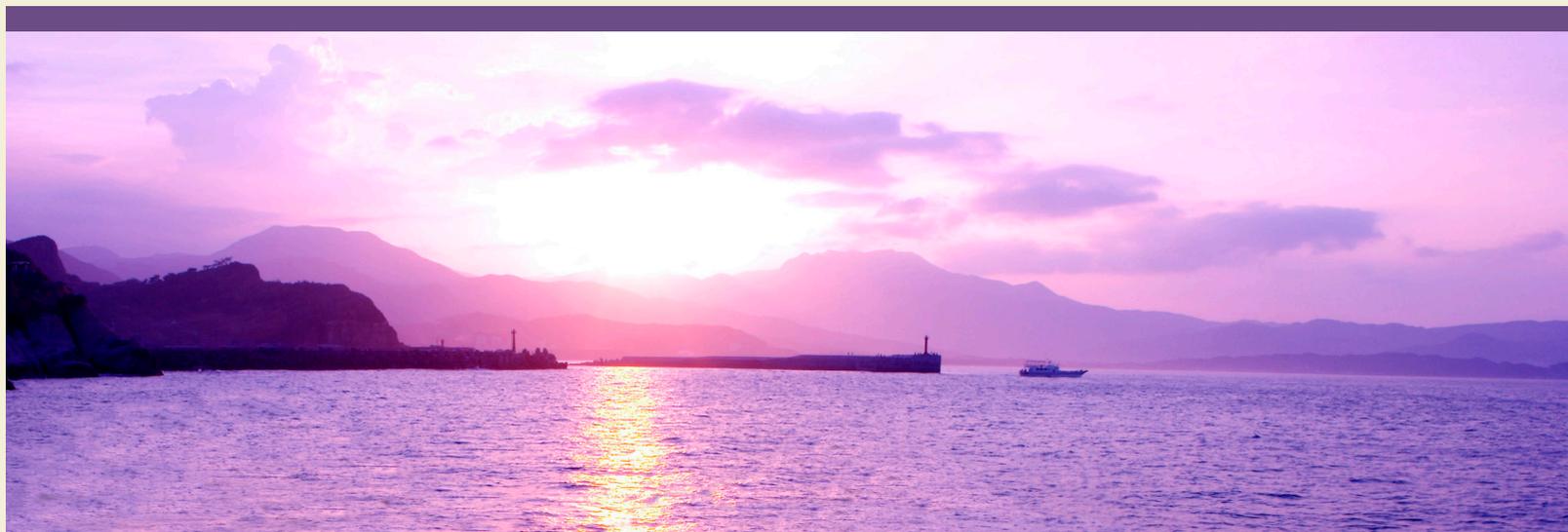
The report is coordinated by APEC Marine Sustainable Development Center.



**Asia-Pacific  
Economic Cooperation**

# **APEC Marine Sustainable Development Report (Part 1)**

## **General Report**



# **Part 1**

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# Executive Summary

The report is the first APEC report on marine sustainable development, and aims to provide a comprehensive overview of the current status of marine sustainable development in APEC as well as review the progress made so far, and the related challenges. As the first APEC Marine Sustainable Development Report, it provides an opportunity for the Ocean and Fisheries Working Group (OFWG) and participating economies to reflect on and share experiences in this important area. The report could also lay the foundation for future collective efforts to improve systematic and detailed evaluation of marine sustainable development, including marine ecosystem and relevant fisheries resources, blue economy, disaster resilience and other environmental, social and economic aspects that APEC economies consider important.

## Importance of the ocean to sustainable development

The 21 APEC economies are linked by the Pacific Ocean, the largest ocean in the world, which is endowed with rich resources and from which the economies gain high value, including both economic and “non-market” benefits. Healthy oceans and coasts are critical for food security, poverty eradication, sustainable and equitable economic growth, as well as preserving traditional culture and promoting trade in APEC.

**Providing for sustained economic benefits.** In most coastal economies, coastal areas are much more developed than inland areas. Over 30% of the GDP in USA originates from coastal areas. China’s coastal provinces contributed more than 60% of domestic GDP in 2012. Marine ecosystems are an important source of economic benefits, mostly deriving from fisheries, energy, tourism, and shipping and transportation.

**Enabling contributions of fisheries resources to food security and local livelihoods.** Fish production of the Pacific accounted for about 60% of the global total. The Pacific’s rich fishery resources supply high-quality food to people in Asia-Pacific and provide livelihoods to millions of its residents. Since the 1960s, most parts of Asia experienced a 100%–200% increase in per capita fish consumption. Fisheries and aquaculture also provide numerous direct and ancillary jobs.



**Securing sustainable development of coastal communities.** Many metropolises are located near coasts in the Asia-Pacific region. In the Pacific islands, more than 50% of the population lives within 1.5 kilometers of coasts that are among the most vulnerable to changing climate and ocean and coastal degradation. Healthy oceans and coastal ecosystems provide important ecological services such as sustaining the living environment and protecting communities from natural hazards in APEC.

### **Progress of marine sustainable development in APEC economies**

In recent years, APEC has implemented a series of initiatives to enhance and promote the understanding of marine sustainable development. APEC economies have also independently developed effective, practical and holistic policies, plans and actions to realize the economic potential of ocean resources, as well as to ensure that these resources and opportunities are available for future generations.

**Ocean sectors contributing to APEC economies.** It is estimated that ocean industries contribute an average 8% of the GNP of APEC economies. Fisheries and aquaculture, shipping and transportation, coastal tourism and marine energy are all major marine industries in APEC economies. Among these industries, the contribution of capture fisheries and aquaculture to agricultural and total GDP is about 16% and 0.6%, respectively. In addition, fisheries and aquaculture industries in APEC employ 60% of the world's total fisheries workforce. Maritime transport supports 90% of the global trade volume. Seventeen of the top 20 ports in terms of cargo handling capacity are located in APEC. Tourism is a vital source of income and employment for APEC economies.

**Implementing holistic approaches from policy to practice for the conservation of marine ecosystems.** Ecosystem-based management has been widely adopted as a guiding principle for marine planning in some economies. Through the use of marine spatial planning, marine protected areas and other management tools, ecosystem-based management experience has accumulated and is shared among APEC economies. Integrated coastal zone management is widely implemented. Marine environmental protection legislations are established in most APEC economies while related plans and programs are implemented. Biodiversity conservation has been given particular attention and special initiatives on protecting coral reefs have been launched at both regional and economy levels.



**Pursuing sustainable marine resource management in a systematical and persistent way.**

Economies promote sustainable fisheries resource management by implementing ecosystem-based approaches, and combat illegal, unregulated and unreported (IUU) fishing by enacting fishery laws and regulations and establishing effective monitoring, control and surveillance systems. Economies have developed domestic plans for renewable ocean energy development. Maritime transport is recognized as critical to promoting connectivity and trade facilitation.

**Making continuous efforts in disaster risk reduction and resilience.**

The Asia Pacific is one of the most disaster-prone regions in the world, and suffers greatly from loss of lives and wealth as a result of disasters. The cumulative impacts of human activities and climate change have significantly increased the unpredictability of disasters, difficulty of response actions and highlight the urgency of disaster preparedness. APEC economies have taken a comprehensive approach, which includes developing policies, laws and plans and establishing institutions for addressing climate change challenges. This approach also supports marine research, monitoring and evaluation, capacity building and regional cooperation so as to enhance understanding of the impacts of climate change on the oceans, and the mitigation, adaptation and risk reduction measures required to deal with marine disasters.

**Increasing efforts to discuss and explore Blue Economy.**

The emergence and recent evolution of the concept of the Blue Economy in several fora (at global, regional and economy levels) bears testimony to the importance of marine sustainable development. Blue Economy was discussed during the drafting process of the outcome document of the 2012 UN Sustainable Development Conference (Rio+20) and was highlighted in side events. Many coastal economies suggested that the term Green Economy can be described as Blue Economy when applied to coasts and oceans. APEC economies are making efforts to better understand the Blue Economy approach. Mainstreaming ocean-related issues for economic growth has been particularly emphasized in this respect, and Blue Economy projects are listed as Rank 1 APEC-funded Projects for 2014, along with projects on conservation and sustainable development of coastal and marine areas.

**Enhancing capacity building.**

Marine laws, policies and regulations are promulgated by economies to regulate marine economic activities, protect the marine environment and conserve marine biodiversity. Marine science and technology is strengthened by regional programs and partner projects at the economy level. Public participation is encouraged as a necessary component of integrated marine management. Projects hosted by the APEC Secretariat, and training programs organized by APEC marine related centers, also effectively help economies upgrade their marine sustainable development capacity.



## Threats and challenges to APEC marine sustainable development

APEC's marine sustainable development is also facing increasing challenges in the context of international financial turmoil and global climate change, fuelled by economic growth, population increase, rapid industrialization and urbanization. The main threats to the sustainability of APEC's ocean and coastal resources include, but are not limited to, pollution, invasive species, the loss of marine biodiversity and habitats, unsustainable fishing and decline of marine resources, multiple conflicting uses of oceans and coasts, climate change and ocean acidification, and so on.

Key challenges to ocean sustainability include, but are not limited to, inadequate understanding of the value of the oceans, insufficient scientific knowledge of oceans, a lack of robust policies and mechanisms for ecosystem-based management, insufficient capacity in addressing the potential impacts of climate change and ocean acidification, and uncoordinated information sharing.

## Suggestions for APEC marine sustainable development

The oceans and coasts of Asia-Pacific region are valuable assets. It is essential to work collaboratively on solutions for halting the losses and helping protect, restore and enhance APEC's ocean assets. Improvements in the following areas are suggested as long-term priorities for consideration by APEC economies and relevant sub-fora, particularly OFWG, to enhance marine sustainable development.

### 1) Strengthening regional cooperation

Regional cooperation is urgently needed because of the complex and trans-boundary nature of ocean and coastal issues and challenges. Regional cooperation can be strengthened by supporting a more active role by relevant APEC centers; the integration of data and information into regional and global ocean observation and forecasting systems; promoting joint and regular review of progress in marine sustainable development in APEC; and improving collaboration between different APEC sub-fora, and between APEC and other regional and international organizations.

### 2) Scaling up best practices of ecosystem-based management

Ecosystem-based management (EBM) is acknowledged to be an effective way of proactively



governing ocean resources and uses across multiple jurisdictions, and protecting and sustaining marine and coastal ecosystems and their functions. APEC economies and sub-fora could take a more active role in promoting EBM by implementing joint programs on ecosystem service valuation; integrated management of watersheds, coasts and marine environments; promoting networks of marine protected areas and cross-border marine spatial planning at a regional scale; and enhancing the conservation of large marine ecosystems.

### **3) Maintaining and improving ocean health**

It has become a common understanding that healthy marine ecosystems contribute to poverty eradication and provide the foundation for a sustainable marine economy. Measures for maintaining and improving ocean health could include promoting a better understanding of marine ecosystems; encouraging better regulation and incentive programs, and the elimination of harmful subsidies for unsustainable fishing and other practices; promoting the implementation of international and regional instruments to combat cross-border pollution; and promoting large-scale ecological restoration of critical coastal and marine habitats.

### **4) Mainstreaming ocean-related issues across APEC**

The 2013 APEC Leaders' Declaration committed to pursue cross-sectoral efforts under the APEC Initiative on Mainstreaming Ocean-related Issues. Suggested actions include increasing coordination and cooperation among policy makers in APEC economies; encouraging APEC economies to speed up mainstreaming processes within their economies; enhancing trade and investment opportunities for sustainably harvested marine fisheries and aquaculture products; and supporting joint ocean programs between the Ocean and Fisheries Working Group and other relevant sub-fora such as the APEC Committee on Trade and Investment (CTI) and APEC Business Advisory Council (ABAC).

### **5) Furthering discussion and initiatives on Blue Economy**

Although there is no universally accepted definition of Blue Economy, it could help align ocean activities closely with APEC's core agenda in investment and trade facilitation. Further efforts related to Blue Economy could focus on supporting regional cooperation on Blue Economy; strengthening policy dialogue and knowledge-sharing among APEC economies on the principles and approaches of Blue Economy; documenting and sharing concrete examples of



good practice; promoting the facilitation of investments in the application of environmentally friendly technologies in marine industries; and promoting public-private dialogue and active involvement of the private sector.

## **6) Integrating fisheries and marine resources into food security**

The contribution of marine resources, fisheries, and aquaculture products are critical to food security, sustainable livelihoods, and economic prosperity in APEC economies. Suggested measures for integrating fisheries and marine resources into food security include promoting a better understanding on the link between fisheries resource sustainability, food security and food safety in APEC; promoting good practices in ecosystem-based fisheries management; strengthening regional and international cooperation on combating IUU fishing; and encouraging sustainable mariculture practices.

## **7) Enhancing disaster risk reduction and resilience**

Climate change and disaster risk reduction are common challenges that many APEC economies face and will continue to face in the decades to come. The following measures could be taken to enhance disaster risk reduction and resilience: promoting a better understanding on the role of coastal and marine ecosystems in disaster resilience; promoting the further development of marine disaster forecasting and warning capability and the sharing and delivery of disaster information; encouraging regional cooperation on emergency planning and response; and enhancing disaster education and capacity building to increase the resilience of the private sector and coastal communities to marine disasters.

## **8) Improving education and public awareness**

High quality, life-long ocean education is essential for improving ocean literacy and instilling a widespread sense of stewardship of the ocean. Incorporating ocean-related elements into school curricula helps improve understanding of the ocean and its value among the younger generation. In addition, informal education aimed at the wider population helps increase awareness and support for marine sustainable development. It is worth exploring possible pathways to raise ocean awareness within current mechanisms in APEC, including but not limited to: APEC Cross Border Education Cooperation, APEC Youth Summit, APEC Young Entrepreneurs' Summit (ABAC), and APEC Youth Science Festival (PPSTI).



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# Chapter 1: Introduction

The ocean is an integral part of our planet and is an absolutely essential component of human lives, livelihoods and the environment that sustains us. The 21 APEC economies are linked by the world's largest ocean-the Pacific Ocean, and its resources are invaluable treasure for the sustainable development of the Asia-Pacific Region.

As highlighted in the *Paracas Declaration* of 2010, the APEC economies have prioritized sustainable development and protection of the marine environment. This Chapter will focus on global understanding of marine sustainable development (MSD) following the outcomes of three United Nations (UN) conferences on sustainable development and, at the same time, highlight recognition among APEC economies of the importance of marine sustainable development by reviewing the marine-related meetings, projects and capacity building in the APEC region.

## 1.1 Oceans and Sustainable Development

The concept of sustainable development, first proposed in 1987 in the World Commission on Environment and Development's (WCED) *Brundtland Report*, has been further discussed and enriched by three UN Sustainable Development Conferences, the UN Conference on Environment and Development (UNCED) in 1992, the World Summit on Sustainable Development (WSSD) in 2002 and the Conference on Sustainable Development (Rio+20) in 2012. Oceans are important constituents of sustainable development, which is mentioned in each outcome document of the conferences-Agenda 21, the Plan of Implementation of The World Summit on Sustainable Development, and The Future We Want.

The *Brundtland Report* provided the first formal definition of the concept of sustainable development. Sustainable development is understood as, "development that meets the needs of the present without compromising the ability of future generations to meet their own needs". The concept defined by WCED has received global recognition and sustainable development is accepted as a global principle of development. Since that time the three pillars



of human development: environmental protection, economic growth, and social fairness, have been integral to the domain of sustainable development.

The *Brundtland Report* also recognized the role of oceans in sustainable development and declared, “sustainable development, if not survival itself, depends on significant advances in the management of the oceans”. Concerning the path to protect oceans and seas, the report saw a need for, “changes... in the institutions and policies” to manage the oceans and called for, “more resources...to be committed to oceans management”.<sup>1</sup>

In the following decade, the importance of the marine environment to sustainable development was reaffirmed by the UN Conference on Environment and Development. In *Agenda 21*, “the marine environment including the oceans and all seas and adjacent coastal areas” was rated as, “an essential component of the global life-support system and a positive asset that presents opportunities for sustainable development”. With full recognition of the ocean’s essential role in sustainable development, this action plan called for a series of economy level, sub-regional, regional and global level program to form, “new approaches to marine and coastal area management and development”. These programs included: 1)integrated management and sustainable development of coastal areas, including exclusive economic zones; 2)marine environmental protection; 3)sustainable use and conservation of marine living resources of the high seas; 4) sustainable use and conservation of marine living resources under national jurisdiction; 5)addressing critical uncertainties for the management of the marine environment and climate change; 6)strengthening international, including regional, cooperation and coordination; and 7)sustainable development of small islands.

The World Summit on Sustainable Development, convened in 2002, further recognized the role of oceans in food security and economic growth. *The Plan of Implementation of the World Summit on Sustainable Development* identified the “oceans, seas, islands and coastal areas” as “critical for global food security and for sustaining economic prosperity and the well-being of many economies, particularly in developing economies”. As for practical implementation, the Plan recommended actions to: 1) achieve sustainable fisheries; 2) promote the conservation and management of the oceans by international instruments; 3) protect the marine environment from land-based activities; 4) enhance maritime safety and

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1. UN. Report of the World Commission on Environment and Development: Our Common Future. Adopted by the World Commission on Environment and Development, Rio de Janeiro, Brazil, 1987.A/42/427.



protection of the marine environment from pollution; 5) encourage governments to make efforts to examine and further improve measures and internationally agreed regulations regarding safe international maritime transportation of radioactive material, radioactive waste and spent fuel; and 6) improve the scientific understanding and assessment of marine and coastal ecosystems as a fundamental basis for sound decision-making.<sup>2</sup>

Inheriting the continuous concerns on oceans from previous conference, the third UN Conference on Sustainable Development (Rio+20) included oceans as one of the seven critical issues under discussion and made further political commitments. In the outcome document, *The Future We Want*, the role of oceans was highlighted and it “stresses the importance of the conservation and sustainable use of the oceans and seas and of their resources for sustainable development”, especially “their contributions to poverty eradication, sustained economic growth, food security and creation of sustainable livelihoods and decent work”, while “protecting biodiversity and the marine environment and addressing the impacts of climate change”.

Chapter V of the Rio+20 outcome document, *The Future We Want* included a robust set of voluntary-commitment on oceans and seas, including attention to such issues as: 1) building the capacity of developing countries to be able to benefit from the conservation and sustainable use of the oceans and seas and their resources; 2) the Regular Process for Global Reporting and Assessment of the State of the Marine Environment; 3) conservation and sustainable use of marine biodiversity beyond areas of national jurisdiction; 4) actions to reduce the incidence and impacts of marine pollution; 5) implement measures to prevent the introduction, and manage the adverse environmental impacts of, alien invasive species; 6) enhance the efforts to address sea-level rise and coastal erosion; 7) support of the initiatives that address ocean acidification and the impacts of climate change on marine and coastal ecosystems and resources; and 8) the potential environmental impacts of ocean fertilization.

Oceans and seas have thus long been identified as essential components of sustainable development and have assumed increasing importance over time. As marine sectors are making greater contributions to economies and marine environmental protection is becoming a more significant issue, marine sustainability will become even more important to global sustainable development.

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2. UN. Plan of Implementation of the World Summit on Sustainable Development. Adopted by The World Summit on Sustainable Development, Johannesburg, South Africa, 2002.A/CONF.199/20\*.



## 1.2 The Understanding of Marine Sustainable Development in APEC

In recent years, 21 APEC economies have recognized the importance of oceans for food security, sustainable economic benefits, and maintaining social and environmental values. Reflecting this recognition, APEC has taken a series of initiatives to promote marine sustainable development in the last decade, including the convening of three ocean-related ministerial meetings (AOMMs), establishing the Ocean and Fisheries Working Group (OFWG), and establishing the APEC Marine Sustainable Development Center, among other things.

More recently, the 2013 APEC Leader's Declaration committed to pursue cross-sectoral work under the APEC Initiative on Mainstreaming Ocean-related Issues.

### (1) Commitments on MSD made by AOMMs

The first AOMM was held in April, 2002 in Seoul, Republic of Korea (ROK, hereafter Korea) and adopted the *Seoul Oceans Declaration* as commitment to domestic and regional action for the sustainable development of oceans, seas and coasts, including their resources in APEC region.



Delegates to the 2<sup>nd</sup> AOMM Meeting



The second AOMM was held in September, 2005 in Bali, Indonesia and adopted the *Bali Plan of Action, "Towards Healthy Oceans and Coasts for Sustainable Growth and Prosperity of the Asia Pacific Community"*, which reiterated a collective determination to take action to ensure the oceans and their resources provide a permanent and sustainable foundation for the economic and social well-being of APEC economies and peoples. The *Bali Plan of Action* reflects a resolve to undertake tangible, domestic and regional actions in the areas of: ensuring the sustainable management of the marine environment and its resources; providing for sustainable economic benefits from the oceans; and enabling sustainable development of coastal communities. As a high-level action plan, the *Bali Plan of Action* contains practical commitments for the period 2006–2009 and sets the priorities of APEC and its working groups dealing with ocean-related issues, as well as demonstrates APEC's regional commitments to global oceans and fisheries priorities.

The third AOMM was held in October, 2010 in Paracas, Peru, under the theme *Healthy Oceans and Fisheries Management towards Food Security*. The third AOMM was convened during a period of global economic recession, food price spike, intensifying effects of climate change and increasing stress on marine ecosystems. Against this background, the third meeting focused on four sub-themes: 1) sustainable development and protection of the marine environment; 2) impact of climate change on the oceans; 3) promoting free and open trade and investment; and 4) the role of oceans in food security. To address these four priorities, the meeting endorsed the *Paracas Action Agenda*, which defines a series of actions for the further implementation of the *Seoul Ocean Declaration*, the *Bali Plan of Action* and the *Paracas Declaration*.

The AOMMs have thus provided a platform for discussion of marine-related issues and for establishing key working areas for marine sustainable development in the APEC region. These high level political plat forms provide opportunities to strengthen regional cooperation on marine-related issues, enhance the supporting role of marine ecosystem to economic growth, and develop strategies to deal with newly emerging problems such as climate change, IUU fishing and so on. By approving regional action plans, such as the *Bali Plan of Action* and the *Paracas Action Agenda*, the AOMMs establish working principles and priorities for the marine-related APEC working groups and promote marine sustainable development in the APEC region.

## **(2) Initiatives promoting MSD supported by OFWG**

The Marine Resource Conservation Working Group (MRCWG) and the Fishery Working



Group (FWG) are among the earliest working groups created by APEC. MRCWG was founded in 1990 to promote initiatives that facilitate balanced and integrated programs and policies for sustainability of marine and coastal environment at regional and economy levels. When founded, MRCWG's focus was marine pollution. As new problems appeared, the group's work was expanded to ecosystem-based management, climate change, cross-boundary marine conservation, and satellite application. The projects sponsored by MRCWG in recent years include: *Satellite application in knowledge-based economies*(2006);*Understanding the economic benefits and costs of controlling marine debris in the APEC region* (2007);*Marine ecosystem identification and mapping in the Asia-Pacific region* (2008);*Fish and biodiversity cross boundaries: Enabling collaborative capacity building to improve the protection of marine resources & strengthen future economic security and ocean wealth in the Asia-Pacific Region* (2009);and the *APEC trans-boundary marine spatial management project* (2009).

In 1991 APEC created the Fisheries Working Group with the aim of achieving well-managed fisheries and aquaculture that would yield optimal economic value and support for local communities and livelihoods. Later, the priorities of this group were expanded to IUU fishing, sustainable development of aquaculture, eco-labeling in fishing and so on. Projects sponsored by this working group in recent years include: *Creating the international standard for the trade in live reef food fish* (2005); *Economic security and sustainable tuna fisheries in the coral triangle* (2008); *Implementing an ecosystem approach to fisheries in the context of broader marine ecosystem-based management* (2009); and *Harvesting currency-The importance of fisheries and aquaculture for APEC economies*(2009).

In 2011 the Ocean and Fisheries Working Group (OFWG) was formed by merging the MRCWG and the FWG. After the merger, two OFWG meetings were held, in 2012 and 2013, and a Strategy Plan 2013–2015 (draft) was discussed in the 2<sup>nd</sup> meeting. According to the Strategy Plan, the OFWG recognizes that a healthy ocean ecosystem is essential for maximizing the economic value of marine resources, promoting food security and sustainable development. The OFWG's Mission is to foster economic growth and prosperity in the Asia-Pacific region by working to facilitate free and open trade in the region and promoting the sustainable use of fisheries, aquaculture and ocean ecosystem resources and related goods and services. The priority areas of this newly formed group are thus free and open trade and investment, sustainable development and protection of the marine environment, food security, climate change, and OFWG operations.



Delegates of the 2<sup>nd</sup> APEC OFWG annual meeting

MRCWG, FWG and OFWG have made enormous efforts over more than two decades to promote initiatives on marine-related issues, and supported projects related to marine sustainable development as well as enhanced knowledge-sharing among APEC economies. The more recent establishment of OFWG, in the context of the increasing role of oceans in APEC economic development, enables a parallel increase in project management and convening resources that will promote marine sustainable development.

### **(3) Programs advancing MSD supported by APEC ocean-related centers**

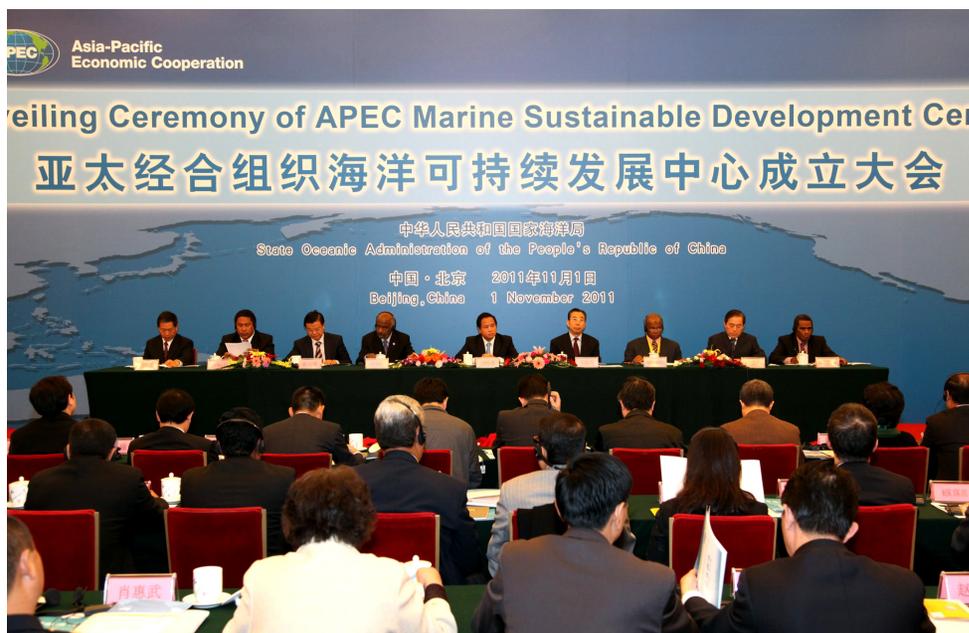
The APEC Marine Environmental Training and Education Center (AMETEC) was formally opened in November 2003 based on an action plan charted during the 2000 APEC meeting in Cheju. AMETEC, located in Geoje Island, Korea, is dedicated to education and training in marine environmental management through effective co-operation and collaboration between APEC economies. Projects hosted by AMETEC in recent years include: *Oil spill: Chemistry and biochemical responses*; *Long range transport of pollutants (passive air sampling)*; and *Marine debris: Macro-debris*, etc. As a leading regional center playing an important role in education and training in marine environmental management, AMETEC assists APEC economies in effectively addressing marine environmental problems by finding appropriate technical solutions and by strengthening their institutional capacity.

The 23<sup>rd</sup> MRCWG 2010 annual meeting approved the creation of an APEC research and



training center for marine biodiversity conservation and ecosystem management (APEC RTC-EBM) in China. The outcome document of the 3<sup>rd</sup> AOMM, the *Paracas Declaration* stated: “We welcome the establishment of the APEC Research and Training Center for Marine Biodiversity Conservation and Ecosystem Management”. The 2010 APEC Ministerial Meeting also endorsed the creation of the APEC RTC-EBM, and in its joint statement declared, “We welcomed the establishment of the APEC Research and Training Center for Marine Biodiversity Conservation and Ecosystem Management (APEC RTC-EBM) in China”.

At the 24<sup>th</sup> MRCWG meeting in 2011, the APEC-RTC-EBM was renamed the APEC Marine Sustainable Development Center (AMSDC) and in November of that year an unveiling ceremony was held in Beijing, China, in the presence of economy representatives, including Dr. Larry Robinson, former Deputy Assistant Secretary of the USA’s National Oceanic and Atmospheric Administration. The establishment of AMSDC addresses the capacity building needs of APEC economies in the fields of Blue Economy, food safety, ecosystem-based management, climate change, marine disaster mitigation and so on. Major training programs and fora promoted by AMSDC include: the APEC Marine Protected Area (MPA) Management Capacity Building Training Workshop; the APEC Marine Spatial Planning Training Workshop; APEC Advanced Training on Marine Spatial Planning for the Pacific Rim; and the 1<sup>st</sup> and 2<sup>nd</sup> APEC Blue Economy fora .



The Unveiling Ceremony for the APEC Marine Sustainable Development Center



#### **(4) Discussion and efforts on Blue Economy made by APEC economies**

Though there is not yet an internationally accepted definition for “Blue Economy”, APEC economies have made efforts to advance the topic and increase collaboration on ocean economic topics. The term Blue Economy was first raised by the Blue Economic and Saint Lawrence Development Forum held by Canada’s, Les Amis de la vallée du Saint-Laurent in 1999. An Australian Commonwealth Scientific and Industrial Research Organization (CSIRO) research program entitled *Wealth from Oceans, Blue GDP* in 2008 claimed, in regard to ocean-based industry development and growth, that “the blue GDP has real potential to deliver huge economic and social outcome to Australia.” Dr Jane Lubchenco stated, in her presentation at Capitol Hill Ocean Weekend in USA in 2009, that “Blue” really means “Blue-Green”, a vibrant, ocean-based economy that is economically and environmentally sustainable. In 2009, Chinese President Hu Jintao in his speech when visiting Shandong province, particularly emphasized the utilization of marine resources based on sound science, nurturing marine industries, and providing support for creating a blue economic zone in the Shandong Peninsula.

The recent evolution of the concept of Blue Economy in several fora (in global, regional and economy level) bears its testimony to the importance of marine sustainable development.

The Rio+20 United Nations Conference on Sustainable Development, focused on two key themes: the further development and refinement of institutional framework for sustainable development and the advancement of the “Green Economy” concept. The meeting reaffirmed poverty eradication as its key challenge and focused on green economy as a tool to achieve both poverty eradication and sustainable development.

Throughout the preparatory process for Rio+20, many coastal economies suggested that the term “Green Economy” can be described as “Blue Economy” when applied to coasts and oceans. Strong Statements were made by some economies during the Rio+20 preparatory processes in support of a “Blue Economy” approach to address their situation more appropriately. The UN secretary-General Ban Ki-moon made remarks a side event at the Rio+20 Conference that a “Blue world” of healthy and productive oceans can boost Green Economy of future and play an immense role in sustainable development. A United Nations inter-organization document prepared for Rio+20, *A blueprint for ocean and coastal sustainability* (IOC/UNESCO et al., 2011), indicated that Blue Economy could be understood as a transition towards a Green Economy, creating a viable socio-economic framework that generates jobs, assists in poverty alleviation, adapts to and mitigates climate change and other



existing and emerging challenges, and embraces integrated environmental management. Though Blue Economy was not negotiated in-depth nor gained broad consensus in Rio+20 conferences, there has been a growing appreciation that the world's oceans and seas require in-depth attention and coordination.

The impetus of Rio+20 has been reflected in various initiatives, *inter alia*: the UN Secretary General's Ocean Compact initiative; the UN Department on Economy and Social Affairs expert group meeting on Oceans, Seas and Sustainable Development; the work of the Global Ocean Commission; the Global Partnership for Oceans; and prominence given to Oceans and Seas in the UN five-year Action Agenda 2012–2016. The emphasis in all these initiatives is on the importance of sustainable management and preservation of marine and ocean resources.

Within APEC, various economies have been working on the issue of Blue Economy and the importance of it, and economies have made efforts on developing or better understanding of the Blue Economy. Then Australian Prime Minister, Julia Gillard, in her speech at the Rio+20 Conference stated that the world needs a new focus on Blue Economy and that she expected all economies to develop a strengthened oceans governance regime. China made domestic efforts to promote Blue Economy development by creating the first Blue Economic Zone in the Shandong Peninsula and approving eleven provincial marine economy development plans. Indonesia presented proposals on Blue Economy, aimed at addressing sustainable management of marine resources in 2012 APEC Ocean-related SOM meeting and APEC OFWG meeting. In 2012, Korea hosted several influential events-Expo 2012 Yeosu, the 6<sup>th</sup> World Ocean Forum (Global Forum on Oceans, Coasts and Islands) and the 4<sup>th</sup> East Asian Seas Congress, all of which included oceans and the Blue Economy as a central topic in the exhibitions and meetings.

The 1<sup>st</sup> and 2<sup>nd</sup> APEC Blue Economy fora were held consecutively in China. The 1<sup>st</sup> APEC Blue Economy Forum (2011) under the theme of *Promoting the Green Growth of the Marine Economy* discussed the concept of Blue Economy and some key areas of consensus were concluded on policies and procedures amongst the Forum participants. The following year, the 2<sup>nd</sup> APEC Blue Economy Forum was held with the theme of *Mobilizing to Address the Rio+20 Challenge of Achieving Blue Economy in the Context of Sustainable Development*. More than 200 participants, including delegates from the APEC Secretariat, 15 APEC economies, 10 international organizations and non-governmental organizations attended. It was co-chaired by Indonesia, the Global Oceans Forum, the Partnerships in Environmental Management for



The 2<sup>nd</sup> APEC Blue Economy Forum

Seas of East Asia, the International Ocean Institute, Conservation International, and the UN Institute for Training and Research. A Co-Chairs' Statement was formulated in which emphasis was given to the Rio+20 principles, inclusive economic growth, technological capability, and regional/international cooperation. The statement was shared with the OFWG for informational purposes.

In December 2013 the APEC Informal Senior Officials' Meeting approved initiatives that specifically and significantly contribute to promoting regional economic integration via free and open trade and investment. Mainstreaming ocean-related issues for economic growth was especially emphasized; projects such as Blue Economy, conservation and sustainable development of coastal and marine resources are listed as Rank 1 APEC-Funded Projects in 2014.

In summary, APEC economies have carried out fruitful activities related to the Blue Economy and it is at the core of many modern strategies for sustainable development—a testimony to the recognition of the role and opportunities that healthy oceans and coasts can contribute to marine sustainable development in APEC economies. In recent times, a number of similar initiatives have been announced related to Blue Economy, although they have been identified under different themes.



### 1.3 Aims and Structure of the Report

#### (1) Aims of the Report

The report is the first APEC report on marine sustainable development. As the first APEC Marine Sustainable Development Report, aims of the General Report (Part 1) include, but are not limited to:

- 1) Preliminarily Reviewing status, progress and related challenges of APEC marine sustainable development in APEC region;
- 2) Proposing suggestions that could serve as suggested long-term priorities for consideration by APEC economies and relevant sub-fora, particularly OFWG to enhance trade, investments, marine environmental protection and marine economic development, and;
- 3) Sharing Information and experiences in the important areas of marine sustainable development among APEC economies.

The overall APEC Marine Sustainable Development Report, which includes both the General Report (Part 1) and the Economy Reports (Part 2), provides a comprehensive overview of the current status of marine sustainable development in APEC and reviews the progress made so far and related challenges. The report represents the first step towards a systematic evaluation of marine sustainable development in APEC. As such it provides an opportunity for OFWG and participating economies to reflect on and share experiences in this important area. The report could thus lay the foundation for future collective efforts to improve evaluation of marine sustainable development in APEC, including marine ecosystem and relevant fisheries resources, blue economy, disaster resilience and other environmental, social and economic aspects considered important by APEC economies.

#### (2) Structure of the Report

The report is composed of two parts. The General Report of APEC Marine Sustainable Development (Part 1) is an overall synthesis of marine sustainable development in the Asia-Pacific region, which falls into four Chapters. *Chapter 1. Introduction*, describes the increasing



importance of oceans to sustainable development by describing the evolution of marine sustainable development following the three UN Sustainable Development Conferences and by demonstrating the development of MSD in APEC region through outcomes of AOMMs and OFWG initiatives. *Chapter 2. The Importance of the Ocean to APEC Sustainable Development*, highlights the unique ecological characteristics of the Pacific, in recognition of the importance of the ocean for food security, sustainable economic development (including trade and investment), and social and environmental values within the APEC region. *Chapter 3. The Progresses of Marine Sustainable Development in APEC Economies*, provide a preliminary review of progress in key areas such as the contribution of ocean sectors, marine environmental protection, sustainable resource management and disaster resilience. On the basis of Chapter 2 and Chapter 3, *Chapter 4. Challenges and Future Prospects of APEC Marine Sustainable Development*, summarizes the threats to APEC's ocean and coastal resource and discusses further efforts needed to address existing challenges, which could serve as suggested long-term priorities for consideration by APEC economies and sub-fora, particularly OFWG, to enhance marine economic development.

Part 2 of the report is a collection of economy reports submitted by individual economies on a voluntary basis and which economies can update on a regular basis if desired, offering more detailed information on the most significant efforts and policies related to the topics identified in the Part 1 in respective economies.

### **(3) Methodology of compiling the Report**

The initiative on compiling APEC Marine Sustainable Development Report was proposed by China and endorsed by the 1<sup>st</sup> APEC OFWG Meeting held in May 2012, in Kazan, Russia. The drafting work is highly valued and strongly supported by APEC economies and the Secretariat. The Report is comprehensive, being the collective outcome of contributions by APEC economies.

The overall methodology for compiling the report was to draft and confirm the framework first, then complete fulfill the report itself according to the approved framework. The preparation of the report went through two stages:

The first stage, from July 2012 to June 2013, was to develop the framework. This was first drafted by Chinese experts and further improved by the 2012 and 2013 AMSD Report Workshops, with the contribution of all participating economies. Common understanding



on the structure and content of the report was formed after two workshops, including agreement that: 1) the drafted framework is comprehensive and that necessary elements of the report have been included; 2) the report is an APEC report that every APEC economy should be invited to participate in compiling; 3) the report contains two parts, Part 1 is the General Report of APEC Marine Sustainable Development and Part 2 is the economy report of each APEC economy; 4) the aim of the report is to propose recommendations for enhancing trade, investments, marine environmental protection and marine economic development; 5) a core experts group for drafting the report was created composed of experts from China; Hong Kong, China; Indonesia; Korea; Russia; Chinese Taipei and USA. The framework was endorsed in June 2013 at the 2<sup>nd</sup> OFWG meeting.

The second stage was the drafting of the report. From July 2013, the drafting group, coordinated by AMSDC, started to draft the General Report, with large number of views exchanged, material collected and information shared. The first Draft of the General Report (DV0.0) was completed in December 2013 and submitted to the Core Experts Group on January 23<sup>rd</sup>, 2014 for further comments. From January 23<sup>rd</sup> to the end of February 2014, the DV0.0 was developed to DV1.0 based on the comments and suggestions from the Core Experts Group. On March 1<sup>st</sup>, 2014, DV1.0 was circulated to all member economies by the APEC Secretariat for review. On March 18<sup>th</sup>, 2014, the report was discussed by participants during the Symposium on APEC Marine Sustainable Development Report, held in Xiamen, China. After that symposium, the drafting group received two rounds of comments from APEC economies. Taking all these comments into account and after sufficient consideration and appropriate balance, the drafting group revised the General Report. The content in the General Report was streamlined and the suggestions for APEC marine sustainable development proposed in section 4.3 were revised, so that the report is more concise and better fits its aims. For Part 2, economy reports were submitted by Chile; China; Hong Kong, China; Japan; Korea and USA by 8<sup>th</sup> May, 2014. The Final Draft of the AMSD Report (Latest Version) was developed by combining Part 1 General Report and the collection of economy reports in Part 2.

In the process of drafting the general report, the drafting group quoted a wide range of literature on marine environmental issues, cited relevant APEC reports and economy reports, and carried out systematic analysis based on the available materials and data. The General Report attempts to reflect the current status and progresses of APEC marine sustainable development. However, due to the limited availability of specific materials in some cases, the report has used economy level or global level materials in some parts. Chapter 3 in Part 1



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uses economy examples to reflect the progresses of marine sustainable development in APEC economies. In Chapter 4 *Threats to APEC's Ocean and Coastal Resources*, some issues are discussed based on information on global status and trends.

Data and material in the General Report are mainly from: 1) annual reports and other materials provided by economies; 2) project reports from APEC OFWG and other sub-fora, and reports from the APEC Secretariat; 3) reports from authoritative international and regional organizations such as UN, IMO, CI, PICES, FAO, PEMSEA, etc.; 4) databases of UN, World Bank, WTO, etc.; and 5) data and conclusions from recent APEC reports such as *APEC Economic Trends Analysis 2013*.



## Chapter 2: The Importance of the Ocean to APEC Sustainable Development

Asia-Pacific is the fastest growing region in the world, and is often identified as the global engine of economic growth. The APEC economies have prioritized the ocean and its resources as the focus of sustainable development efforts in the Asia-Pacific Region.

This chapter describes the unique ecological characteristics of the Pacific, in recognition of the importance of oceans for food security, sustainable economic development (including trade and investment), and social and environmental values within the APEC region.

### 2.1 Natural and Social-economic Aspects in the Asia-Pacific Region

#### (1) Natural aspects of the Pacific

The Pacific Ocean is the largest of the earth's oceanic divisions with the largest biota, and covers over 165 million square kilometers, more than the entire land area of the planet. It extends from the Arctic in the north to the Antarctic in the south, and is bounded by Asia and Australia in the west, and the Americas in the east. The Pacific Ocean sustains unique ecosystems and abundant marine life. This section elaborates on the typical ecosystems and biodiversity hot spots, and the living and non-living resources of the Pacific.

##### 1) Typical ecosystems

The Pacific Ocean supports a wide array of productive ecosystems. In the tropical low water areas, coral reefs and mangroves are typical habitats and sustain exceptionally rich biodiversity in the Western and Central Pacific Ocean. Coral reefs are the most productive ecosystems in the world. Although occupying only 0.1% of the surface of the planet, coral reefs maintain a remarkable biodiversity with 93,000 described species, or almost 34% of



all marine life (Reaka-kudla, et al., 1997). The Asia-Pacific region is home to approximately 45% of the world's coral reefs<sup>3</sup> with the majority located along Southeast Asia, Western and Central Pacific islands (refer to the global coral reef distribution in Figure 1). Mangroves also have high productivity and support rich marine life. Mangroves provide nursery bases for marine mollusks, waterfowl and small terricolous mammals. The majority of mangroves are found in Asia and those in Southeast Asia and South Asia are particularly species-rich (Agardy, 2005). The intensive generation of coral reefs, mangroves and other species makes the South Western Pacific highly productive and outlines the area of the Coral Triangle, which is widely known for its extremely high biodiversity and tremendous goods and services value.

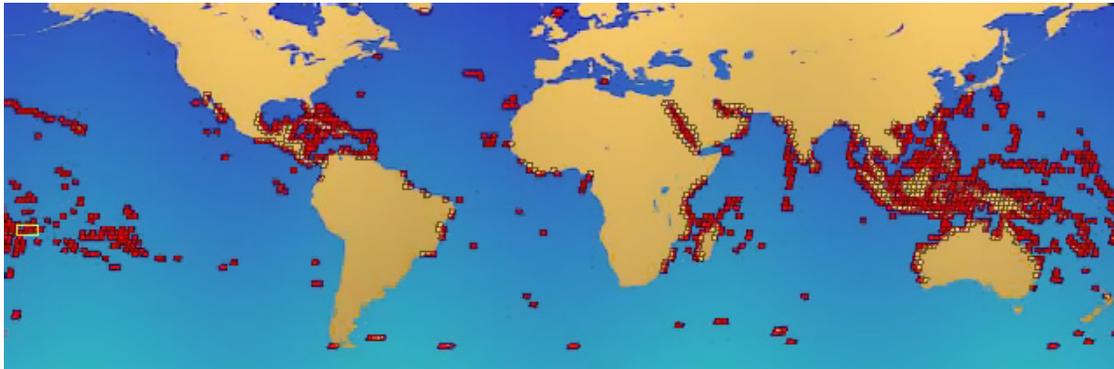


Figure 1 Distribution areas of coral reefs in the world

Source: Institute for Marine Remote Sensing, University of South Florida, USF Millennium Global Coral Reef Mapping Project, <http://oceancolor.gsfc.nasa.gov/cgi/landsat.pl,2013/12/06>.

There are some large ecosystems spanning across both inshore and offshore waters in the Pacific Ocean. For example, the Humboldt Current is a cold, low-salinity ocean current that flows north along the west coast of South America from the southern tip of Chile to northern Peru. It is an eastern boundary current flowing in the direction of the equator, and can extend 1,000 kilometers offshore. The Humboldt Current Large Marine Ecosystem (LME) is one of the major upwelling systems of the world, and supports an extraordinary abundance of marine life. Approximately 18%–20% of the world's fish catch comes from the Humboldt Current LME. The species are mostly pelagic: sardines, anchovies and jack mackerel.

## 2) The hot spots of biodiversity

The ecosystems in the Pacific have distinct characteristics in relation to climate, ocean current

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3. APEC, Ocean and Fisheries Working Group. Creating the international standard for the trade in live reef food fish. Singapore: APEC Secretariat, 2005.



and habitat bases. However, some seascapes display similar high-level biodiversity – which are called biodiversity hot spots. The distribution of hot spots in the world is shown in Figure 2. Typical hot spots of biodiversity in The Pacific Ocean such as the Coral Triangle and the Gulf of California are discussed below.

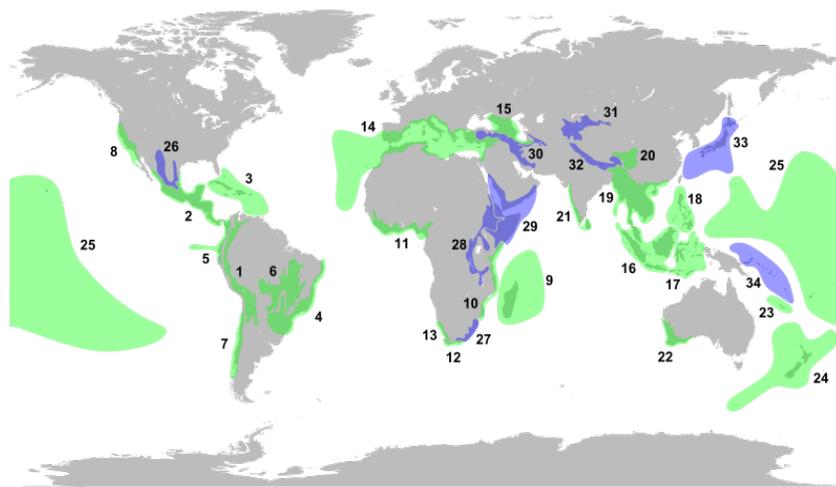


Figure 2 Distribution of biodiversity hot spots globally

Source: [http://upload.wikimedia.org/wikipedia/commons/9/93/Biodiversity\\_Hotspots.svg](http://upload.wikimedia.org/wikipedia/commons/9/93/Biodiversity_Hotspots.svg)

The Coral Triangle refers to a roughly triangular area of the tropical marine waters of Indonesia, Malaysia, Papua New Guinea, the Philippines, Solomon Islands and Timor-Leste and covers 5.7 million square kilometers of ocean waters (Stone, 2011). It is recognized as the global center of marine biodiversity (Allen, 2008) and is also called the “Amazon of the Seas”. It contains at least 605 species of hard corals for example (over 75% of the world’s known taxa)(Veron, et al., 2009). Furthermore, groups as diverse as sea slugs and other mollusks, mantis shrimps, seagrasses and mangroves all display maximum species diversity within this area. Scientists have also found that this area hosts very high genetic biodiversity within species. Many groups include a wealth of so-called cryptic species that look remarkably similar but are actually descended from genetically distinct lineages. The Coral Triangle also provides feeding, breeding, and calving grounds for an outstanding diversity of dolphins and whales, including blue whales and sperm whales.

Another biodiversity hot spot in the Pacific Ocean, the Gulf of California, is the home of high concentration of cetacean diversity (34 species) in the world, with 61% of the baleen whales and 33% of the toothed whales species worldwide (Urban, 2010). Overall, this productive sea attracts five sea turtle species, 170 sea bird species and 34 marine mammals (Stone, 2011).

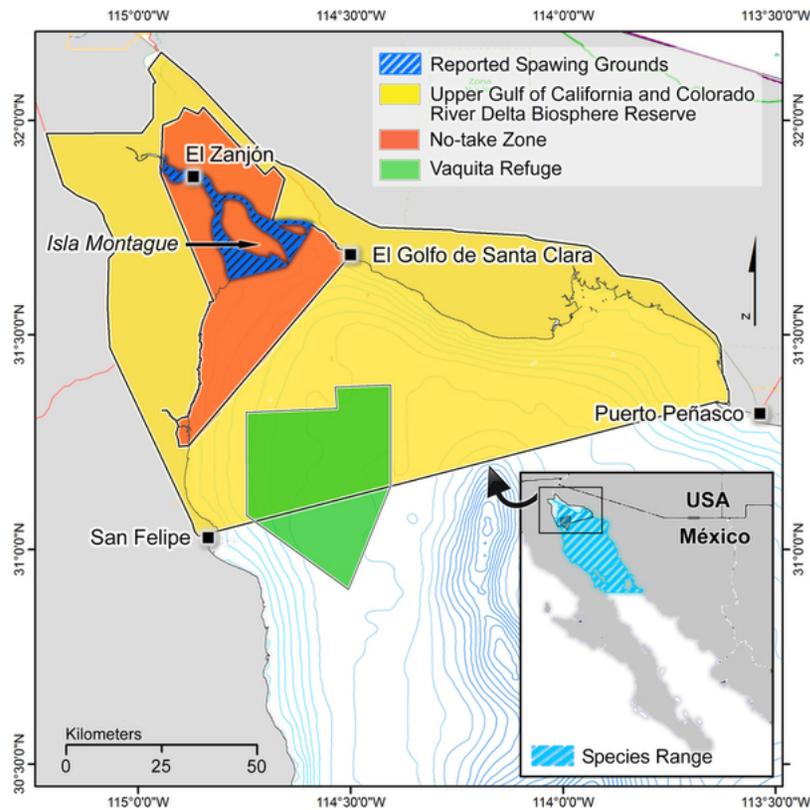


Figure 3 The Gulf of California

Source: Erisman, B., Aburto-Oropeza, O., Gonzalez-Abraham, C. Spatio-temporal dynamics of a fish spawning aggregation and its fishery in the Gulf of California. doi:10.1038/srep00284. 2012. [http://www.nature.com/srep/2012/120222/srep00284/fig\\_tab/srep00284\\_F1.html](http://www.nature.com/srep/2012/120222/srep00284/fig_tab/srep00284_F1.html). 2014/04/01.

### 3) Primary Production

The primary production in global oceans estimated in the amount of biomes converted by phytoplankton from light increases dramatically from open oceans to seas and coasts, forming large area of productive waters in the North Pacific and highly biomes-intensive spots along eastern Asia and Western American (shown in Figure 4). The Asia-Pacific region has long coastlines that host 22 Large Marine Ecosystems, the primary production of which is shown in Table 1. Among them, the area with the highest primary production is the Yellow Sea ( $1613 \text{ gCm}^{-2}\text{yr}^{-1}$ ), followed by the Gulf of California ( $1119 \text{ gCm}^{-2}\text{yr}^{-1}$ ).

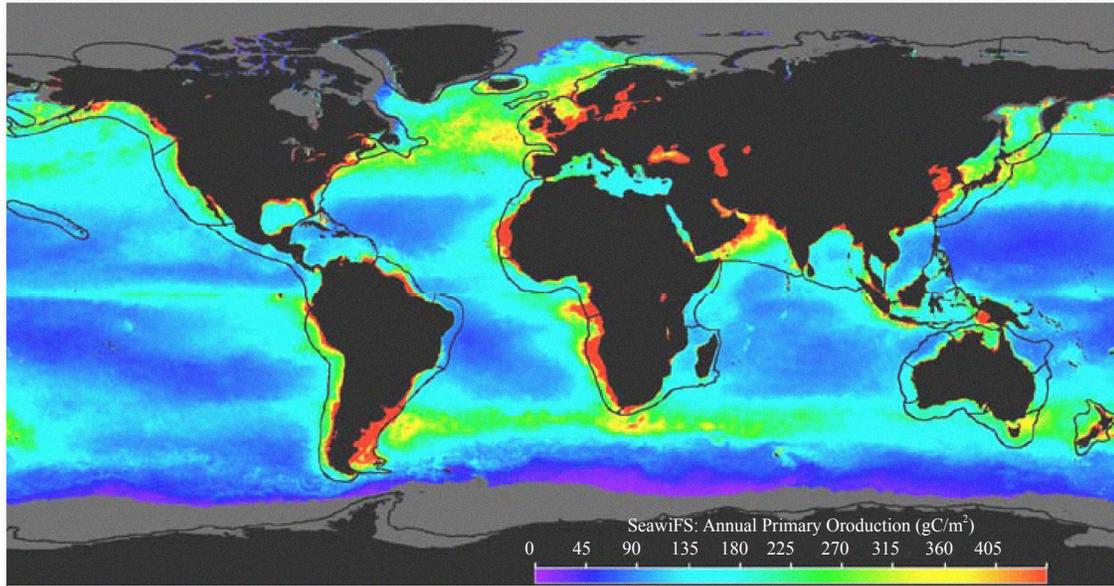


Figure 4 Primary production in global oceans

Source: Estimates are based on Sea WiFS satellite data collected between September 1998 and August 1999, follow the model developed by Behrenfeld and Falkowski in 1997. The color-enhanced image depicts a shaded gradient of primary productivity from a high of  $450 \text{ gCm}^{-2}\text{yr}^{-1}$  in red to  $< 45 \text{ gCm}^{-2}\text{yr}^{-1}$  in purple. Provided by Rutgers University. [http://www.lme.noaa.gov/index.php?option=com\\_content&view=article&id=47&Itemid=28](http://www.lme.noaa.gov/index.php?option=com_content&view=article&id=47&Itemid=28). 2014/04/01.

Table 1 Primary production in LMEs in Pacific coast region

	Region	primary production ( $\text{gCm}^{-2} \text{yr}^{-1}$ )
1	East Bering Sea	782
2	West Bering Sea	586
3	Aleutian Islands	–
4	Insular Pacific-Hawaiian	232
5	Gulf of Alaska	906
6	California Current	613
7	Gulf of California	1119
8	Pacific Central-American	668
9	Humboldt Current	876
10	South China Sea	477
11	Sulu-Celebes Sea	573



	Region	primary production(gCm <sup>-2</sup> yr <sup>-1</sup> )
12	Indonesia Sea	722
13	North Australian Shelf	900
14	Northeast Australian Shelf	358
15	Southeast Australian Shelf	512
16	East Central Australian Shelf	431
17	New Zealand Shelf	570
18	East China Sea	891
19	Yellow Sea	1613
20	Kuroshio Current	422
21	Sea of Okhotsk	815

Source: The PEW Charitable Trusts & the University of British Columbia. Sea Around US Project-Fisheries, Ecosystems & Biodiversity. <http://www.seaaroundus.org/lme/>. 2013/12/06.

#### 4) Marine living resource

The food web based on phytoplankton and zooplankton sustains abundant fish resources. As for the highly commercially valued finfish group, 690 finfish species of 138 finfish families are found in Northeast Pacific and 4,760 species of 326 families are found in Northwest Pacific (including the South China Sea) (Perry and McKinnell, 2005).

The fish fauna of subarctic coastal systems is dominated by gadids, flatfishes, and crustaceans. The subarctic gyres in the Western and Eastern North Pacific are dominated year-round by Pacific salmon. The principal species fished in the central subtropical gyre are tunas and billfishes. In contrast to the subarctic coastal systems which tend to be dominated by large and long-lived bottom fishes, the coastal and adjacent oceanic systems in temperate mid-latitude regions have very important fisheries for short-lived small pelagic fishes, in particular Pacific sardine and northern anchovy (Mckinnell and Dagg, 2008).

This richness of fish resources enables a prosperous fishery industry in the North Pacific. In terms of fish production the North Pacific has long ranked as the highest among oceans. In 2012, fish production in the Northwest Pacific and Western Central Pacific comprised up to 42% of the global total.



Other marine species which are regarded as North Pacific icons are marine mammals, including whales (cetaceans), seals and sea lions. In the Gulf of Alaska, at least 18 species of marine mammals use the shelf and offshore habitats. A total of 16 cetacean species have been recorded in the East China Sea and Yellow Sea region (Mckinnell and Dagg, 2008).

### **5) Marine hydrocarbon resources**

Besides living resources, the Pacific Ocean contains abundant hydrocarbon resources. Marine hydrocarbon deposits occur in fields ranging from the continental slopes of northern Alaska to Tierra del Fuego and the South China Sea to the Gulf of Mexico. The International Energy Agency (IEA) considered offshore reserves in 2010 to be of the order of 200 billion barrels in global oceans.<sup>4</sup> However, the IEA also strongly cautions against unrestrained carbon emissions from unrestricted burning of fossil fuels because of their climate implications.<sup>5</sup> Another resource with huge economic potential, gas hydrates, are found on the Pacific margins of both North and South America, especially at the equator. As gas hydrates represents 10 times the fuel value of current conventional hydrocarbon resources, these reserves in the Pacific may make an important contribution to the future energy supply of APEC economies.

## **(2) Socio-economic aspects of the Asia-Pacific region**

With further economic globalization, economies become more reliant on international markets and more connected with each other. Meanwhile, the world is experiencing unprecedentedly challenges from the risks of climate change, food insecurity, unpredictable energy supply, environment degradation and natural disasters. All of these call for regional cooperation. As a high level political forum and the most influential economic cooperation organization in the Asia-Pacific region, APEC has the capacity and mandate to facilitate cooperation for maintaining healthy and sustainable economic growth in this region. The 2010 APEC Economic Leaders' Meeting endorsed the new APEC Growth Strategy to ensure balanced, inclusive, sustainable, innovative and secure growth. For more than 20 years, APEC and its economies made considerable contribution to promoting the trade and investment liberalization and facilitation in Asia-Pacific region moving toward sustained economic growth.

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4. International Energy Agency. Global offshore oil prospects to 2000. Paris:International Energy Agency, 1996

5. IEA. World Energy Outlook Special Report 2013: Redrawing the Energy Climate Map. [http://www.iea.org/publications/freepublications/publication/WEO\\_Special\\_Report\\_2013\\_Redrawing\\_the\\_Energy\\_Climate\\_Map.pdf](http://www.iea.org/publications/freepublications/publication/WEO_Special_Report_2013_Redrawing_the_Energy_Climate_Map.pdf). 2014/04/23.



APEC economies account for approximately 57% of global GDP<sup>6</sup>, 45% of the global population, and 47% of world trade.<sup>7</sup> The APEC region also includes some of the fastest growing economies. The developing economies of the East Asia and Pacific region grew by 7.5% in 2012, lower than the 8.3% growth recorded in 2011, but still higher than any other region.<sup>8</sup>

It is calculated that the 2.6 billion people living in the APEC region accounted for approximately 50% of global economic growth between 2000 and 2010.<sup>9</sup> With long coastlines and diverse marine activities, APEC economies have developed active marine industries which comprise a substantial part of domestic economies. In 2012, China's gross ocean products (GOP) was CNY 5,008 billion which comprised 9.6% of its GDP,<sup>10</sup> with tourism, fishery, transportation and ship building making major contributions.

The growing scale and increasing vitality of APEC economies attract trade and invest into the region. The value of total goods trade by APEC economies nearly tripled between 2000 and 2012. In 2012, the value of total goods trade by APEC economies grew by 3.3%.<sup>11</sup> Five economies in APEC were listed among world top 10 by merchandise imports in 2010, including USA, China, Japan, Korea, and Russia.

The total labor participation rate in APEC region was 69% in 2012 compared with a world average of 64%.<sup>12</sup> Russia and the Philippines have made good progresses in promoting employment in the recent decade. The unemployment rate in Russia declined from 10.6% to 7.5% during 2000–2010 and that of Philippines decreased from 11.2% to 7.3% during the same period.<sup>13</sup> Moreover, ocean-related industries are of great importance to economies'

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6. The World Bank database, <http://worldbank.org/indicator>, 2013/10/15; Chinese Taipei Directorate-General of Budget, Accounting and Statistics.

7. World Trade Organization, statistic database, [http://www.wto.org/english/res\\_e/statis\\_e.htm](http://www.wto.org/english/res_e/statis_e.htm), 2013/12/09.

8. The International Bank for Reconstruction and Development / The World Bank. A fine balance. World Bank East Asia and Pacific economic Update April 2013. Washington DC: The International Bank for Reconstruction and Development / The World Bank, 2013.

9. Calculation based on economies' GDP data from the World Bank database.

10. China Marine Statistical Yearbook 2012. Beijing: China Ocean Press, 2013.

11. Calculation based on data from the World Trade Organization, statistic database.

12. International Labor Organization, Statistics and Databases, ILOSTAT Database, <http://www.ilo.org/global/statistics-and-databases/lang-en/index.htm>, 2014/3/31. & Chinese Taipei Directorate-General of Budget, accounting and statistics.

13. World Trade Organization, statistic database, <http://stat.wto.org/Home/WSDBHome.aspx?language=E>, 2013/10/15.



domestic employment, offering 2,770 thousand jobs in USA<sup>14</sup> in 2010 and 34,217 thousand jobs in China in 2011.<sup>15</sup>

With rising incomes and improvements in social welfare, citizens in APEC economies can now expect longer lifetimes than previously. Life expectancy at birth in the APEC region<sup>16</sup> rose from 73.6 to 76.1 years from 2000 to 2010, six years higher than the world average. The average infant mortality rate in APEC economies was 12‰ in 2010 with half of the economies lower than 10‰, much lower than the world average level of 29‰.<sup>17</sup>

Another core indicator of social development is education. In recent years, the net endorsement ratio in secondary education in most economies in APEC has been higher than 70% and the average tertiary gross education ratio has been approximately 50% (52% for women and 46% for men).<sup>18</sup> In the information area, most APEC economies developed internet infrastructure in the past ten years and built the information highway for social development. Internet users in APEC economies increased from 19.6 per 100 persons in 2000 to 55.9 in 2010.<sup>19</sup>

## 2.2 Providing for Sustained Economic Benefits

Healthy oceans and coasts are critical for food security, poverty eradication, sustainable and equitable economic growth, and for preserving traditional culture and promoting trade.

Marine ecosystems are an important source of economic benefit. In USA, in 2010, marine-related sectors generated US\$ 258 billion (GDP) with the majority of benefits coming from tourism, transportation, and living resource related industries.<sup>20</sup> In most coastal economies,

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14. USA National Ocean Economics Program, <http://www.oceaneconomics.org/Market/ocean/oceanEcon.asp?IC=N&dataSource=E>, 2010/10/15.

15. China Marine Statistical Yearbook 2012. Beijing: China Ocean Press, 2013.

16. The World Bank database, <http://worldbank.org/indicator>, 2013/10/15. Due to data available, Chinese Taipei is not included.

17. The United Nations database-social indicators. <http://unstats.un.org/unsd/demographic/products/socind/>, 2013/10/15.

18. The United Nations database-social indicators. <http://unstats.un.org/unsd/demographic/products/socind/>, 2013/10/15. Australia, Chile, Malaysia, Russia is 2009 data; Philippines is 2008 data; Thailand is 2011 data; Papua New Guinea is 1999 data; others are 2010 data.

19. The World Bank database, <http://worldbank.org/indicator>. 2013/10/15. Because of data available, Chinese Taipei is not included.

20. USA National Ocean Economics Program, <http://www.oceaneconomics.org/Market/ocean/oceanEcon.asp?IC=N&dataSource=E>, 2010/10/15.



coastal areas are much more developed than inland areas and over 30% of the GDP in the USA originates from coastal areas. China's coastal province earned more than CNY 3,100 billion (GDP) in 2012, contributing more than 60% of domestic GDP.<sup>21</sup>

Fisheries are a traditional industry in all coastal regions and APEC economies. APEC members are top fishing economies and major fish consumption regions. APEC economies representing nine of the top ten fish producers (including capture and aquaculture) globally.<sup>22</sup>

Tourism is a vital source of income and employment for APEC economies. In the case of USA, travel and tourism is the largest employer and second largest contributor to GDP. Beaches are the leading tourist destination in USA. Approximately 89.3 million people vacation and recreate along USA coasts every year, with coastal states contributing 85% of all tourism revenues in the USA.<sup>23</sup> Coral reefs in the APEC region are attractive and profitable tourism resource. It is estimated that the value of healthy coral reefs per square kilometer ranges from US\$ 10–60 million per year, depending on their locations in relation to tourist attractions. And those located in Indonesia, American Samoa and Australia are calculated to be of higher value. A project of APEC Marine Resource Conservation Working Group estimates that the highest value for a healthy coral beach in Thailand is US\$ 3.5 million per square kilometer.<sup>24</sup>

Shipping plays an important role in international trade with sea shipping the most common means of moving international cargo. In 2008, the international maritime freight loaded and unloaded in the APEC region<sup>25</sup> was 3.19 billion tons, which represents a substantial volume of the global seaborne total. Seventeen of the top 20 ports in cargo handling capacity are located in APEC, with Shanghai, Singapore, Ningbo and Tianjin ranking among the top five globally.

Offshore oil and gas is an essential supplier of world energy consumption. In 2009, offshore fields accounted for 32% of worldwide crude oil production and this is expected to rise to

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21. China Institute for Marine Affairs. *China's Ocean Development Report*. Beijing: Ocean Press, 2013.

22. APEC. *Harvesting Currency: The importance of fisheries and aquaculture for APEC economies*. Singapore: APEC Secretariat, 2009.

23. Leeworthy, Vernon R., *Preliminary Estimates from Versions 1–6: Coastal Recreation Participation*, National Survey on Recreation and the Environment (NSRE) 2000. NOAA Oceans and Coasts, Special Projects Office. <http://marineeconomics.noaa.gov>.

24. APEC Marine Resource Conservation Working Group. *Satellite Application in Knowledge-based economies*. Singapore: APEC Secretariat, 2007.

25. *China Marine Statistical Yearbook 2012*. Beijing: China Ocean Press, 2013. Based on data of Hong Kong, China; Indonesia; Korea; Malaysia; Singapore; Australia and New Zealand.



34% in 2025 (23 million barrels per day).<sup>26</sup> Marine oil and gas is a very important industry in APEC. In USA, marine oil and gas exploration and production earned US\$ 85.8 billion in 2010. With the maturation of energy technologies, new energy derived from the sea is potentially developing into a strategic source of supply. In the APEC region the available estimates of exploitable tidal stream resource is 11GW of potential capacity or 330 TW/h in terms of energy output which may make up  $\frac{1}{2}$  to  $\frac{2}{3}$  of the total world tidal stream resource.<sup>27</sup>

### 2.3 Enabling Contributions of Fisheries Resources to Food Security and Local Livelihoods

Fish production in APEC economies accounts for 70% of the world total. APEC's share of total world capture fisheries is 65%, and in total world aquaculture production, its share is more than 80%. Fisheries resources contribute to food security and local livelihoods as well as supporting other commercial activities and contributing to regional economies.

#### (1) Fisheries resources and fish production<sup>28</sup>

The world's oceans and seas harbour rich fisheries resources. In 2012, global registered fish production in marine waters amounted to 79.7 million tons. The fish production of the Pacific Ocean constitutes nearly 60% of the global total, with the Northwest Pacific's production the highest at 21.5 million tons (27% of world total), followed by the Western Central Pacific at 12.1 million tons (15%), and Southeast Pacific at 8.3 million tons (10%), as shown in Figure 5.

The Northwest Pacific maintains its ranking as the most productive fishing area in the Pacific Ocean. The Northeast Pacific temperate fishing area reached peak production many years ago and total production had declined continuously from the early and mid-2000s. Total catches in the tropical area of the Western Central Pacific has been in uptrend in those years. Since 1978, the Eastern Central Pacific has shown a series of fluctuations in capture production with a cycle of about 5–9 years.

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26. International Energy Agency .World Energy Outlook. Paris: International Energy Agency,2010.

27. APEC Energy Working Group. Prospects for Marine Current Energy Generation in APEC Region. Singapore: APEC Secretariat, 2013.

28. Contents in this part quote statistics from the FAO. The state of world fisheries and aquaculture 2014. Rome: FAO Fisheries and Aquaculture Department, 2014.

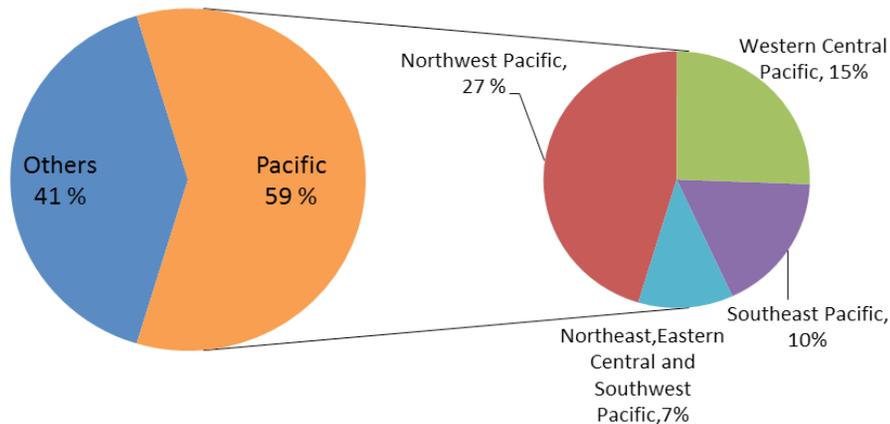


Figure 5 Marine fish production in world and Pacific Ocean in 2012

Source: data come from FAO. The state of world fisheries and aquaculture 2014. Rome: FAO Fisheries and Aquaculture Department, 2014.

Fish and fishery products are among the most traded food commodities worldwide. For developing economies, fish and fishery products trade is a significant source of foreign currency earnings and a key to sustainable economic benefits. World imports of fish and fish products recorded at US\$ 129.2 billion in 2012, a slight decline from the previous year but an increase of over 80% from 2000. Export earnings of APEC economies from fisheries and aquaculture products totalled US\$ 46 billion in 2007, including US\$ 37 billion in trade between APEC economies.

## (2) Providing protein and nourishment

Marine fish provide high quality protein that is easily digested and contains a wide variety of essential vitamins, minerals, fatty acids and amino acids. Fish contribute largely to the protein supply in Asia, with people in Indonesia, Japan, Malaysia and the Philippines most reliant on fish to meet their animal protein needs. Significant increases in fish consumption have occurred in East Asia, from 10.6 kg per capita in 1961 to 34 kg per capita in 2009, and in South East Asia from 12.8 kg per capita in 1961 to 32 kg per capita in 2009, these rates of increase being almost double the global rate over the same period. The nourishment provided by marine fish is difficult to obtain from rice-based diets like those predominant in the APEC region, so fish is not only a source of food but a necessary constituent of healthy diets (Lymer, 2008).

The development of fisheries in Asia has enriched populations' diets and led to significant declines in the region's share of the world's undernourished people. Undernourishment



declined fastest in South East Asia, from 13.4% in 1990–1992 to 7.5% in 2010–2012, followed by East Asia, from 26.1% to 19.2%, though in South Asia the share increased from 32.7% to 35% in this same period<sup>29</sup>. This overall improvement in food security can be attributed to better balanced diets contain notably higher proportions of animal-protein, fruits and vegetables.

As the APEC economies continue to grow, its population's diets will continue to diversify, generating a greater demand for fish as a source of animal protein and placing increasing pressure on fisheries industries and fish resources.

### **(3) Creating employment opportunities<sup>30</sup>**

In 2012, 3.2 million vessels were estimated to be operating in marine waters globally, comprising 68% of the world total. There are approximately 15 million fishers employed aboard decked and un-decked fishing vessels in the marine capture fishery sector. Apart from the primary production sector, fisheries and aquaculture provide numerous jobs in ancillary activities such as processing, packaging, marketing and distribution, manufacturing of fish-processing equipment, net and gear making, ice production and supply, boat construction and maintenance, and research and administration. All of this employment is estimated to support the livelihoods of some 600 to 800 million people, or about 10% to 12% of the world's population.

In the period 2005 to 2010, employment in the fisheries sector continued to grow faster (at 2.1% per year) than the world's population (at 1.2% per year) and employment in the traditional agriculture sector (at 0.5% per year). As 90% of APEC fish harvesters and fish farmers are employed in small-scale activities, the importance of small-scale fisheries to food security, poverty alleviation and poverty prevention is becoming increasingly recognized.

Though Pacific Ocean is a large source of global marine capture production, the status of its economically important fish stocks is of concern. Overfishing has caused significant declines in some stocks in waters under national jurisdiction and of some migratory and straddling stocks. Illegal, unreported and unregulated (IUU) fishing is one of a range of interrelated factors that

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29. APEC Ocean and Fisheries Working Group. Potential contribution of small pelagic fish to food security within the Asia-Pacific Ocean. Singapore: APEC Secretariat, 2013.

30. Contents in this part quote statistics from FAO. The state of world fisheries and aquaculture 2014. Rome: FAO Fisheries and Aquaculture Department, 2014.



is putting these stocks at risk. It is estimated that 3.4 to 8.1 million tons of fish is taken by IUU fishing each year in the Asia-Pacific region. This represents between 8% and 16% of the reported catch from the Pacific Ocean in recent years.<sup>31</sup> To increase the contribution of marine fisheries to the food security, economic development and well-being of coastal communities, effective management plans must be put in place to rebuild overexploited stocks.

## 2.4 Enabling Sustainable Development of Coastal Communities

APEC economies are endowed with abundant marine and coastal habitats. Although the contributions of these diversified seascapes are not readily measured by traditional market-based accounting, they play an essential role in safeguarding coastal residents' lives and properties.

### (1) Providing living space

Ocean and coastal areas are major contributors to the global economy and fundamental to global wellbeing; through direct economic activities, provision of environmental services, and as home to the majority of the world's population. Thirteen of the world's twenty megacities lie along coasts and nearly 700 million people live in low-lying coastal areas less than ten meters above the sea (IOC/UNESCO et al., 2011). In the Asia Pacific region, many metropolises are located near coasts. Ocean provides convenient transportation for these economic and political centers and endows them with pleasant climates and beautiful scenery.

The Western and Central Pacific contains groups of small islands with extraordinary biodiversity as well as human settlements. Some of these Small Islands Developing States (SIDS) are among the world's most vulnerable areas to changing climate and ocean and coastal degradation. Activities within the ocean and coastal sector in SIDS are important sources of income and foreign exchange. In the Pacific islands, more than 50% of the population lives within 1.5 kilometers of the coast. Almost without exception, international airports, roads and capital cities in the small islands are sited along the coasts, or on tiny coral islands. A typical example is the Republic of Kiribati, composed of thirty-three atolls speckled on the map of the Central Pacific. The islands of Kiribati are on average less than two meters above sea level. Sea-level rise has inundated some islands in the group and increasing erosion is destroying the coconut trees that line the beaches and causing losses to this largest export sector of Kiribati (Mittermeier, 2008).

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31. APEC Ocean and Fisheries Working Group. Assessment of impacts of illegal, unreported and unregulated fishing in the Asia-Pacific. Singapore: APEC Secretariat, 2008.



## **(2) Addressing climate change and reducing disaster**

Oceans play a key role in atmospheric and climate regulation, while coastal areas provide flood protection and erosion control for low lying communities, and act as a sink for waste and nutrient disposal (IOC/UNESCO et al., 2011). Ocean and coastal wetlands are important sinks for absorbing greenhouse gases. Fifty-seven percent of atmospheric carbon captured by living organisms is captured by marine organisms and, of this, between 50% and 70% is captured by marine vegetated habitats including mangroves, salt marshes, sea grasses and seaweeds. However, the ocean currently absorbs more than 26% of the carbon dioxide emitted to the atmosphere from human activities, resulting in increased acidity of the ocean (Nellemann, et al., 2009). Maintaining healthy ocean ecosystems must be a key component of the strategy for addressing climate change.

Typical sequestration rates of coastal ecosystems are estimated to be up to 50 times those of tropical forests. Annual carbon sequestration rates of mangroves, coastal marshes and seagrass beds are estimated at 7 Mg CO<sub>2</sub>e/ha/yr, 8 Mg CO<sub>2</sub>e/ha/yr and 7 Mg CO<sub>2</sub>e/ha/yr (Sifeet, et al., 2011). Through accumulative sequestration of CO<sub>2</sub> from the atmosphere, these coastal habitats store large quantities of carbon in both the plants and in the sediments below them. If destroyed, degraded or lost, these coastal habitats not only lose their capacity to sequester greenhouse gas, but also become sources of carbon dioxide emission. For example, draining a typical coastal wetland such as a marsh or a mangrove for agriculture will release 0.25 million tons of carbon dioxide per square kilometer. Maintaining the existence and integrity of coastal wetlands is thus an important means of safeguarding our climate and ecosystems.

Coastal systems also serve as defense against typhoons and flooding. A barrier of coastal wetland, such as mangroves, seagrass beds or tidal marshes, could effectively moderate the impacts of typhoons and flooding. Fringing mangrove forests, which are tidal-dominated and stand in shallow waters, provide strong protection for coastal areas in the face of destructive waves and winds. By trapping sediments, mangroves and seagrass beds play a notable role in stabilizing shorelines and thus help resist climate disasters.

## **(3) Sustaining indigenous culture**

Human cultures and societies are defined by the biological and physical environments in which they live (Orbach, 2010). For coastal communities the ocean and its elements have profound influence on their culture and lifestyle. After generations living near the sea, coastal



citizens develop language, custom and belief related to oceans. Fishermen in East Asia and Southeast Asia have the tradition of an ocean rite—they pray to the ocean with food and opera ceremonies for richness and peace in the following year. In Zhougezhuang, a village in Qingdao, China, local people hold a celebration each early spring, at the beginning of the fishing season. All fishery vessels are ranked in the sea that day, and with delicate food put on boats, people light fireworks and pray to the ocean following the lead of a respected fisherman.<sup>32</sup>

Living in a space surrounded by the ocean, Pacific small island states have an even higher dependence on the marine environment than other coastal communities. The ocean is a constant and dominant presence in islanders' lives. Pacific island languages reflect this and contain many words relating to the ocean. Common across the Polynesian region of the Pacific, the word *moana* means ocean and *vaka* means canoe and these words are used in many ways to reflect the unique culture of the Pacific islands<sup>33</sup>. *Te Vaka Moana*, for example, is the name adopted by a group of Pacific island fisheries administrations that have grouped together to pursue common fisheries interests.

The unique cultures that have developed in the Pacific islands, and the arts and crafts, music, songs and dances, which often reflect a preoccupation with the ocean, have considerable tourism value and thus provide income for some islanders and are of economic value to the region as a whole.

Endowed with culture richness, Pacific SIDSs utilize it for cultural industries and heritage industries which provide economic opportunities and assist economic and regional development. Recognizing the role of culture diversity, a UN SIDS conference in Mauritius in 2005 recognized *inter alia* that, respect for cultural diversity is essential for achieving sustainable development and ensuring that sustainable development benefits all.<sup>34</sup>

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32. Jing Ting. (in Chinese) Ocean custom forming and development—seen from Zhouge Village Ocean rite. Journal of Juamjusi Education Institute. 2012 (2): 77-78.

33. VakaMoana – the Ocean Roads. UNESCO project.<http://www.unesco.org/new/en/natural-sciences/priority-areas/sids/culture-tourism/culture/unescos-past-activities-ie-pre-january-2005/vaka-moana-the-ocean-roads/>. 2013/10/24.

34. UN. The Mauritius Strategy for the Further Implementation of the Programme of Action for the Sustainable Development of Small Island Developing States, endorsed by The International Meeting to Review the Implementation of the Programme of Action for the Sustainable Development of Small Island Developing States, Port-Louis, Mauritius, 2005. A/CONF.207/11.



## Chapter 3: The Progresses of Marine Sustainable Development in APEC Economies

As defined by the UN Conference on Sustainable Development, three coordinated pillars of sustainable development-economic, social and environmental-are essential for marine sustainable development. Both the 2005 *Bali Action Plan* and the 2010 *Paracas Declaration* identified the APEC economies' priorities for marine sustainable development, including: protecting the marine environment; mitigating the impacts of climate change on the oceans; liberalizing and facilitating trades and investments; and strengthening the role of oceans in food security. In addition, institutional support and capacity building, as well as technical assistance, are also needed. APEC economies have developed effective, practical and holistic policies, plans and actions to realize the economic potential of ocean resources for their communities and to ensure access to the resources for future generations.

### 3.1 Contribution of Ocean Sectors to APEC Economies

The economic value of the oceans' "natural capital" is huge. The oceans contribute US\$ 70 trillion total GDP annually, while the value of unreported ecosystem services the oceans provide is US\$ 20.9 trillion annually(Costanza, 1997). Ocean industries are critical infrastructure for APEC economies. It is estimated that the contribution of ocean industries accounts for 8% of the GNP of an APEC economy on average and could contribute as much as 48% of the GDP within coastal areas of an APEC economy.<sup>35</sup>New Zealand's marine economy contributed almost 3% (US\$ 3.3 billion) of the domestic economy as measured by GDP (US\$ 115 billion) in 2002 and the marine economic value-added increased by 28% from 1997 to 2002.<sup>36</sup> In the USA evaluation system,

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35. Asia-Pacific Economic Cooperation Oceans Conference. Realizing the Opportunities for APEC Economies. Report of the Senior Level Meetings. October 12–13, 1998, Honolulu, Hawaii, USA.

36. Statistics New Zealand.New Zealand's Marine Economy 1997–2002. Wellington: Statistics New Zealand, 2006.



ocean industries such as shipping, marine construction, energy development, commercial fishing, recreational fishing and boating, aquaculture, and tourism contributed about 1.8% of USA GDP and provided nearly 2.8 million jobs.<sup>37</sup>

## (1) Fisheries and aquaculture

The socio-economic importance of the fisheries and aquaculture sectors to APEC economies cannot be overestimated. They generate a significant source of revenue to economies across the region, provide considerable employment opportunities, and supply a vital source of animal protein to food-deficient economies.

Fisheries represent an important part of GDP in the APEC region. In 2012, the total domestic harvest (capture fisheries plus aquaculture production) of Chile reached an estimated 3.7 million tons (preliminary figure), including almost 1.1 million tons from farming.<sup>38</sup> Korea's production from fisheries has been increasing since 2003 and the value of capture fisheries was 7.7 trillion KRW, accounting for 0.3% of the domestic economy in 2012.<sup>39</sup>

The fisheries sector is a critical source of foreign exchange in the APEC region. Almost 70% of global fish production comes from the 21 APEC economies.<sup>40</sup> Intra-regional trade and exports in fishery products are extremely important. Japan and USA obtain 80% of their fishery product imports from other APEC economies, compared to 50% in the European Union.<sup>41</sup>

Fisheries and mariculture sectors provide important employment in APEC, with potential growth in job opportunities generated from mariculture. In 2008, the fisheries and aquaculture sector employed approximately 26.2 million fish harvesters and fish farmers among APEC economies, which constitute 60% of the world's total fisheries workforce.<sup>42</sup>

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37. NOEP.State of U.S. Ocean and coastal Economics 2014.Montery: Center for blue economy, 2014.

38. APEC 2<sup>nd</sup> OFWG meeting. Economy Report-Chile. 2013/SOM3/OFWG/007

39. Fishery Production Survey, Statistics Korea, 2012.

40. Calculation based on the capture and aquaculture fishery data 2008 from FAO database.

41. APEC. Harvesting Currency: The importance of fisheries and aquaculture for APEC economies. Singapore: APEC Secretariat, 2009.

42. APEC. Harvesting Currency: The importance of fisheries and aquaculture for APEC economies. Singapore: APEC Secretariat, 2009.



## **(2) Shipping and transportation**

Maritime transport is the backbone of world trade and globalization. Maritime transport supports 90% of the global trade volume (Hughes, 2013). Australia exported nearly 950 million tons of goods by sea, valued at US\$ 179 billion in 2009–2010. In Canada, the maritime sector handles over 440 million tons of cargo annually, representing a value of approximately US\$ 150 billion in trade. The quantity of goods handled through ports in Korean was estimated at more than 1.3 billion tons in 2012, an increase of 2.1% compared with 2011. Over 300 million tons of goods passed through Busan port and over 200 million tons were transported through Gwangynag port in 2012.<sup>43</sup> Port and maritime transport represents an important means of international trade for Mexico. The Mexican Port System consists of 116 authorized ports and terminals, with 57 in the Pacific. It is expected that by 2022 Mexican ports will handle 294 million tons of cargo, including 122 million tons of oil and oil by-products.<sup>44</sup>

## **(3) Coastal tourism**

The economic importance of coastal tourism is unquestionable. United Nations World Tourism Organization (UNWTO) statistics show that tourism is the world's largest industry with regard to the number of people involved and economic profit. They also show that 12 of the 15 world's top destinations in 2000 were destinations with coastlines. Coastal tourism ranks among the main economic activities in many economies.

For example, Australia's domestic and international marine tourism was valued at nearly US\$ 11.6 billion during 2009 and 2010. Indonesia's coastal tourism generated a large amount of income at US\$ 43.5 billion, accounting for 7.5% of domestic GDP.<sup>45</sup> Similarly, 6.5% of the economy's employment is generated by tourism. Korea's marine tourism sector is also growing due to the increase in income and improved access to coastal areas. As of 2007, the number of beach visitors was 108 million and the number of recreational fishing tourists was 2 million.<sup>46</sup> In Malaysia, coastal tourism accounts for 13.3% of GDP and is valued at US\$ 33.6 billion. Malaysia's service industries (including tourism) are now its major revenue earner and the largest contributor (contributing 46%) to its GDP.<sup>47</sup> As for New Zealand, the aquatic

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43. Information provided by Korea.

44. Statistical Yearbook of Mexican Ports 2008. Monthly Statistical Report, SCT, Jan-Dec 2008–2009.

45. Data form World Travel and Tourism Council (WTTC)

46. Information provided by Korea

47. Data form World Travel and Tourism Council (WTTC)



and marine tourism sector, including boat trips/ charters and travel activities such as fishing, snorkeling and diving, and coastal retail and services is one of the fastest growing segments of active tourism (Forsman, 2008).

#### **(4) Marine energy**

Conventional oil reserves are currently estimated to be as much as 157 billion tons. Of this amount, 26% (41 billion tons) are found in offshore areas. In 2007, 1.4 billion tons of oil, the equivalent of about 37% of annual oil production, was derived from the ocean.<sup>48</sup> Meanwhile, the development of marine energy will benefit local communities in APEC economies. For instance, 95% of Australia's petroleum production comes from offshore sedimentary basins, and was valued at US\$ 21.8 billion in 2009–2010. The industry employs over 10,000 people and four LNG projects alone are worth US\$ 100 billion.<sup>49</sup> Offshore production of crude oil accounted for approximately 30% of the total oil production in the USA in 2008, down from 35% in 2004.<sup>50</sup>

Renewable ocean energy includes tidal and wave energy, temperature gradient energy, salinity gradient energy and chemical energy. So far, there are 8 temperature gradient power plants globally. Korea, Japan and USA are leading developments in this area. Japan has established two temperature gradient power plants on Nauru Island and Kagoshima Island since the 1980s. Korea's Sihwa Tidal Power Plant is the world's largest tidal power installation, with a tidal power output capacity of 254 MW and 553GWh estimated annual output.<sup>51</sup>

In addition to offering renewable power, the emerging clean power industry will have a sizable spillover effect on job creation, emission reduction and income generation. For example, offshore wind energy could support 20.7 jobs for every megawatt-hour generated and the total offshore wind capacity of 54 GW in the USA would create more than 43,000 permanent operation and maintenance jobs.<sup>52</sup>

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48. Maribus/The Future Ocean/IOI/Mare. World Ocean Review 2: The Future of Fish, The Fisheries of The Future. Kiel: MaribusGmbH, 2013.

49. Australian government, Bureau of Resources and Energy Economics. Australian Petroleum Statistics, Issue no. 206.2013.

50. Humphries M., Pirog R., Whitney G. USA Offshore Oil and Gas Resources: Prospects and Processes. Congressional Research Service, 2010, 7–5700, [www.crs.gov](http://www.crs.gov).

51. Information provided by Korea.

52. U.S. Department of Energy & U.S. Department of the Interior. A National Offshore Wind Strategy Creating an Offshore Wind Energy Industry in the United States. Washington D.C.: U.S. Department of Energy & U.S. Department of the Interior, 2011.



## 3.2 Sustainable Management and Protection of the Marine Environment

General best practices to improve the health and productivity of ocean and coastal ecosystems within the Asia-Pacific region are reviewed briefly in this section, while detailed economy specific activities and practices are described in Part 2 Economy Reports. Best practices could include, among others:

### (1) Ecosystem-based management and Integrated Coastal Zone Management

Sustainability of the environment is best achieved through a holistic, science-and ecosystem-based approach. Within the APEC economies, practices, experiences and lessons in Integrated Coastal Zone Management (ICM) have been learned over the past few decades. The ICM framework has been applied at various scales (economy, local and community), employing different types of strategies. Domestic acts, plans and programs on coastal and marine management programs are issued and adopted in APEC economies, such as Indonesia's special act for ICM—Integrated Marine and Coastal Area Management implementation (Act No 27/2007). Local governments also have an active role in promoting ICM practices. Fifteen provinces and 43 districts/cities in Indonesia have implemented the Marine and Coastal Resources Management Project aiming to promote sustainable management of marine and coastal ecosystems. Information on policies and measures taken by other economies in implementing ICM can be found in Part 2 Economy Reports.

Ecosystem-based management (EBM) emphasizes the protection of ecosystem structures, functions and key processes, systems, and internal links, as well as ecological, social, economic and institutional interdependence. While APEC economies have faced institutional structural constraints and challenges to economic development, in recent years, there is a consensus on the need for ecosystem-based management and it has been implemented from policy to practice for the conservation of marine ecosystems. Laws and policies on marine environment and ecosystem conservation have been issued as domestic guidelines for EBM. APEC economies have made progress in EBM through marine protected area network building, biodiversity conservation and marine spatial planning, among other measures.

Through the use of marine spatial planning, marine protected areas and other management tools, experiences on ecosystem-based management are accumulated and shared among APEC economies. For example, China has implemented a national system of marine functional zoning to sustainably manage marine resources in a comprehensive way. Peru



has been promoting the implementation of a series of measures to achieve the sustainable management of marine resources so as to improve the productivity of its territorial waters by, for example, managing the extraction of fishery resources through the establishment of closed fishing seasons, minimum landing sizes and quotas.<sup>53</sup>

## (2) Marine pollution control

Marine pollution has degraded the quality of coastal and marine environment in the past decades. Marine pollutants mainly (80%) come from land-based sources.<sup>54</sup> Additionally, endogenous sources also contribute significantly to marine pollution, including offshore oil and gas exploitation, maritime pollution and mariculture activities.

In the APEC region, increasing urbanization, industrialization and tourism activities, coupled with a growing coastal population, have degraded coastal areas, reduced water quality and increased pressures on marine resources.<sup>55</sup> Pollution from land-based urban, industrial and agricultural activities, as well as from offshore oil and gas exploitation, has adversely affected the coastal and marine environment of the region.<sup>56</sup> In addition, tourism and other recreational activities pose a threat to coastal ecosystems in many economies.

Considering the extensive and serious environment impacts of marine pollution, measures intended to enhance and promote its prevention have been widely adopted in APEC economies. Such measures include: the development and application of appropriate policies; the establishment and enforcement of appropriate legal/administrative instruments and institutional arrangements; the creation of appropriate incentive programs; and the implementation of education and outreach campaigns. More information on economies' legislative progress on marine pollution control can be found in Part 2 Economy Reports.

A series of regional programs and actions have been initiated to combat marine pollution in the APEC Pacific areas, including: the *Action Plan for the Protection, Management and*

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53. APEC 2<sup>nd</sup> OFWG meeting. Economy Report –Peru,2013/SOM3/OFWG/027.

54. UNEP. Regional Seas Programme. <http://www.unep.org/regionalseas/issues/landactivities/default.asp>. 2013/12/1.

55. APEC Marine Resource Conservation Working Group .Understanding the economic benefits and costs of controlling marine debris in the APEC region. Singapore: APEC Secretariat, 2008. (MRC 02/2007)[J]. A report to the Asia-Pacific Economic Cooperation by the National Marine Science Centre (University of New England and Southern Cross University), Coffs Harbour, NSW, Australia, December, 2008.

56. MoSTE Viet Nam. State of the Environment of Viet Nam: 1999 Report. Hanoi, Ministry of Science, Technology and Environment. 1999.



*Development of the Marine and Coastal Environment of the Northwest Pacific Region (NOWPAP)*<sup>57</sup>; the *Action Plan for the Protection and Development of the Marine Environment and Coastal Areas of the East Asian Seas Region (EASAP)*; the *Partnerships in Environmental Management for the Seas of East Asia (PEMSEA)*; and the *Reversing Environmental Degradation Trends in the South China Sea and Gulf of Thailand* in the Southwest Pacific Region<sup>58</sup>; the *Pacific Regional Environment Program (SPREP)*; and the *Southeast Pacific Action Plan (SPAP)* in the Southeast Pacific region.<sup>59</sup>

Most APEC economies have dedicated efforts to marine pollution prevention and control focusing on oil spills, marine litter, and land-based sources control. Canada established the *Marine Oil Spill Preparedness and Response Regime* and set forth guidelines and regulatory structure for the preparedness and response to marine oil spills. To control land-based pollution, the Chinese Government launched *China's National Programme of Action for the Protection of Marine Environment from Land-based Activities* in order to guide and promote marine environmental protection across China.<sup>60</sup> To combat marine litter problems, Japan has introduced a ban on free distribution of plastic bags at major grocery stores and dry cleaners in 2008. As a result, the number of consumers who bring their own bags for shopping has risen from 20% to 93%.

### **(3) Prevention of marine invasive species**

The invasion of alien species (IAS) is an irreversible process, and causes serious ecological or evolutionary consequences. Alien invasive species compete for space with native marine organisms, endangering marine life in Asia-Pacific economies. Invasive species breed with closely related native species, thus reducing genetic diversity of marine organisms. Alien species carrying pathogens have caused great harm to the marine environment in the APEC region.

International organizations have focused on IAS impacts. In 2009, the Commission for Environmental Cooperation released the *Tri-national Risk Assessment Guidelines for Aquatic*

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57. UNEP. The Action Plan for the Protection, Management and Development of the Marine and Coastal Environment of the Northwest Pacific Region (NOWPAP).<http://www.nowpap.org>.2013/10/10.

58. COBSEA. Marine litter in the East Asian Seas Region. Bangkok: COBSEA Secretariat, 2008.

59. Jeftic, L., Sheavly, S., and Adler, E. Marine Litter: A Global Challenge. Nairobi: UNEP,2009

60. National Report of China on the protection of Marine Environment from Land-based Activities.[http://english.mep.gov.cn/special\\_reports/GPAII/IGRM2/200710/P020071023499964342456.pdf](http://english.mep.gov.cn/special_reports/GPAII/IGRM2/200710/P020071023499964342456.pdf).2013/10/10.



*Alien Invasive Species*, which was developed in cooperation with experts from Canada, Mexico and the USA.

Appropriate actions and a series of measures have been taken by APEC economies to limit introduction and spread of marine invasive species. For instance, Russia paid close attention to the severe problem of invasive species, especially in the ocean and carried out domestic actions on assessment of the status of invasive species, developing an alien species database, and conducting research on the impact of alien species and gene mutations on ecosystems.

#### **(4) Conservation of coral reefs and other vulnerable habitats**

Ocean and coastal habitats, including shallow and deep water coral reefs, mangroves, seagrass beds, wetlands and seamounts, play significant roles in maintaining the biodiversity and productivity of marine and coastal ecosystems, and are important for the socioeconomic and cultural development of coastal communities.

Special efforts that have been made to maintain these ecosystems' health in APEC economies include the Coral Triangle Initiative (CTI). The coral reef ecosystems of the Coral Triangle are among the most threatened in the world, with about 95% considered to be at risk. Working collaboratively with development partners, non-government organizations and communities, the CTI has made important progress towards better management and conservation of these valuable ecosystems and resources. Good practice for the case of CTI will be introduced in section 3.7 of this Chapter.

Vulnerable habitat rehabilitation, marine parks and other place-based conservation tools are used to maintain the health of coastal and marine ecosystems in APEC economies. For example, Brunei Darussalam implemented a comprehensive management plan for mangroves and coastal forests as well as regeneration and re-vegetation programs to restore coastal habitats. Hong Kong, China has designated four marine parks and one marine reserve under the Marine Parks Ordinance to protect marine areas of high ecological value.<sup>61</sup>

### **3.3 Sustainable Management and Protection of the Marine Resources**

Marine resources are generally considered to be the materials and energy in the marine

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61. Information provided by Hong Kong, China.



environment which can be utilized by human being. For APEC economies, the Pacific Ocean was historically a vital channel of communication, offering indispensable routes for economic and cultural interchanges along with its rich biological resources. Nowadays, the ocean can also supply clean energy to economies on both sides of the Pacific. However, marine resources always fall under the jurisdiction of multiple governmental authorities and a lack of coordination among the agencies impedes effective management. APEC has been paying attention to the sustainable management of marine resources since its establishment.

### **(1) Sustainable fisheries and aquaculture management**

The Pacific Ocean plays a very important role in the global ocean fishery. Unfortunately, overfishing has resulted in depletion of fisheries resources and high-density aquaculture has led to the spread of diseases. These are considered to be important factors restricting the sustainable development of fisheries and aquaculture. Consequently, many economies, APEC OFWG and other regional organizations have been trying to take effective management measures to deal with the problems.

In 2012 in Vladivostok, Russia, APEC Leaders reaffirmed their commitment to: enhancing cooperation to combat IUU fishing and associated trade; working towards sustainable management of marine ecosystems; improving capture fisheries management and sustainable aquaculture practices; and facilitating sustainable, open and fair trade of fisheries and aquaculture products. In Bali in October 2013, APEC Leaders called upon their economies to promote the crucial role of fishers, particularly small holders and women.

OFWG helps APEC economies respond to these issues by supporting the development and regional implementation of global fisheries and aquaculture practices across the seafood value chain. The group also ensures that APEC economies have a strong voice internationally on fishery-related issues.<sup>62</sup>

Economies have focused great efforts on combating IUU fishing. Australia and Indonesia jointly chair the *Regional Plan of Action to Promote Responsible Fishing Practices including Combating IUU fishing in the South East Asia Region* (2007).<sup>63</sup> Chinese Taipei has complied

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62. Harvesting Currency: The importance of fisheries and aquaculture for APEC economies. APEC Secretariat, 2009.

63. APEC 23th MRCWG meeting and 21st Fisheries Working Group Meeting. Economy Report –Australia. 2010/MRCWG/012.



with relevant regulations stipulated by Regional Fisheries Management Organizations (RFMOs) to implement effective measures to combat IUU fishing.<sup>64</sup> In April 2009, the Thailand Cabinet finally approved a *Master Plan for Management of Thai Marine Capture Fisheries*.

## (2) Managing marine renewable energy sustainably

The 2008 APEC Leaders' Declaration highlighted that, "access to adequate, reliable, clean and affordable energy resources is vital to sustain economic prosperity in the region". At the 4<sup>th</sup> APEC Energy Ministerial Meeting in 2012, Ministers reiterated the need to work to, "develop renewable energy sources" so as to increase energy security, and contribute to APEC's "economic development, and reduce emissions of carbon dioxide and other pollutants into the atmosphere".

To develop ocean renewable energy, while maintaining the sustainability of marine environments, APEC economies and related working groups have carried out a series of actions. For example, the APEC Energy Working Group (EWG) designed and implemented the project, *Prospects for Marine Current Energy Generation in APEC Region* (EWG 23/2011A) to bring in leading developers and consultants to review the most essential topics in tidal stream energy development.

Some economies have issued domestic energy policy or plans<sup>65</sup> which address marine renewable resource as one of the action areas and priorities and at the same time give emphasis to exploring and utilizing marine renewable resources with adequate respect for marine environmental protection.

## (3) Facilitating trade by ocean connectivity

Industry globalization has increased world economic and trade inter-dependence. Marine connectivity has become an important issue for APEC economies, including in three key areas—institutional, physical and people to people connectivity.<sup>66</sup> Promoting Connectivity was emphasized in the 2013 APEC Leaders' Declaration.<sup>67</sup>

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64. APEC 2nd OFWG meeting. Economy Report –Chinese Taipei.2013/SOM3/OFWG/024.

65. Note: economies released renewable energy plans or plans on ocean development such as China's "the 12th Five Year Plan on Renewable Energy Development" and Korea's "2nd Basic Plan for Ocean and Fisheries Development (2011–2020)"

66. AkhmadBayhaqi, Collin Gerst and Le Quynh Thai, *Improving Connectivity in the Asia Pacific Region: Perspectives of the APEC Policy Support Unit*. APEC Policy Support Unit/Secretariat, 2013.

67. APEC Leaders' Declaration. Bali Declaration-Resilient Asia-Pacific, Engine of Global Growth. Bali, Indonesia, 2013.



Maritime transport (seaports, shipping) is the main part that should be considered as physical connectivity to promote the connectivity and the trade facilitation. In 2013 APEC Senior Officials made improving the quality and connectivity of physical infrastructure between APEC economies a priority in facilitating the flow of goods, services, capital and people throughout the Asia-Pacific region. At the 2011, 7<sup>th</sup> APEC Transportation Ministerial Meeting, Ministers encouraged capacity building efforts in support of the ongoing implementation of the *APEC Common Principles for Shipping Policy*, and acknowledged the development of voluntary *Guidelines Related to Liner Shipping*, to enhance free and open trade in the APEC region. Highlighting the connection between ocean resources and transportation, the Transportation Working Group has proposed a new project designed to support the sustainability of ocean resources by promoting cooperation on the enforcement of the *International Convention for the Prevention of Pollution from Ships (MARPOL 72/78)*.<sup>68</sup>

Recognizing that access to shipping services is vital to increase trade competitiveness, many APEC economies make maritime transport an integral part of international logistics. Measured by an indicator concerning connecting to global shipping networks, six APEC economies—including China; Hong Kong, China; Singapore; Korea; Malaysia and the USA – occupied the top 6 positions in 2012. Other APEC economies have been making steady progress in connecting to global shipping networks.<sup>69</sup> In addition to strengthening offshore infrastructure building, APEC economies are enhancing cooperation to achieve a connected and integrated Asia-Pacific. In 2012, Australia, New Zealand and the USA, as three of the four principal providers of aerial and surface maritime surveillance that supports the efforts of Pacific Island states, intend to improve the exchange, analysis and utilization of information between maritime surveillance providers and Pacific Island states.

### 3.4 Disaster Risk Reduction and Resilience

APEC economies face the common challenge of marine disasters and the fact that extreme events are projected to become more intense, more widespread or more frequent in some regions. The vulnerability of the coastal zone and marine ecosystems to marine disasters is becoming an important concern for economies. This makes the ocean one of the most important areas for action in addressing climate change and disaster risk reduction and resilience. APEC economies have taken specific measures to enhance their understanding

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68. APEC Ocean-Related Activities Mapping Exercise, submitted by OFWG Lead Shepherd. 2012/SOM2/OFWG/003.

69. AkhmadBayhaqi, Collin Gerst and Le Quynh Thai, *Improving Connectivity in the Asia Pacific Region: Perspectives of the APEC Policy Support Unit*. APEC Policy Support Unit/Secretariat, 2013.



of the impact of climate change on oceans, climate change adaptation, marine disaster risk reduction, and sustainable development of the Asia-Pacific region.

### **(1) Understanding the impact of climate change on the ocean**

In recent decades, APEC economies have developed policies to respond to climate change as well as plans to cope with climate change and to strengthen cooperation in understanding climate change and adaptation. These efforts have, focused on marine climate observation and forecasting capacity, research on sea-level rise, ocean disaster forecasting and risk evaluation, and the response and adaptation of coastal zone and marine ecosystems.

Ocean observation provides the information base to tackle climate changes. Japan promulgated its *Japanese Marine Development Strategy in the 21st Century* in 2002, which aims to strengthen marine monitoring of waters around Japan with the main purpose of understanding the mechanism of the carbon dioxide cycle and deep-sea carbon fixation, etc.<sup>70</sup>In addition, reports on climate change are shared among economies. Russia, for example, issued an assessment report on climate change and its effects on the Russian Federation in 2009 which acknowledged that anthropogenic global warming will lead to serious consequences.<sup>71</sup>

### **(2) Mitigation and adaptation of climate change**

APEC economies have undertaken efforts to mitigate climate change and have made progress in fulfilling their obligations in energy conservation and emission reduction under the Kyoto Protocol. For example, by the end of 2009, in all of the projects registered in the world's clean development mechanism (CDM), the top six economies in project number were: China (35.97% of the total), India (23.82%), Brazil (8.27%), Mexico (5.98%), Malaysia (3.89%), and Indonesia (2.09%), which means the Asia-Pacific region accounts for 75% of the projects registered globally.<sup>72</sup>

Some economies have special plans on climate change adaptation. Korea's *Comprehensive Plan on Climate Change Adaptation* emphasizes oceanographic observation, long-term based

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70. The Marine Development Strategy in the 21st Century in Japan. <http://sdinfo.coi.gov.cn/analysis/management/japan.pdf>. 2013/09/11

71. MGO, IGCE. Assessment report on climate change and its consequence in Russian Federation. Moscow, 2008.

72. The National Development and Reform Commission, People's Republic of China China's Policies and Actions for Addressing Climate Change.



prediction model on ocean climate change, and assessment of climate change impacts. To address climate change, Peru has issued a *National Climate Change Strategy* which focuses on predicting the impacts of climate change on the marine ecosystem and promoting the early adoption of adaptation measures.<sup>73</sup> In 2008, Thailand developed a master plan, the *Thailand Climate Change Master Plan (2013 to 2050)* that involves all sectors, and public and private educational institutions ineffectively preparing for and responding to climate change challenges.<sup>74</sup>

Cooperation on scientific and technological research on climate change among APEC economies has been strengthened. For example, the ARGO plan presided over mainly by the USA, encouraged many APEC economies to participate in this global marine monitoring system. In April 2010, an international plan, the *Northwestern Pacific Ocean Circulation and Climate Experiment (NPOCE)* was initiated by Chinese scientists, joined by 19 departments from eight economies, including China, the US, Japan, Korea, Australia, the Philippines, Indonesia, Germany and others. This provides a solid foundation for improving climate prediction ability.<sup>75</sup>

Mitigating climate change means eliminating both atmospheric and oceanic carbon, and to reduce new carbon emissions. Thus a *Blue Carbon Plan* was launched, led by Conservation International, the World Conservation Union (IUCN) and the International Marine Board. Many APEC economies, research institutes, non-governmental organizations, coastal communities, and inter-governmental and international institutions participated actively in the initiative. Protection and recovery of the blue ocean carbon sinks is known today to be one of the most effective mitigation measures against climate change.<sup>76</sup>

### **(3) Reducing marine disasters**

The 16<sup>th</sup> APEC Economic Leaders' Meeting held in Lima, Peru, in 2008 passed the *Strategy for Emergence of Risk Reduction and Emergency Preparedness and Emergency Response Strategy in the Asia-Pacific Region: 2009–2015*, which emphasizes addressing the main disasters prone to occur in the APEC area, including flood, earthquake, typhoon, hurricane, tornado, fire, and agriculture and public health emergency events. It stressed the strengthening of disaster risk reduction and disaster preparedness, emergency and reconstruction, and

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73. APEC 2<sup>nd</sup> OFWG meeting. Economy Report –Peru.2013/SOM3/OFWG/027.

74. APEC 2<sup>nd</sup> OFWG meeting. Economy Report–Thailand.2013/SOM3/OFWG/026.

75. Science Times.[http://news.xinhuanet.com/tech/2011-08/09/c\\_121834177\\_2.htm](http://news.xinhuanet.com/tech/2011-08/09/c_121834177_2.htm).2013/09/11.

76. Blue Carbon Report, 2009, <http://ishare.iask.sina.com.cn/f/9897122.html>.2013/09/11.



promoting community emergency preparedness, capacity building and vulnerability and risk assessments, etc.<sup>77</sup>

There is a general trend towards the increasing frequency of marine disasters, which is a great threat to the economic and social development, as well as safety and livelihoods in coastal areas in the APEC region. Increasing importance has thus been given to marine disaster preparedness, early warning, emergency response and post-disaster relief among APEC economies. Japan has established a complete disaster warning forecast mechanism and releases timely forecasts and warnings of major marine meteorological disasters. China has built an ocean disaster forecast and warning system through the National Marine Environmental Forecast Center and provincial forecast centers for specific sea areas. This network releases daily marine environmental information on sea temperature, waves, flow and so on, and issues forecasts and warning alarms during the high risk period of storms.

Regional cooperation on addressing marine disasters has been enhanced in the APEC region. The *Pacific Partnership* mission, born in response to the 2004 tsunami, is the humanitarian operation for adapting to natural disasters in this area as well as a capacity building network to improve the disaster relief capacities of Bangladesh, Indonesia, the Philippines and Timor-Leste.<sup>78</sup>

### 3.5 Capacity Building

In recent years, APEC economies have made great efforts to improve capacity building in order to promote marine sustainable development. APEC OFWG and other relevant sub-fora are undertaking much of their work programs through annual meetings and projects, seminars/symposiums, surveys or analysis and research, and short term training forums for capacity development.

#### (1) Marine policy, legislation and planning

APEC economies have enacted marine laws, policies and regulations and formulate marine development plans to regulate marine resource use, protect marine biodiversity and

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77. APEC FSCF Meeting. [http://www.apec.org/Meeting-Papers/Ministerial-Statements/Food-Security/2010\\_food.aspx.2013/09/11](http://www.apec.org/Meeting-Papers/Ministerial-Statements/Food-Security/2010_food.aspx.2013/09/11).

78. IIP DIGITAL. <http://iipdigital.usembassy.gov/st/chinese/article/2013/05/20130513147283.html#ixzz2TLdhrta>. 2013/10/12.



promote marine sustainable development. For instance, in Brunei Darussalam, the *Proposed Environmental Protection and Conservation Order 2010* was formalized to protect and manage the environment and to integrate environmental concerns into private and public decision making. Canada enacted basic law in marine affairs, the *Ocean Act*, which states principles for marine management, sustainable development, integrated management and a precautionary approach. In 2007, Japan passed the *Basic Act on Ocean Policy*.

## **(2) Marine science and technology**

APEC Ministerial Meetings have emphasized support for the development of scientific research in fisheries and aquaculture. The aim is to strengthen knowledge and improve decision-making, and advance the scientific basis for incorporating ecosystem considerations in developing a shared understanding of the concepts and practice underpinning the ecosystem-based approach to management. In recent years, APEC economies have made significant efforts in marine science and technology aimed at better understanding the oceans, such as the *Integrated Marine Observing System (IMOS)* in Australia, the *Marine and Coastal Integrated Survey and Evaluation Project* in China and the *Integrated Ocean Observing System (IOOS)* in USA.

To promote knowledge accumulation and sharing, APEC economies have carried out joint research projects in marine science and technology. The *Sea Around Us* project was initiated in 1999 as a scientific collaboration between the University of British Columbia, Canada, and the Pew environment group, USA. The aim of this project is to study the impact of fisheries on the marine ecosystems of the world, and to offer mitigating solutions to a range of stakeholders.

Regional scientific organizations have an active role in promoting marine research in the Pacific region. The North Pacific Marine Science Organization (PICES) is an intergovernmental scientific organization in the North Pacific that aims to foster and coordinate scientific research in the North Pacific and bordering seas. In 2013 it had six members: Canada, China, Korea, Japan, Russia and USA. PICES has published a series of high-impact research on marine life.

## **(3) Implementing mechanisms and institutionalization of ICM**

ICM has been widely implemented among APEC economies, with the establishment of diversified ICM mechanisms and measures, such as establishment of the National Ocean Council and coastal management agencies, and the enacting of marine policy and legislation.



Indonesia, for example, established a high level marine coordinating mechanism, the National Ocean Commission, and founded a marine enforcement coordination institution, the Maritime Security Coordinating Board (IMSCB). The Philippines established a Coastal Zone Management office under the Ministry of Environment and Natural Resources, which is responsible for promoting and coordinating the economy's coastal zone management activities. Viet Nam established the coastal and river basin management office to strengthen and support integrated coastal zone management activities.

#### **(4) Public participation**

Public participation has an important role in ICM implementation, marine protection, climate change adaptation and fishery management. In Batangas, the Philippines, for example, the voice and actions of private agencies and citizens are involved in ICM through a coordinate agency called the Batangas Bay Region Environment Protection Council (BBREPC), which assists the ICM project obtain funding and technical assistance from relevant agencies and promotes volunteer protection action.

#### **(5) Education and training**

APEC has established platforms for regional education and training. The APEC Marine Environment Training and Education Center has conducted numerous education and training activities in the field of marine pollution prevention and mitigation, especially related to oil spills and emergency pollutants control. The APEC Marine Sustainable Development Center (AMSDC) was established later to address the needs of APEC economies in building capacity for sustainable development of Asia-Pacific's seas and coasts.

AMSDC has conducted several training courses and workshops on MPA capacity building, marine spatial planning and so on. More than 100 participants from 18 APEC economies have benefitted from the training courses. Alongside these activities AMSDC has offered an exchange platform for all the APEC economies in the field of marine sustainable development. Participants in AMSDC activities share best practices and this helps to enhance capacity building towards a better understanding of how the advanced information, technologies and decision-making support marine sustainable development. In addition, economies conduct training and education activities domestically. These are highlighted in Part 2 Economy Reports.



## (6) Programs supported by the APEC Secretariat

APEC is a forum whose member economies are linked by the world’s largest ocean. Naturally, numerous APEC endeavors engage, or at least touch upon, ocean-related activities including, but not limited to, work in the areas of food security, transportation, and communications. APEC economies are an important voice internationally on ocean-related issues, and collectively have a significant impact on the global sustainability of fisheries and responsible practices. APEC officials have recognized that healthy marine and coastal environments support marine-related industries, and the associated employment it creates, and contributes to economic growth.

Table 2 provides an overview of Ocean-related programs by the APEC Secretariat from 2010 to 2013. Food security, energy, transportation, health, communications, and emergency preparedness are involved areas, including the Committee on Trade and Investment (CTI), Emergency Preparedness Working Group (EPWG), Energy Working Group (EWG), Life Sciences Innovation Forum (LSIF), Transportation Working Group (TPTWG), and others. The OFWG and its precursor groups have played an important role in ocean-related projects in APEC. Further, the table implies that APEC has been continuously active in ocean-related efforts and has sustained its commitment to fostering wise management of ocean resources.

**Table 2 The Ocean-related programs supported by APEC Secretariat (2010–2013)**

	Year	APEC Group	Description of Activity	Proponent
1	2013	OFWG	APEC Blue Economy Model Program-Phase I (Self-funded)	China. Co-sponsoring: Chile; Hong Kong, China; Indonesia; Korea; Peru; Singapore; Chinese Taipei.
2	2013	OFWG	Marine Ecosystem Assessment and Management in the Asia-Pacific Region	USA
3	2013	OFWG	Workshop on Fisheries and their Contribution to Sustainable Development in APEC Economies-Small-Scale and Artisanal Fisheries to Support Food Security	Indonesia
4	2013	OFWG	Advanced Training on Marine Spatial Planning for the Pacific Rim	China. Co-sponsoring: Indonesia, USA
5	2012	OFWG	APEC Workshop on Marine Spatial Planning.	China. Co-sponsoring: Indonesia, USA
6	2012	OFWG	Coral Reef Monitoring for Sustainable Economic Utilization using Innovative Observation and Satellite Information.	Indonesia. Co-sponsoring :Philippines, Russia, Chinese Taipei



	Year	APEC Group	Description of Activity	Proponent
7	2012	OFWG	Reducing Derelict Fishing Gear in the Asia Pacific Region.	USA Co-sponsoring: Australia, Indonesia
8	2012	CTI	Economic Impact of Submarine Cable Disruptions (The protection of submarine cables is included under Chokepoint 7 of the APEC Supply Chain Connectivity Action Plan)	Australia (lead economy), APEC Secretariat Policy Support Unit
9	2012	EWG	S EWG 23 11A-Prospects for Marine Current Energy Generation in APEC	Russia
10	2012	LSIF	CTI 25 2011A-Marine Microorganism: Capacity Building for a Broader Cooperative Research and Utilization”	Russia
11	2012	OFWG (Formerly under FWG)	FWG Seminar on Sharing the Experiences of Mitigating the Impact of Extreme Climate on Aquaculture and Fisheries	Chinese Taipei
12	2012	OFWG (Formerly under FWG)	FWG 01/2010A-Potential Contribution of Small Pelagic Fish to Food Security within the Asia Pacific Region	Peru
13	2012	SCSC	CTI 21 2011T–Laboratory Capacity Building for the Determination of Toxic Contaminants in Seafood	Peru
14	2012	TPTWG	S TPT 07 11T-Sharing Best Practices For Seamless Intermodal Cargo Movement-Phase1, Physical Infrastructure	Russia
15	2012	TPTWG	TPT 03 2011T-APEC Training Course on Common Principles to Shipping Policy	Japan
16	2012	TPTWG	01/2010A-Transport, Energy and Environmental Benefits of Intermodal Freight Strategies	USA
17	2012	TPTWG	TPTWG 08/2010A-International Ship and Port Facility Security (ISPS) Code-Port Security Visit Program	Australia
18	2012	TPTWG	TPTWG 07/2010A-International Ship and Port Facility Security (ISPS) Code Implementation Assistance Program	USA
19	2012	TPTWG-IIEG	TPT 02 2011–Sustainable Intermodal Transportation Network Using Short Sea Shipping: 2nd Phase of Short Sea Shipping Study that Can Improve Intermodal Efficiency and Reduce Pollution, Congestion, Fuel Costs and Green House Gas Emissions	Korea
20	2012	TPTWG-MEG	S TPT 04 11T–Workshop on Enhancing Visibility of Maritime Container Transportation for Advancing Supply	Japan
21	2012	OFWG	S OF 11 11–Marine Ecosystem Assessment and Management in the Asia-Pacific Region Phase III – Pilot APEC LME Projects	USA
22	2012	OFWG (Formerly under FWG)	FWG 01/2011S-Seminar on Satellite Data Application for Sustainable Fishery Support in APEC	Russia
23	2012	TELWG	TELWG Submarine Cable Information Sharing Project	Australia



	Year	APEC Group	Description of Activity	Proponent
24	2012	TPTWG	TPT 03 2011T – APEC Training Course on Common Principles to Shipping Policy	Japan
25	2011	EWG	EWG 18/2009-Resource Potential of Algae for Biodiesel Production in APEC Economies	Australia
26	2011	FWG	FWG 06/2009-Market-Based Improvements in Live Reef Food Fish Trade	Indonesia
27	2011	MRCWG	MRC 01/2009-Marine Ecosystem Assessment and Management in the Asia-Pacific Region Part 2--the APEC LME Project	USA
28	2011	MRCWG	MRCWG 01/2009A-Fish and biodiversity cross boundaries: Enabling collaborative capacity building to improve the protection of marine resources and strengthen future economic security and ocean wealth in the Asia-Pacific region.	Australia
29	2011	TPTWG	TPTWG 05/2009A-International Ship and Port Facility Security (ISPS) Code Implementation Assistance program (ICIAP)	Canada
30	2010	ATCWG	ATCWG 03/2009A-APEC-ATCWG Symposium on the Implementation of Important OIE Aquatic Animal Health Standards	Chinese Taipei
31	2010	FWG	FWG 01/2009 - Implementing an ecosystem approach to fisheries in the context of broader marine ecosystem-based management	Canada

Selected projects information from the “APEC Ocean-related Activities Mapping” in the document “APEC Ocean-Related Activities Mapping Exercise (2012/SOM2/OFWG/003)” submitted by OFWG Lead Shepherd.

### 3.6 Cooperation

Mechanisms for collaboration, knowledge sharing and exchange of best practices have been established among APEC economies and more broadly. Under the APEC framework, economies have cooperated in fisheries and food security, marine observation, climate change mitigation and adaptation to promote marine sustainable development, as highlighted in Chapter 3 above and in Part 2 Economy Reports.

Cooperation among the APEC economies benefits all participants by making best use of the resources available among the economies. For example, Chinese Taipei hosts the *APEC Roundtable Meeting on the Involvement of the Business/Private Sector in the Sustainability of the Marine Environment* each year, which attracts researchers, governments, NGOs and other stakeholders as participants and to promote cooperation.



APEC OFWG is enhancing cross-fora collaboration to support the mainstreaming of ocean-related issues in APEC. During the 2<sup>nd</sup> OFWG meeting 2013, in the presence of non-member participants included the Nature Conservancy (TNC) and the World Wildlife Fund (WWF), and observers including representatives from the APEC Business Advisory Council (ABAC) and the Policy Partnership for Food Security (PPFS), positive dialogue and constructive discussion were held on issues related to promoting free and open trade and investment, advancing sustainable development and protection of marine environment, strengthening food security, and so on.

In addition to APEC forums, other international organizations also play active roles in marine sustainable development of the APEC region. International organizations such as UNEP, UNDP, Global Environment Facility, Conservation International, International Maritime Organization, WWF, and others are widely involved in APEC marine protection discussions.

### 3.7 Good Practice in Marine Sustainable Development

The preceding sections of Chapter 3 provide an overview of progress in marine sustainable development at regional and economy levels. This section aims to introduce a few examples of good practice, most of which highlight local efforts in promoting marine sustainable development in the Asia-Pacific region.

#### (1) Motu MotiroHiva Marine Park, Chile<sup>79</sup>

An important achievement in the protection of national and global marine biodiversity was the creation of the Motu Motiro Hiva Marine Park around Salas y Gómez Island under Supreme Decree N 235 of 2010, of Chile's Ministry of Economy, Development and Tourism. The marine bottoms surrounding Salas y Gómez Island are nationally and internationally recognized for their biological wealth and the high level of endemism; they are one of the last environments of the planets to remain almost untouched by men. This park, located about 1,890 nautical miles from Chile's mainland, and 216 nautical miles from Eastern Island, covers 150,000 square kilometres, has become the sixth largest protected area in the world. By creating this park, Chile has extended its marine protected area surface to around 4.4% of the relevant marine ecosystems.

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79. Information provide by Chile.



Distance has kept Salas y Gómez Island from human intervention and this has allowed the island to become a natural reservoir of marine biota. Likewise, its biodiversity reflects the conditions of a place with scarce anthropogenic intervention and rich in natural resources. The wealth of marine seabirds in Salas y Gómez suggests the presence of a pristine ecosystem. Marine seabirds, as part of the marine ecosystems, participate in the food chain as secondary or tertiary carnivores and also as scavengers. Given their high feeding rate, metabolism and energy requirements, these organisms are considered to be key elements of coastal and pelagic ecosystems and also potential indicators of the availability of food and presence of pollutants. In the case of species that live in the water, an abundance of sharks and fish of unusual size constitute a good indicator of the quality of the ecosystems. Also, there is international acknowledgement of the pristine marine ecosystems around Salas y Gómez Island.

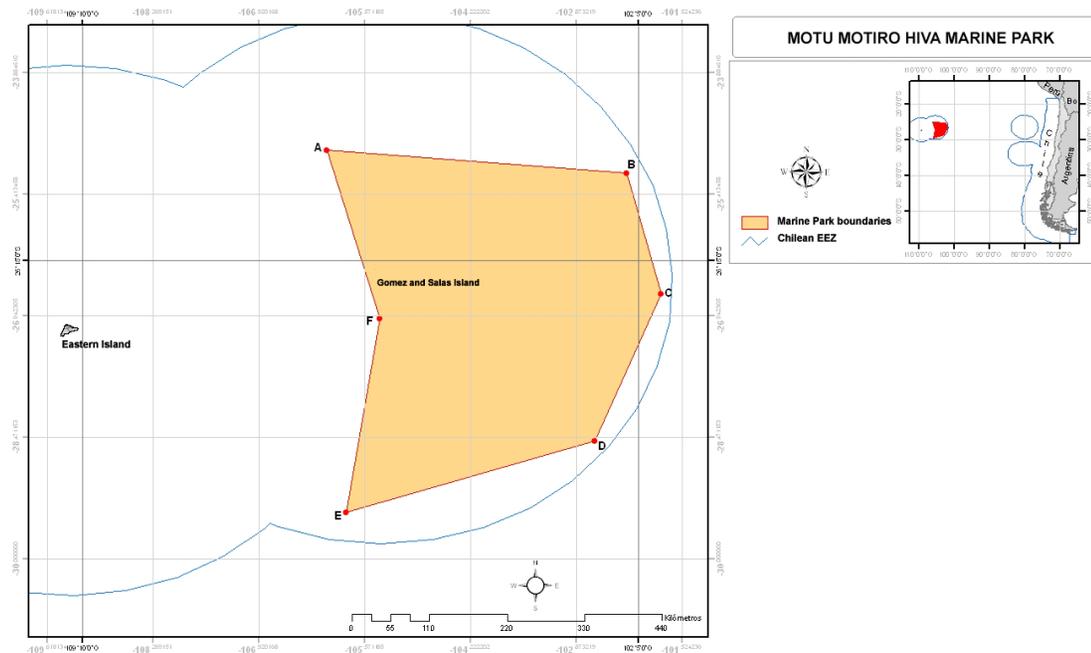


Figure 6 Map of Motu Motiro Hiva Marine Park

## (2) Implementing ICM in Xiamen, China<sup>80</sup>

Xiamen is located in the southeast of Fujian Province in China and has diverse marine

80. Information provide by China.



and coastal ecosystems that attract thousands of tourists each year. However, with rapid development of tourism, shipping, coastal industries and uncontrolled mariculture, the city faces a major challenge to promote sustainable economic growth while protecting the coastal and marine environment.

Integrated Coastal Management (ICM) was introduced at Xiamen and effectively implemented as a means to reducing the conflict between economic growth and marine environment protection. The main ICM actions in Xiamen include, among others, the Jiulongjiang River integrated watershed management, rehabilitation of the Maluan Bay, and initiating ISO 14001 certification to improve environmental management systems. As a result of continued efforts over the past 20 years, Xiamen has accumulated experience with pollution control, water quality improvement and marine species conservation. The risks of pollution and red tide occurrence have been effectively reduced, offering better recreational amenities and a clean environment for residents and tourists. The implementation of ICM in Xiamen has been regarded as a best practice for achieving a win-win scenario between economic development and ecosystem conservation. The lessons learnt from the Xiamen case can be summarized as follows:

- 1) Strong political will at both local and national levels is a key element in implementing ICM. It can help improve marine environmental protection through legislation, funding, law enforcement and other means.
- 2) Environmental management can precipitate cost reductions and habitat improvements that rebound to socioeconomic benefits. In turn, socioeconomic benefits help secure support for sustainable development. Marine environmental protection and marine economic development can thus reinforce each other.
- 3) Poor coordination and conflicts among different marine sectors lead to economic costs and inefficient use of marine resources. Integrated management can help improve coordination and thereby reduce conflict.
- 4) Resource-rent capture mechanism (e.g., through user fees) helps secure substantial resources required for effective enforcement. In turn, stronger control through inspection and enforcement helps deter evasion of the resource-rent capture mechanism.<sup>81</sup>

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81. GEF/UNDP/IMO/PEMSEA. Xiamen: an ICM journey. Quezon City: PEMSEA, 2006.



### **(3) Coral Triangle Initiative, a multilateral partnership of six members**

Sometimes referred to as the “Amazon of the Seas”, the Coral Triangle is located along the equator where the Indian Ocean and Western Pacific Ocean meet. This region consists of portions of the waters and coastal regions of Indonesia, Malaysia, Philippines, Papua New Guinea, Timor-Leste and Solomon Islands. CTI opens up large opportunities to begin looking at this mega-ecosystem as one whole unit. The *Coral Triangle Initiative on Coral Reefs, Fisheries, and Food Security* (CTI-CFF) is a multilateral partnership of six members working together to sustain extraordinary marine and coastal resources by addressing crucial issues such as food security, climate change and marine biodiversity.

Recognizing the need to safeguard the region’s marine and coastal resources, then Indonesian President Yudhoyono inspired other leaders in the region to launch the *Coral Triangle Initiative on Coral Reefs, Fisheries and Food Security* (CTI-CFF) in 2007. At the Leader’s Summit in 2009, these governments agreed to adopt a 10-year CTI Regional Plan of Action (CTI RPOA) to safeguard the region’s marine and coastal biological resources. The RPOA has five goals: strengthening the management of seascapes, promoting an ecosystem approach to fisheries management (EAFM), establishing and improving effective management of marine protected areas (MPAs), strengthening community capacity on climate change adaptation (CCA), and protecting threatened species.

So far, under the leadership of CTI, this region has moved toward better management by implementing MPAs, EAFM and CCA. The CTI has made effective regional plans including the *CTI Regional Plan of Action*, the *CTI Regional Framework for the Coral Triangle Marine Protected Area System* and *Region-wide Early Action Plan for Climate Change Adaptation* to affirm regional goals and actions. At economy level, each CTI economy has nominated an MPA learning and integration site to promote local efforts, and a roadmap to develop a domestic MPA management evaluation system.<sup>82</sup>

The CTI has become a successful model for integrating multiple management tools such as MPAs, EAFM and CCA in one region and maximizing the overall benefits of sustainable development. Lessons could be learnt through several perspectives:

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82. Information from the official website of CTI-CEF, <http://www.coraltriangleinitiative.org/>.2014/03/10.



- 1) Regional commitments reached through high-level political events such as leader's summits and ministerial meetings are crucial for raising awareness of MPAs, EAFM and CCA. Regional plans with clear objectives and working areas can serve as a guide for regional and domestic management actions.
- 2) It is important to translate regional initiatives into domestic efforts supported by strong awareness and political will. Much of the CTI activities gain support from economy and local governments, which are crucial for effective implementation. Domestic working plans and roadmaps under the CTI framework are important assistance in this transmitting.
- 3) Networks with development partners, non-government organizations and communities help ensure success. International organizations such as WWF, the nature conservancy, CI, the Global Environmental Facility (GEF) and the Asian Development Bank (ADB) are important partners of CTI, who provide funds and carry out projects under the CTI framework. These networks raise the international visibility of CTI and contribute resource and expertise into the Coral Triangle conservation.
- 4) The establishment of a regional secretariat is highly valued. The Coral Triangle Initiative on Coral Reefs, Fisheries and Food Security (CTI-CFF) Interim Regional Secretariat was created during the First CTI-CFF Senior Officials Meeting in 2007. The Secretariat plays an important role in promoting regional cooperation and facilitating learning across the six Coral Triangle members<sup>83</sup>.

#### **(4) Batangas Bay Region, the Philippines**

Batangas Province, Philippine is located along the southwestern edge of Luzon Island. The Province faces the South China Sea on its western flank and the Verde Island Passage to the south. The Batangas Bay Region (BBR) is located in the southern part of Batangas Province, with a land area of 1,416 square kilometers and comprises of 14 cities and municipalities (Figure 7). Batangas Bay forms a semi-enclosed body of water connected to the oligotrophic tropical South China Sea and is separated by a deep trench from the island of Mindoro.

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83. The summary of 'lessons learnt' in CTI is based on information from <http://www.coraltriangleinitiative.org>

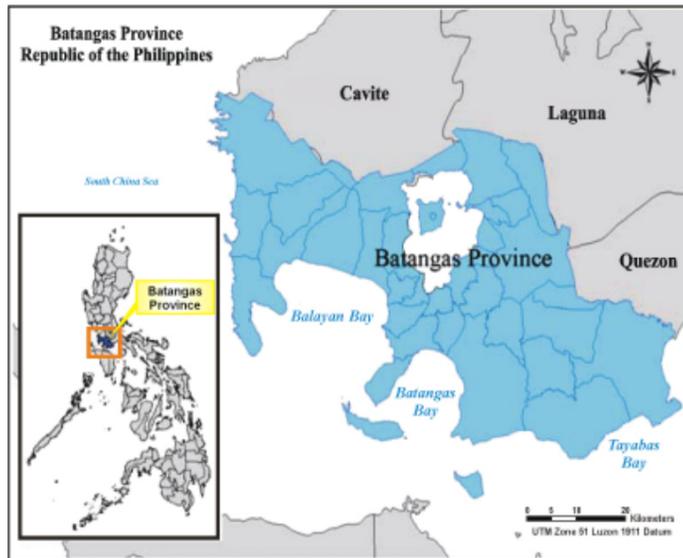


Figure 7 Map of Batangas Province

Source: GEF/UNDP/IMO/PEMSEA. Securing the future through ICM: The Case of Batangas Bay Region. Quezon: PEMSEA, 2006.

Batangas plays a major role as the region's industrial heartland, hosting key corporations such as Shell Philippines, Batangas Coal Fired Thermal Power Plant, First Gas Corporation and chemical and textile manufacturing. Heavy industries are the most important users of the bay. In addition, coasts and inland areas in the province are important for agriculture and fishery production, with 61% of the province's total area devoted to agriculture and more than 3,000 fishers dependent on fishing for their livelihood. With further development of industries, Batangas faces increasing risks of pollution from oil spills and ship accidents and escalating conflicts in resource use. Recognizing the limitations of sectoral solutions, ICM was introduced as a viable approach to resolving multi-dimension management issue affecting the area. The experience can be summarized as follows:

- 1) Stakeholder participation is vital during the planning and preparation phase. A cross-disciplinary management team and professionals representing the stakeholders should be formed as early as possible, with the ability to build a critical mass of stakeholders with commitment and interest in developing solutions to perceived problems and issues. Heightened public awareness on the necessity of managing the marine environment helps to strengthen the determination of the government to undertake pragmatic solutions.
- 2) Political leadership is always required to initiate and sustain successful ICM programs through the provision of resources, legal mandate, and overall direction for local stakeholders. Clear legal mandates enhance efforts to integrate the



activities of diverse sectors and institutions. It is important to start early with activities to clarify and harmonize the legal framework.

- 3) Making scientific advice available at the local level through integrated planning and management improves efficiency and effectiveness of management interventions.
- 4) Moving to strategic action planning once the project is launched and enough information and awareness have been generated. Developing a plan that builds on good information, evolves with the planning process, and identifies roles, responsibilities and resources.
- 5) While an ICM initiative might be triggered through external funding and developed by external support, efforts should be made by local government and other stakeholders to share the costs.
- 6) It is important that the project design pays particular attention to how results and impacts will be monitored and measured. Environmental quality criteria should be set at the outset and baseline information secured as basis for comparison.<sup>84</sup>

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84. GEF, UNDP, IMO, PEMSEA. Securing the future through ICM – the case of Batangas Bay Region. Quezon: PEMSEA, 2006.



## Chapter 4: Challenges and Future Prospects of APEC Marine Sustainable Development

Social well-being and prosperity in the Asia-Pacific Region are vitally dependent on the products and services the marine ecosystems provide. Healthy oceans and coasts are critical not only for food security, but also for poverty eradication, sustainable economic growth, preservation of traditional culture, and trade facilitation. Additionally, coastal and marine ecosystems play a very important role in global water and hydrology regulation, climate change mitigation, erosion and storm protection and air quality maintenance, etc. However, human actions are diminishing the capacity of many marine ecosystems to provide these services. It is important for APEC marine sustainable development to realize the objective of the 2013 Leaders Declaration, *Resilient Asia-Pacific, Engine of Global Growth*. It is therefore essential to analyze the major threats, probe the root causes of environmental degradation and propose priorities and recommendations for marine sustainability in the Asia-Pacific region.

### 4.1 Threats to APEC's Ocean and Coastal Resources

With fast economic development and population increase in the Asia-Pacific region, the cumulative effects of human actions, combined with climate change, are threatening the long-term sustainability of coastal and marine resources. To adopt and implement effective measures, it is important to understand and acknowledge the full consequences of failing to take actions.

#### (1) Polluted waters

Despite great efforts to prevent and control pollution, the densely populated Asia-Pacific



region's marine water quality continues to show signs of deterioration<sup>85,86</sup>, thereby threatening marine biodiversity, compromising human health and undermining economic development.

The oversupply of nitrogen, phosphorus, and other nutrients in coastal ecosystems is one of the most widespread pollution problems. Nutrient enrichment has resulted in expansion of hypoxic zones, and detrimental effects on ecosystem functions and marine industries such as tourism, aquaculture and fisheries. As a result, algal blooms have become increasingly common in the last 20 years, with major outbreaks in Australia, China, Japan, New Zealand, the Philippines and Korea. In addition, mercury contamination in seafood is increasing and frequently exceeds safe levels for human consumption. Seawater mercury concentration trajectories in areas such as the North Pacific Ocean are projected to increase by more than 50% by 2050 (Sunderland and Selin, 2013).

Fuelled by economic growth, population increase, rapid industrialization and urbanization, the Asia-Pacific region is also facing rapidly growing challenges of organic and inorganic pollutants from sewage, solid wastes including plastics, dumping of toxic materials, oil spills, coal burning and chemical pollution, which threaten both the environment and socio-economic status of economies. Additionally, aquaculture results in pathogenic contamination and eutrophication, for example, the development of shrimp farms leads to salinization of coastal lowlands.<sup>87</sup>

## **(2) Invasive species and biodiversity loss**

Across the APEC economies and throughout the world, invasive species of plants and animals are being intentionally and unintentionally introduced into new ecosystems. Most non-native marine animals and plants are introduced through the discharge of ballast water and holding tanks from ships. At least 7,000 different species of marine life are transported around the world every day.<sup>88</sup> Further contributors to the spread of invasive species include the aquarium trade, fisheries-related activities, floating marine debris, boating, navigational buoys, and drilling platforms.

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85. UN Economic and Social Commission for Asia and the Pacific. Review of State of the Environment in Asia and the Pacific, 2000. E/ESCAP/SO/MCED(00)/1.

86. UN Economic and Social Commission for Asia and the Pacific. Review of State of the Environment in Asia and the Pacific, 2005. E/ESCAP/SO/MCED(05)/1.

87. UNEP. Global Environment Outlook-5. Nairobi, UNEP, 2012.

88. Carlton, J.T., Reid, D.M., and van Leeuwen, H. Shipping study. The role of shipping in the introduction of nonindigenous aquatic organisms to the coastal waters of the United States (Other Than the Great Lakes) and an analysis of control options. The National Sea Grant College Program/Connecticut Sea Grant Project R/ES-6. Report #CG-D-11-95. Washington, DC, and Groton, CT: USA Department of Transportation and USA Coast Guard, 1995.



Invasive species compete with other species for habitats and food and may induce disease, and disturbed habitats are more prone to invasions. Invasive species can alter the functions of entire ecosystems. While few economies and territories in the Asia-Pacific region have documented research on invasive (non-indigenous) species, evidence suggests that marine invasive species, identified in 18 locations, can adversely affect the habitats they invade both ecologically and economically.<sup>89</sup> Over 500 non-native species have become established in coastal marine habitats of North America, hundreds of which can be found in a single estuary.<sup>90</sup> The biological diversity of Asia and the Pacific is extremely rich. For a range of marine species including corals, mangroves and fish populations, the India-Australian Islands tropical waters is the center of the world's biodiversity. Despite efforts by governments to expand protected areas and encourage innovative policies and financing, the scale of these efforts does not match the extent of biodiversity and habitat loss in the region. The main pressures on biodiversity include habitat loss and degradation, overexploitation, alien invasive species associated with high shipping volumes in the Pacific, climate change and pollution. Marine biodiversity loss is a huge concern in the region, leading to losses in food sources and economic opportunities while increasing the negative impacts of coastal hazards.

The emerging economies of Asia and the Pacific are exerting considerable pressures on biodiversity and habitats. South-East Asia is a terrestrial and marine biodiversity hotspot, yet two thirds of the economies in the region have experienced an increase in the number of threatened species between 2008 and 2010. Two-thirds of the region's natural areas and wildlife habitats have already been destroyed and many wild flora and fauna are now threatened by extinction.<sup>91</sup>

The degradation of coastal ecosystems has been accelerated by the decline of ecological resilience and human-induced climate change. Productive marine ecosystems such as coral reefs, mangrove forests, salt marshes, seagrass beds, and kelp forests which provide enormous value to the Asia-Pacific region have also been adversely affected.<sup>92</sup> About 60% of the mangroves in Asia and the Pacific have already been cleared due to coastal development, land reclamation and aquaculture activities. Most coral reefs in South Asia have been

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89. Center for ocean solutions. Pacific ocean syntheses. California: The Woods Institute for the Environment, Stanford University, 2009.

90. U.S. Commission on Ocean Policy. An Ocean Blueprint for the 21st Century. Washington, D.C.: U.S. Commission on Ocean Policy, 2004.

91. ASEAN Center for Biodiversity. ASEAN Biodiversity Outlook (2010). Laguna: ASEAN Center for Biodiversity., 2010.

92. Asia Pacific Forum for Environment and Development. APFED II Final Report-Driving Innovation for Sustainable Asia and Pacific. Kanagawa: APFED secretariat,2010.



impacted negatively by coral bleaching and ocean warming due to global climate change. Coastal coral reefs are affected negatively by increased sedimentation, which has occurred due to the degradation of mangrove and sea grass areas that function as sediment traps.<sup>93</sup>

### **(3) Declining resources**

Fishery declines, degraded coastal habitats, and invasive species are compromising APEC economies' ability to meet current and future demands for healthy and productive marine resources.

More than half of the reported global fisheries landings are caught in the Pacific Ocean, providing annual gross revenues amounting to approximately US\$ 50 billion every year. With the introduction of modern fishing techniques, the production of marine fisheries in the region increased by an average of 2.9% per year during the period 1975–1996. The total catch increased from around 10 million tons in the 1950s, reaching a peak at around 80 million tons in the early 1990s. The total catch dropped to around 45 million tons in the 2000s. In general, most fisheries resources (about 87% in 2009) in the Pacific Ocean are currently fully or over exploited. These stocks yielded catches that were already at or exceed their maximum sustainable production. Some regions are already experiencing far more dramatic losses. For example, in the northern South China Sea, vulnerable fish species such as skates and rays have declined by over 90% during the last 40 years. Analysis of fisheries in many Small Island Developing States in Oceania and Asia points to an estimated loss of production of 55%–70%, with devastating consequences for local economies (FAO, 2011). Overexploitation of these resources has been a continuing threat to ecosystem integrity and functioning.

### **(4) Multiple conflicting uses of oceans and coasts**

APEC's marine environment currently hosts a variety of land-and ocean-based human activities, including shipping, fishing, tourism, oil and gas exploration and marine renewable energy development (wind and wave energy), etc. As population density rises in APEC economies' coastal zones, the need for ocean space is growing fast in order to meet a myriad of overlapping and conflicting interests.

There may be conflicts between different types of use of the sea (e.g. between offshore wind

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93. Asia Pacific Forum for Environment and Development. APFED I Final Report-Driving Innovation for Sustainable Asia and Pacific. Kanagawa: APFED secretariat, 2004.



development and fishing), or between resource use and nature conservation (e.g. between port developments and protected areas). Typical manifestations of conflicts among users involve: 1) competition for ocean or coastal space, including shoreline resources; 2) adverse effect of one use, such as oil development, on another use, such as fisheries; and 3) adverse effects on ecosystems (Cisin-sain and Knecht, 1998). An additional complexity is that there are emerging or increasing interests such as public right to access beaches and to protect the environment and vulnerable habitats. Such public interests typically conflict with private interests.

The competition for ocean and coastal space among various stakeholders often results in severe conflicts and destruction of the functional integrity of the resource system. Under the current “sector-by-sector” or “use-by-use” approach, different uses of the ocean are planned and managed under different laws and by different government agencies. Because of the lack of coordination between these laws and agencies, decisions made for one ocean use can end up conflicting with another.

### **(5) Climate change and natural hazards**

Emissions of greenhouse gases due to human activities continue altering the atmosphere in ways that are expected to affect the climate. The Asia-Pacific is the fastest growing source of greenhouse gas emissions globally. Rapid economic growth over the past 20 years, particularly in the larger economies, has been accompanied by increasing emissions of greenhouse gases and degradation of natural capital.<sup>94</sup> A large portion of the greenhouse gas emissions are absorbed by the oceans. Ocean warming accounts for over 90% of the energy accumulated in the global climate system between 1971 and 2010. On a global scale, the ocean warming is largest near the surface, and the upper 75 m warmed by 0.11 degree Celsius [0.09 to 0.13] per decade over the period 1971 to 2010.<sup>95</sup>

Climate change has many implications for sustainable development in the Asia and Pacific region because of its multiple impacts on the environment and society. Pacific economies have already suffered strong effects from ocean warming, changes in ocean circulation, and abrupt shifts in precipitation patterns. Many areas of the Asia-Pacific region may become uninhabitable due to sea level rise. Sea-level rise and tropical cyclones could potentially

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94. UNEP. Global Environment Outlook–5. Nairobi, UNEP, 2012.

95. Page 3 in IPCC, 2013: Summary for Policymakers. In: Climate Change 2013: The Physical Science Basis. Contribution of Working Group I to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change. Cambridge, United Kingdom and New York, NY, USA: Cambridge University Press.



displace tens of millions of people in low-lying coastal areas. For the island states in the Pacific, such as the Cook Islands, Kiribati, Nauru, Niue, the Marshall Islands etc., the threats of global warming, sea level rise, flood, drought and other natural disasters have devastating impacts.

Changes in sea water temperature and atmospheric and ocean carbon dioxide levels can also exacerbate threats to biodiversity. Marine species such as reef-building corals are particularly sensitive to such changes. Recent studies project that tropical Pacific will suffer from a large reduction in potential fish catch by 2050 compared with the 2000s under one of the climate change scenarios. Moreover, modeling projections for marine fishes and invertebrates suggest that ocean acidification, combined with surface temperature increase and de-oxygenation, may lead to up to an extra loss equivalent to 30% of the catch potential (Pachauri and Reisinger, 2007).

Human communities and the environment are increasingly suffering from the effects of natural disasters. In the Asia-Pacific region, there has been a general trend of increased frequency of natural disasters due to hydro-meteorological events (such as cyclones and flooding), while the frequency of geophysical disasters such as volcanic eruptions, earthquakes and tsunamis has remained fairly stable. In 1997 the region suffered 33% of the world's worst catastrophes, 67% of total casualties and 28% of the global economic losses due to disasters.<sup>96</sup>

Of the ten economies in the world that are at greatest risk from climate change impacts, six are in the Asia-Pacific- including low-lying Pacific island economies, which may eventually disappear due to sea level rise and extreme weather events<sup>97</sup>.

## 4.2 Factors Affecting Ocean Sustainability

In the Asia-Pacific region, the cumulative effects of human actions combined with climate change threaten the long-term sustainability of ocean and coastal resources. The section focuses on the factors that lead to unsustainable use of ocean resources, particularly an insufficient understanding of the oceans and associated values, inadequate institutional arrangements, a lack of ability to address climate change and a lack of mechanisms to share information and knowledge.

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96. Asia Pacific Forum for Environment and Development. APFED I Final Report-Paradigm Shift towards Sustainability for Asia and the Pacific-Turning Challenges into Opportunities-Kanagawa: APFED secretariat, 2004.

97. UNEP. Global Environment Outlook-5: summary for policy makers, Nairobi, UNEP, 2012.



### **(1) Inadequate understanding of the value of the oceans**

Economic signals—reflected in prices and government policies—are one of the prime factors determining our behavior and the decisions we make about our assets. They underlie our choices of what to consume and how to manage our lands and our businesses. Similarly, the values we assign to ocean and coastal ecosystem assets—goods and services like climate regulation, air quality maintenance, erosion and storm protection, nitrogen fixation, and carbon storage—are an important factor in determining how we manage marine ecosystems.

One of the concerns is that many of the services the ocean and coastal ecosystems provide are not tradable in the marketplace and are therefore hard to assign a value to. How much is carbon storage in ocean worth? What price tag can be put on erosion and storm protection provided by the coastal wetlands? Furthermore, the connections between ecosystem services and marketable goods—coastal timber or fish—are not always obvious to those benefiting from these goods and services. For example, the value of healthy ecosystems in sustaining fish stocks may not be obvious to an individual fisherman trying to maximize his or her profit. As a result, most ecosystem services have been undervalued in the past and neglected in decisions about whether to exploit or alter an ecosystem. The market often fails to register the real value of these services in its price system, which can be labeled as a “market failure”.

In the past decades, economists have applied a variety of tools to assign a monetary value to direct—and even some indirect and intangible—ecosystem services (Gordon,1954; Solow,1974; Hanemann, 1994;Costanza,1997). Although there are some debates about the contingent valuation methods—a primary method to quantify the non-use or existence value in academic circle (Carson, 2012; Hausman, 2012), ecosystem valuation has been integrated into decision making in some APEC economies.

### **(2) Insufficient scientific knowledge of oceans**

Scientific understanding of the ocean helps us make better decisions for formulating sustainable policies, planning economic activities, and developing new technologies. Encouraged by the core programs on environmental change established after Rio 1992<sup>98</sup>, marine scientific research has progressed considerably in the last 20 years, providing a basic

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98. E.g. World Climate Research Program (WCRP), International Geosphere-Biosphere Program (IGBP), DIVERSITAS, and Earth System Science Partnership (ESSP), etc..



understanding of: 1) ocean physics through models describing patterns of change in the ocean (temperature and currents); 2) ocean chemistry particularly related to ocean carbon cycle, and related acidification processes, as well as de-oxygenation; 3) ecosystem functioning, including climate change impacts and cumulative impacts on marine biota.<sup>99</sup>

Despite domestic and international efforts and initiatives, to date there are still knowledge gaps which undermine our ability to pursue marine sustainable development. Although the impacts of human activities and natural factors on marine ecosystems are reported and observed, we still have incomplete quantitative understanding of the impact of multiple and simultaneous stresses, including climate change, fisheries, ocean acidification and de-oxygenation on species, size distribution, life stages and trophic dynamics. These quantitative understandings are crucial to policy making.

Although scientists have observed that trends in sub-surface oxygen exist, there is no coherent understanding of the patterns of change. In fact, the effects of de-oxygenation are still poorly known, such as the impacts of oxygen stress on fish and other marine organisms, reduction in available habitat and changes in growth performance of fish.

The oceans are acidifying at probably the fastest rate for 65 million years. But the effects of acidification on the food chain are still unclear. And the implications of acidification for the three billion people who depend on fish for protein are unknown.<sup>100</sup>

It must be recognized that narrowly focused, single-disciplinary science alone cannot adequately underpin policies and solutions to resolve major sustainability challenges. To meet the need of scientific understandings on marine sustainability, it is imperative to ensure effective interdisciplinary collaboration across natural and social sciences, humanities, economics, and technology development.

### **(3) Need for improved policies and mechanisms for ecosystem-based management**

Traditionally, governmental agencies and departments concerned with natural resources and ocean/coastal-related activities have been given sectoral jurisdiction and responsibilities

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99. Expert Group meeting on Oceans, Seas and Sustainable Development: implementation and follow-up to Rio+20 (18 & 19 April 2013) – Summary, <http://sustainabledevelopment.un.org/2014/3/1>.

100. UNEP. Environmental consequences of ocean acidification: a threat to food security, Nairobi: UNEP, 2010.



(Lévy, 1998; Juda, 2003). The fragmented system for managing oceans and coasts has proven to be ineffective for addressing the trans-boundary environmental and resources issues. With advancements in scientific understanding of marine ecosystems and increasing awareness of the cumulative impacts of industry activities on the ecosystems, it has become a common understanding that a holistic or integrated management approach is needed to ensure the sustainability of marine ecosystems (Underdal, 1980; Pew Ocean Commission, 2003; US Commission on Ocean Policy, 2004; Link, 2002; Anon,1999).

Ecosystem-based management (EBM) is an integrated approach to management that considers the entire ecosystem, including humans. The goal of ecosystem-based management is to maintain an ecosystem in a healthy, productive and resilient condition so that it can provide the services vital for the society. Ecosystem-based management differs from traditional approaches that usually focus on a single species, sector, activity or concern; on the contrary, it considers the cumulative impacts of different sectors.<sup>101</sup>

There are tangible evidences in some APEC economies that principles and philosophy of EBM are increasingly being accepted and followed. There is considerable volume of published literature on EBM. EBM research and demonstration projects have been undertaken. Extensive professional and public discussions have focused on practical ways to further the adoption of EBM principles. Administrative organizations are experimenting with new organizational designs, leadership models, and communication forums. And new laws and policies have been proposed and adopted that would explicitly address EBM in some economies.

Adopting the EBM paradigm would mean rejecting traditional paradigms, the values, theories, methodologies, and tools of ocean and coastal management which have been developed through years of trial and error. EBM are primarily designed for the purpose of sustaining ecosystem health but not maximizing short-term socioeconomic gains. Implementing EBM will require extensive social and political changes, ranging from redefinition of the values of nature to reform of traditional resource management institutions. Implementing EBM presents a major political challenge to APEC economies, and innovative policies and mechanisms will be needed to support EBM.

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101. Communication Partnership for Science and the Sea (COMPASS).Scientific consensus statement on marine ecosystem-based management.2005. [http://compassonline.org/pdf\\_files/EBM\\_Consensus\\_Statement\\_v12.pdf](http://compassonline.org/pdf_files/EBM_Consensus_Statement_v12.pdf).2014/3/1.



#### **(4) Lack of capacity for addressing the potential effects of the climate change and ocean acidification**

Current research shows that climate change poses a great risk to ocean ecosystems and threatens sustainable development in the Asia-Pacific region. Several high level APEC statements have emphasized that marine and coastal resources are an integral part of the carbon cycle and have prioritized addressing the impacts of climate change on the oceans.<sup>102</sup> During the 2013 APEC SOM1, the *Outcome of the Steering Committee on Economic and Technical Cooperation Committee of the Whole (SCE-COW) Dialogue on Mainstreaming Ocean-Related Issues* also identified the ocean's role in climate change mitigation and adaptation as an area of cooperation that should be further promoted in APEC. It is therefore imperative to improve information exchange and the capacity for addressing the potential effects of the climate change.

Although climate change has become an increasingly important issue, there is still a lack of research documenting place-based, present and future impacts of climate change.<sup>103</sup> Extreme events and slow-onset impacts of climate change are already surpassing the capacities of economies to prevent loss and damage through risk reduction and adaptation.<sup>104</sup> These associated losses and damage now require new approaches to finance, compensation and rehabilitation. New approaches must also consider the challenge of addressing non-economic losses.

Ocean acidification is likely to have wide-ranging impacts on marine life, with negative implications for sustainable development<sup>105</sup>, food security<sup>106,107</sup> and economic diversification (Cooley and Doney, 2009). Despite its potential to be regionally and globally disruptive, it seems that the problem of ocean acidification is only beginning to be addressed in policy discussions relating

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102. including the Sydney APEC Leaders' Declaration on Climate Change, Energy Security and Clean Development ,2007; the Singapore APEC Leaders' Declaration,2009; the Paracas Declaration and Action Plan (2010); the Yokohama APEC Leaders' Growth Strategy ,2010; and the outcome of the APEC Meeting of Ministers Responsible for the Environment .2012.

103. Center for ocean solutions. Pacific ocean syntheses. California: The Woods Institute for the Environment, Stanford University, 2009.

104. UNFCCC. Background paper to the expert meeting on: A range of approaches to address loss and damage associated with the adverse effects of climate change, including impacts related to extreme weather events and slow-onset processes. Bridgetown, Barbados, 2012,9–11 October.

105. UN-DESA, Ocean Acidification: A Hidden Risk for Sustainable Development, Copenhagen Policy Brief No. 1.New York: Division of Sustainable Development, Department for Economics and Social Affairs, United Nations,.,2009.

106. UNEP. Environmental Consequences of Ocean Acidification: A Threat to Food Security, UNEP Emerging Issues. Nairobi: UNEP,2010.

107. UNEP. Proposed Amendment to the Montreal Protocol, Note by the Secretariat, UNEP/OzL.Pro.WG.1/30/5, Open ended Working Group of the Parties to the Montreal Protocol on Substances that Deplete the Ozone Layer. Nairobi: UNEP,2010.



to CO<sub>2</sub> emissions and has only recently been included in discussions within the *United Nations Framework Convention on Climate Change* (UNFCCC).<sup>108</sup> The recent Rio+20 Conference outcome document stresses the need to prevent further ocean acidification, and to support research, monitoring and observation of ocean acidification.<sup>109</sup> The Rio+20 Conference also saw the announcement of the Ocean Acidification International Coordination Centre by the International Atomic Energy Agency (IAEA).<sup>110</sup>

In addition to high-level political commitments and scientific research, local capacity and resilience in risk management, infrastructure development, and vulnerability reduction are also very important for collective actions in addressing the impacts of climate change.

#### **(5) Uncoordinated information sharing**

Sufficient, coordinated and consistent information is the basis for sustainable ocean and coastal management. At APEC regional level, there exists a large amount of information and scientific knowledge about the ocean, its biodiversity, biogeochemical processes, ecosystem services, the impact of human activities on the marine environment and climate change, and the impacts of environment change on the well-being of societies. But a large part of these knowledge and information, which are observed, and collected by different economies and research agencies, are not integrated into decision making because of a lack of information sharing mechanisms. At economy level, many sectoral agencies are responsible for monitoring the marine environment. However, monitoring standards are different from sector to sector, and the data collected are inconsistent in terms of frequency and accuracy. A lack of consistency in data collection methods and standards creates many difficulties for data sharing between various agencies and economies, and effective policymaking is challenged due to the existence of incompatible data. The lack of a common information-sharing platform leads to resource inefficiencies and incorrect or faulty policy decisions in the worst cases. The 2013 APEC leaders' informal meeting addressed the importance of information sharing as a common theme for action across APEC economies, wherever possible, mechanisms for cooperation, collaboration, and the sharing of knowledge and best practices, both among APEC economies and more broadly should be supported.

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108. Harrould-Kolieb, E. R., Herr, D.. Ocean acidification and climate change: synergies and challenges of addressing both under the UNFCCC. *Climate Policy*, 12(3), 378–389.

109. United Nations. *The Future We Want*. Outcome document of UN Conference on Sustainable Development (Rio+20) Conference. Rio de Janeiro, Brazil, June 20–22, 2012.

110. IAEA. <http://www.iaea.org/nael/page.php?page=22602014/05/06>.



### 4.3 Suggestions for APEC Marine Sustainable Development

The ocean and coasts in the Asia-Pacific region are priceless assets, and are vital for economic growth and sustainable development in the Asia-Pacific Region.<sup>111</sup>APEC 2013 Leaders' Declaration *Resilient Asia-Pacific, Engine of Global Growth*, endeavored to pursue cross-sectoral work under the APEC Initiative on Mainstreaming Ocean-related Issues that will maintain the health and sustainability of our oceans and coastal resources for the benefit of food security, poverty eradication, preservation of traditional culture and knowledge, conservation of biodiversity and facilitation of trade and investment.

In light of the challenges that APEC economies face, the progress made and the good practices documented, efforts to further advance marine sustainable development could focus on the areas outlined below. It is beyond the scope of this report to develop a comprehensive set of recommendations; rather, improvements in the following areas are suggested as long-term priorities for consideration by APEC economies and relevant sub-fora, particularly OFWG, to enhance trade, investments, marine environmental protection and marine sustainable development.

#### (1) Strengthening regional cooperation

Regional cooperation is urgently needed because of the complex and trans-boundary nature of ocean and coastal issues and challenges. Furthermore, ocean-related activities cut across a number of APEC groups, including the Committee on Trade and Investment (CTI), Energy Working Group (EWG), Policy Partnership on Science, Technology and Innovation (PPSTI), Life Sciences Innovation Forum (LSIF), Transportation Working Group (TPTWG), and others. The 2010 *Paracas Declaration* and the Third APEC Oceans-Related Ministerial Meeting proposed to support wherever possible mechanisms for cooperation, collaboration, and the sharing of knowledge and best practices, both among APEC economies and globally. As a common theme for action across all of these areas, regional cooperation could be further promoted in APEC.

Regional cooperation can be strengthened by implementing measures such as:

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111. See the Paracas Declaration (2010), the Seoul Oceans Declaration (2002), the Bali Plan of Action (2005), the Niigata Food Security Declaration (2010), and Food Security Ministerial Statement (2012).



- supporting a more active role by APEC centers functioning as platforms for regional cooperation, such as the APEC Marine Sustainable Development Center and the APEC Marine Environmental Training and Education Center;
- promoting the sharing of data, information and knowledge among APEC economies in the area of ocean observation and forecasting, and the integration of data and information into regional and global ocean observation and forecasting systems;
- formulating a process to jointly review progress, identify challenges and share best practices in marine sustainable development on a regular basis, which could take the form of a APEC Marine Sustainable Development Report, compilation of economy reports, and/or other forms; and
- improving collaboration between different APEC sub-fora, and between APEC and other regional and international organizations, including those from the private sector; supporting the OFWG and its precursor groups playing a leading role in ocean-related activities in APEC.

## **(2) Scaling up best practices of ecosystem-based management**

Ecosystem-based management is thought to be an effective way of proactively governing ocean uses, resources and problems across multiple jurisdictions, and protecting and sustaining the ocean and coastal ecosystems and their function. Ecosystem-based management is being advanced at many scales in both terrestrial and aquatic environments, and APEC could take a more active role in promoting the application of related principles and approaches.

Measures for scaling up ecosystem-based management could include:

- encouraging joint projects and activities among APEC sub-fora and APEC economies to assess the value of ecosystem services provided by coastal and marine ecosystems;
- promoting integrated, science-based management of watersheds, coasts and marine environments and land-sea integration in the planning and management of marine activities;
- promoting ecosystem-based management at a regional scale by establishing networks



of marine protected areas and cross-border marine spatial planning; and

- enhancing the conservation of large marine ecosystems by participating in the UNEP Regional Seas Programs,<sup>112</sup> Coral Triangle and other regional initiatives.

### **(3) Maintaining and improving ocean health**

Maintaining and improving ocean health is imperative: more than a half billion people in the APEC region rely directly on oceans for their livelihoods. It is important to identify the drivers of ecosystem degradation and implement various measures (regulatory, economic and scientific) to maintain or restore ecosystem health.

Actions for maintaining and improving ocean health could include:

- promoting a better understanding of marine ecosystems, for example by encouraging APEC economies to participate in the “Regular Process for Global Reporting and Assessment of the State of the Marine Environment, including Socio-economic Aspects” undertaken by the United Nations;
- encouraging sustainable use of coastal and marine resources through better regulation and incentive programs, and the elimination of harmful subsidies and other incentives for unsustainable fishing and development activities;
- promoting the implementation of international and regional instruments such as the Global Program of Action for the Protection of the Marine Environment from Land-based Activities (GPA) to combat cross-border marine pollution; and
- promoting large-scale ecological restoration of coastal wetlands, mangroves, sea grass beds, coral reefs and other critical habitats.

### **(4) Mainstreaming ocean-related issues across APEC**

APEC economies are connected by the largest ocean in the world, which provides us with abundant resources that support economic growth. The importance of ocean and marine

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112. The Coordinating Body on the Seas of East Asia (COBSEA), South Pacific Regional Environment Programme (SPREP), Northwest Pacific Action Plan’s Regional Coordinating Unit (NPAPRCU), and The Partnerships in Environmental Management for the Seas of East Asia (PEMSEA).



resource sustainability has been recognized as an integral part of sustainable growth under the APEC Growth Strategy. Mainstreaming ocean related issues will support the attainment of sustainable and inclusive development in the Asia Pacific, and reaffirm the commitment to strike a balance between economic growth, social development and environmental protection.

Suggested actions for mainstreaming ocean-related issues include:

- increasing coordination and cooperation among marine policy makers in APEC economies;
- encouraging APEC economies to implement high-level instructions on mainstreaming ocean-related issues and to take measures to speed up mainstreaming processes within their economies;
- enhancing trade and investment opportunities for sustainably harvested marine fisheries and aquaculture products, and improving value chain for small-scale fisheries and aquaculture; and
- supporting mapping and regular updating of APEC ocean-related projects to provide an overview of ocean-related activities across different APEC sub-fora, and supporting joint programs between the Ocean and Fisheries Working Group (OFWG) and other relevant sub-fora including the APEC Committee on Trade and Investment (CTI) and APEC Business Advisory Council (ABAC).

### **(5) Furthering discussion and initiatives on Blue Economy**

In recent years, the blue economy concept was introduced in some APEC economies as a way of applying green economy principles to oceans and coasts. APEC economies face the challenge of how to boost economic growth and at the same time ensure environmental sustainability and social equity. As ocean-based sectors are making a greater contribution to the domestic economy and coastal and marine ecosystems are under increasing threat, further discussion and initiatives on Blue Economy would be useful for APEC economies to advance sustainable management and conservation of ocean and coastal resources and ecosystems and sustainable development, in order to foster economic growth.

Further efforts to promote Blue Economy could focus on the following aspects:



- strengthening regional cooperation, policy dialogue and knowledge-sharing among APEC economies on the understanding, principles and approaches of Blue Economy, including convening the APEC Blue Economy Forum on a regular basis;
- documenting and sharing concrete examples of good practice in achieving sustainable, science-based, environmentally friendly, inclusive and equitable marine economic growth through Blue Economy approach;
- encouraging facilitation of investments in the application of environmentally friendly technologies in marine industries; and
- promoting public-private dialogue and active involvement of the private sector in Blue Economy.

## **(6) Integrating fisheries and marine resources into food security**

The contribution of marine resources, fisheries, and aquaculture products are critical to ensure food security, sustainable livelihoods, and economic prosperity worldwide. Achieving sustainable management of fisheries in the Asia-Pacific region faces many challenges, such as over exploitation, illegal, unreported, and unregulated fishing and the degradation of important fish habitats. Addressing these challenges and enhancing APEC economies' understanding of the role of fisheries, aquaculture and ocean resources in regional food security are imperative.

Suggested measures for integrating fisheries and marine resources into food security include:

- promoting a better understanding on the link between fisheries resource sustainability food security and food safety in APEC;
- promoting good practices in ecosystem-based fisheries management in APEC economies to provide high-quality protein to coastal communities, enhance fish stocks and reduce the ecological impacts of fishing activities;
- strengthening regional and international cooperation on combating IUU fishing, and supporting effective control and surveillance programs; and
- encouraging sustainable mariculture practices that enhance the added value of mariculture products while reducing environmental impacts and improving the livelihoods of fish farmers.



## **(7) Enhancing disaster risk reduction and resilience**

APEC economies are confronting the challenge of climate variability and natural disasters. Healthy and productive oceans and coasts play an important role in natural disaster risk reduction, and underpin the well-being of coastal communities.

The following measures could be taken to enhance disaster risk reduction and resilience:

- promoting a better understanding on the role of coastal and marine ecosystems in mitigating climate change and increasing disaster resilience;
- promoting the further development of marine disaster forecasting and warning capability at domestic, regional and international levels, the sharing of information among APEC economies, and the timely delivery of disaster information to the public;
- enhancing education and capacity building on disaster reduction to help the private sector and coastal communities to be better prepared for and placed to recover from marine disasters, and promoting a more active role of the private sector in disaster response and relief efforts; and
- improving collaboration between OFWG and the Emergency Preparedness Working Group in marine disaster risk reduction and response.

## **(8) Improving educations and public awareness**

Public support and engagement are essential for successfully addressing complex ocean- and coastal-related challenges, striking a balance between the use and conservation of marine resources, and reaping future benefits from the ocean. High quality, life-long ocean education is important for improving ocean literacy and instilling a widespread sense of stewardship of the ocean. Incorporating ocean-related elements into school curricula can help improve understanding of the ocean and its value among the younger generation and nurture the next generation of ocean leaders.

In addition, informal education aimed at the wider population helps raise awareness and support for marine sustainable development. It is worth exploring possible pathways to increase ocean awareness within current mechanisms in APEC, including but not limited to: APEC Cross Border Education Cooperation, APEC Youth Summit, APEC Young Entrepreneurs' Summit (ABAC), and APEC Youth Science Festival (PPSTI).



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## List of Acronyms

Acronyms	Full Name
ABAC	APEC Business Advisory Council
AMETEC	APEC Marine Environmental Training and Education Center
AMSDC	APEC Marine Sustainable Development Center
AOMMs	APEC ocean-related ministerial meetings
APEC	Asia-Pacific Economic Cooperation
ASEAN	Association of Southeast Asian Nations
BBR	Batangas Bay Region
BBREPC	Batangas Bay Region Environment Protection Council
CCA	Climate Change Adaptation
CI	Conservation International
CSIRO	(Australia) Commonwealth scientific and Research Organization
CTI	APEC Committee on Trade and Investment
CTI/CTI-CFF	Coral Triangle Initiative on Coral Reefs, Fisheries and Food Security
EAFM	Ecosystem Approach to Fisheries Management
EASAP	the Action Plan for the Protection and Development of the Marine Environment and Coastal Areas of the East Asian Seas Region
EBM	Ecosystem-based Management
EPWG	APEC Emergency Preparedness Working Group
EWG	APEC Energy Working Group



Acronyms	Full Name
FAO	Food and Agriculture Organization
FARPL	(Russia) Fisheries and Aquatic Resources Protection Law
FWG	APEC Fishery Working Group
GEF	Global Environmental Facility
GOP	Gross Ocean Product
GPA	Global Programme of Action for the Protection of the Marine Environment from Land-based Activities
IAS	Invasive Alien Species
ICM	Integrated Coastal Zone Management
IMO	International Maritime Organization
IMOS	Integrated Marine Observing System
IMSCB	(Indonesia) Maritime Security Coordinating Board
IOC	Intergovernmental Oceanographic Commission
IOOS	Integrated Ocean Observing System
IPCC	Intergovernmental Panel on Climate Change
IUCN	World Conservation Union
IUU	Illegal, Unreported and Unregulated Fishing
LNG	Liquid Natural Gas
LSIF	APEC Life Sciences Innovation Forum
MARPOL	International Convention for the Prevention of Pollution from Ships
MCRMP	(Indonesia) Marine and Coastal Resources Management Project
MPA	Marine Protected Areas
MRCWG	Marine Resource Conservation Working Group



Acronyms	Full Name
MSD	Marine Sustainable Development
NGO	Non-governmental Organization
NOAA	(USA) National Oceanic and Atmospheric Administration
NOEP	(USA) National Ocean Economics Program
NOWPAP	the Action Plan for the Protection, the Protection, Management and Development of the Marine and Coastal Environment of the Northwest Pacific Region
NPOCE	Northwestern Pacific Ocean Circulation and Climate Experiment
OFWG	APEC Ocean and Fisheries Working Group
PEMSEA	Partnerships in Environmental Management for the Seas of East Asia
PICES	North Pacific Marine Science Organization
PPFS	APEC Policy Partnership on Food Security
RFMOs	Regional Fisheries Management Organizations
Rio+20	the Conferences on Sustainable Development
ROK	Republic of Korea
SCE-COW	APEC Steering Committee on Economic and Technical Cooperation Committee of the Whole
SEAGOOS	Southeast Asia Global Observing System
SIDS	Small Island Developing States
SOA	(China) State Oceanic Administration
SPAP	the Action Plan for the Protection of the Marine Environment and Coastal Areas of the South-East Pacific
SPREP	(Secretariat of) Pacific Regional Environment Program
TPTWG	APEC Transportation Working Group
UN	United Nations



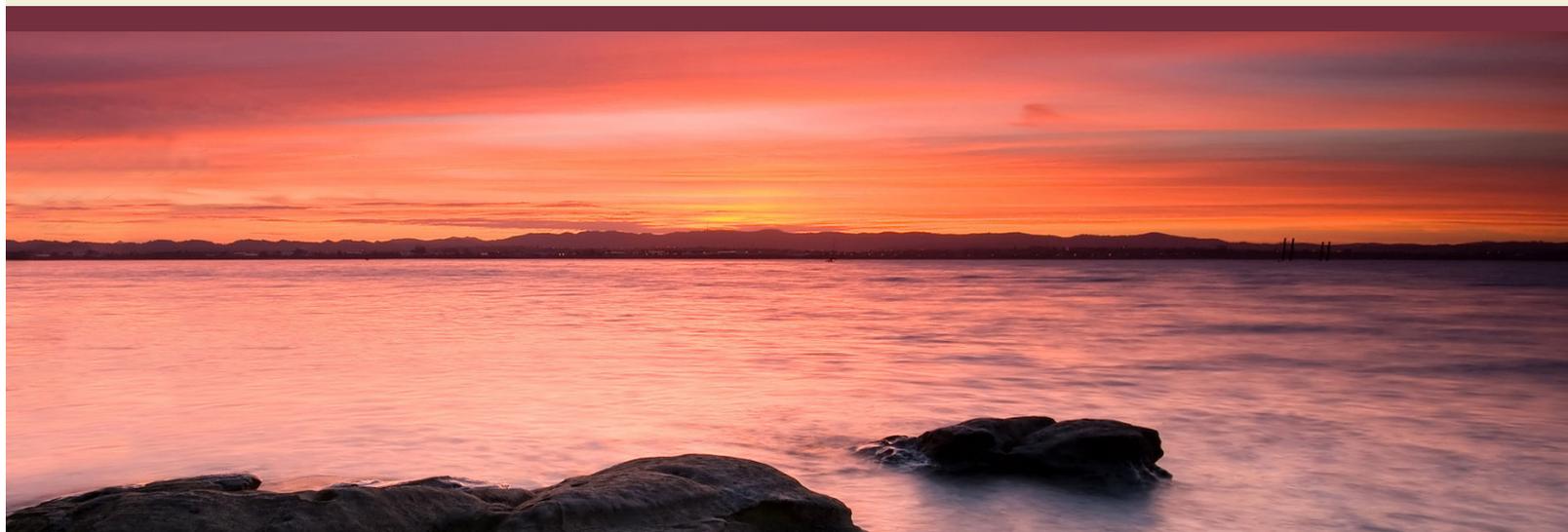
Acronyms	Full Name
UNCED	the Conferences on Environment and Development
UNDP	United Nations Development Programme
UNEP	United Nations Environment Programme
UNESCO	United Nations Educational, Scientific and Cultural Organization
UNFCCC	United Nations Framework Convention on Climate Change
UNWTO	United Nations World Tourism Organization
USA	United States of America
WCED	World Commission on Environment and Development
WHO	World Health Organization
WSSD	World Summit on Sustainable Development
WTO	World Trade Organization
WTTC	World Travel and Tourism Council
WWF	World Wild Fund



**Asia-Pacific  
Economic Cooperation**

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## **Economy Report**



# **Part 2**

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**Submitted by Chile**



In Chile the government agency responsible for the sustainable management of fisheries and aquaculture is the Undersecretariat for Fisheries and Aquaculture, a institution subordinated to the Ministry of Economy. The protection of marine and freshwater environments is shared with the Ministry of Environmental Affairs and the Chilean Navy.

### **Progress in National Legislation**

The General Law of Fisheries and Aquaculture as of 1989, and its subsequent amendments, is the basic legal body to regulate fisheries and aquaculture activities and, in general, for rational and sustainable use of living aquatic resources and protection of the ecosystems.

Most recent legal progresses include:

- a. Law N° 20.625 as of 2012, regarding Discards: this law formalized a research program to identify and characterize discards and also institutes a discard reduction plan.
- b. Law N° 20.657 as of 2013. The main developments introduced by this Law are:
  - Concepts of precautionary and ecosystem approaches as basic statements to the resource management are explicitly included.
  - New definitions to assess and classify the fisheries status are included.
  - International standards of sustainable management such as the establishment of Biological Reference Points (BRP) and especially the Maximum Sustainable Yield (MSY) are incorporated.
  - The obligation of performing an annual public account to communicate the exploitation status of fishing resources to the country is established.
  - Eleven Scientific and Technical Committees (eight of fisheries and three of aquaculture) are created. In the field of fisheries, they will make decisions on the availability of resources, BRP's and annual catch quotas.
  - The obligation of establishing management plans for resources with



closed access and recovery plans for overexploited and depleted fisheries is incorporated.

- Conservation Measures for Vulnerable Marine Ecosystems (VMEs) are established; bottom fishing is prohibited unless shown that it does not cause damage.

## Protection of Biodiversity

After the approval of the Biodiversity National Strategy (2003) and its Plan of Action (2005) Chile has set out to impel in the conservation and restoration of its ecosystems, so as to significantly reduce the biodiversity loss rate.

In this context Chile's goal is the creation and implementation of a National Network of Protected Areas, public and private, which properly represent the biological and cultural diversity of the nation and guarantee the protection of natural processes and the provision of ecosystem services.

## Marine Protected Areas

Within the framework of the National Network of Protected Areas, Chile has created 10 marine protected areas including Marine Parks, Marine Reserves and Multiple Use Protected Areas.

In this context an important achievement in the protection of the national and global marine biodiversity was the creation of the Motu Motiro Hiva Marine Park (Salas y Gómez Island) in 2010. This park covers 150,000 km<sup>2</sup> and is one of the largest protected areas in the world. A proposal to widen this park is under discussion; this expansion seeks to protect many seamounts that constitute VME and are currently outside the limits of the park. By creating this park, Chile has extended its marine protected area surface to around 4.4% of the relevant marine ecosystems.

It is worth noting that Chile and the United States signed a Memorandum of Understanding on Environmental Cooperation aimed at stepping up cooperation and



improving the management on conservation of protected marine and terrestrial areas in January 2013.

### **Protection of threatened species**

In the framework of the National Policy for the Protection of Threatened Species and through the application of the decree for the classification of wildlife fauna several freshwater and marine fishes as well as marine mammals have been classified under conservation categories.

The National Plan of Action (NPA) for the Conservation of Sharks and the NPA for Reducing Incidental Catch of Seabirds in Longline Fisheries were approved in 2007. Chile also participates of the Regional Plan of Action for the Conservation and Management of Sharks in the Southeastern Pacific and chairs the recently-created Technical-Scientific Committee.

Chile is also party of the Agreement on the Conservation of Albatrosses and Petrels (ACAP); as it is known, these species in the South hemisphere are threatened by the incidental mortality caused by the commercial fishing.

Regarding marine mammals, in 2008 Chile established a permanent prohibition of capture and hunting of cetacean in all the jurisdictional waters;

Law N° 20.525 as of 2011 amended the General Law on Fisheries and Aquaculture and prohibits fishing practices that may be detrimental to the conservation of sharks – it particularly prohibits finning onboard fishing or transport vessels.

### **Invasive Species Regulation**

This regulation came into force in 2008 and is focused on inspecting activities and measures aimed at preventing, controlling and eradicating organisms that constitute, or may constitute, marine pests. The provisions contained in the regulation apply to the transference of species, equipment transportation, farming and research centres



on aquatic species, and transformation and processing activities.

### **Protection and use of coastal areas**

Since 1988, Chile has a Coastal Environment Monitoring Program, carried out by Directemar, an entity under the umbrella of the Chilean Navy. The program consists of monitoring the 44 stations along the country twice a year. Basically, it measures the concentration levels of polluting agents present in water, organisms and sediments. All the data collected are analyzed in a database with the aim of generating an early alarm system that enables a timely detection of negative or potentially dangerous environmental changes.

Chile has a National Policy on the Use of Coastal Areas. Its purpose is to determine the potential use of coastal sectors, ensuring compatibility of the possible uses and enabling investment as well as the development of private and public projects (port facilities, ship construction companies, artisanal fisheries coves, areas for public and recreational use, areas for the development of value-added activities such as tourism, fisheries, aquaculture, and mining, among others). With this Policy as a base, regional commissions analyze zoning proposals for the preferable use of coastal areas, which are finally defined by the National (inter-ministerial) Commission for the Use of Coastal Areas.

An innovative regime for artisanal coastal fisheries is the Benthic Resources Management Areas. These management areas are geographically delimited in the five-mile coastal area and in inland waters, and are assigned and given to legally constituted artisanal fishing organizations. The overall objective of this regime is the conservation of benthic resources and the management of artisanal fisheries. To the date, there are 527 management areas operating along the Chilean coast.

A few years ago a Law that creates the Marine Coastal Spaces for Indigenous Peoples came into force. This Law is focused on setting aside specific spaces for indigenous peoples, with a view to keeping their traditions and religious, recreational, fishing, medicinal activities, among others. The regulation of this Law provides procedures for indigenous peoples to claim their marine coastal space.



## **Protection of Vulnerable Marine Ecosystems (VME)**

Conservation measures to protect VME were established in Law N° 20.657 Provisions include restrictions to bottom fishing, obligation to have scientific observers onboard of fishing vessels in all fishing trips, and the application of protocols on procedures to address finding and possible impact on a VME.

## **Climate change**

The commitments contracted by Chile to confront climate change are contained in the National Strategy on Climate Change, approved in January 2006, and in the National Plan of Action, approved in 2008. Both the Strategy and Plan of Action include guidelines and actions in three main topics:

- Adapting to the Impacts of Climate change (including actions on fisheries)
- Mitigating Greenhouse Gas Emissions, and
- Promoting capabilities to confront the problem in Chile.

This master plan, provides a framework and mechanism for effective response and preparedness to manage climate change challenges in adaptation, mitigation, and capacity building and institutional readiness issues

At the institutional level of the fishery sector climate change is considered as a priority issue and the Undersecretariat for Fisheries and Aquaculture is the entity responsible to conduct and implement the action plan.

At an international level, Chile is part of the United Nations Framework Convention on Climate Change and its Kyoto Protocol.

## **International and bilateral issues**

Chile implemented the FAO Code of Conduct for Responsible Fisheries by approving



the National Plan of Action to Prevent, Deter and Eliminate Illegal, Unregulated and Unreported Fishing (IUU Fishing).

In 2012, Chile ratified the Agreement on Port State Measures related to IUU Fishing. This agreement constitutes a new tool to strengthen the role of States in the control of foreign vessels requesting access to their ports. Prior to this, a policy of access and use of national ports has been devised in 2004, which applies both to foreign fishing vessels and to vessels that provide logistic support to fishing vessels operating in high seas.

Chile is an active member of the Convention on the Conservation and Management of High Seas Fishery Resources in the South Pacific Ocean (SPRFMO). This regional organization plays an important role in the governance of the south Pacific fisheries, in particular the jack mackerel pelagic fishery. The organization also addresses bottom fisheries and protection of VME. Chile is also a member of the Commission for the Conservation of Antarctic Marine Living Resources (CCAMLR).

In April 2012, the Global Environmental Facility (GEF) funded project “Humboldt Current Large Marine Ecosystem: Toward Ecosystem Based Management Chile-Peru” was reactivated. The ultimate goal of this project is to safeguard the health and integrity of this large marine ecosystem, which produce around 18% to 20% of the world capture fisheries, so as it can continue providing goods and services for the global community. In terms of biodiversity protection the project considers baseline surveys in pilot sites (coastal Guano Islands, in Peru, and seamounts of the Juan Fernandez area in Chile) and the establishment of marine protected areas in both countries. Ecosystem-based management in the Humboldt Current Large Marine Ecosystem is advanced through a coordinated framework that provides for improved governance and the sustainable use of living marine resources and services.



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**Submitted by China**



## Policy and plans concerning marine sustainable development

The Chinese Government has been actively engaged in the global sustainable development process. China attended the 1972 United Nations Conference on the Human Environment in Stockholm, the 1992 United Nations Conference on Environment and Development in Rio de Janeiro, the 2002 World Summit on Sustainable Development in Johannesburg, and the 2012 United Nations Conference on Sustainable Development in Rio de Janeiro (Rio +20). The importance of marine sustainable development is also recognized and emphasized in China. The Chinese Government promulgated China's Agenda 21 in 1994 and sustainable development officially became one of China's basic development policies in 1996. It evolved from a scientific consensus into an important element of government policy and operational programs.

In 1996 and 1998 respectively, the China Ocean Agenda 21 and the White Paper, *The Development of China's Marine Programs* were published, together forming the foundation for a sustainable development strategy for China's seas and coasts and for a national marine policy. Since the implementation of Agenda 21, the sustainable development of China's seas and coasts has had an almost 20-year history, which coincides with the period of transition in China's economic and social development. The terms 'a moderately well-off society', 'harmonious society', 'environmentally friendly' and 'resource-saving society', and 'ecological civilization' are now all continuously employed at the highest levels of government, shaping progress and defining China's sustainable development.

With the arrival of the 21st century, the government has shifted even more of its focus onto marine development. China's program outlines in the 10<sup>th</sup>, 11<sup>th</sup> and 12<sup>th</sup> Five-Year Plan of the National Economy and Social Development have set out important measures for the development of China's marine programs, ensuring the implementation of the marine sustainable development strategy.

**China's Agenda 21 and China's Ocean Agenda 21:** After the 1992 United Nations Conference on Environment and Development, the Chinese Government issued China's Agenda 21, *White Paper on China's Population, Environment, and Development*



*in the 21st Century* in March 1994. China's Agenda 21 was a follow-up document to the United Nations *Agenda 21*, based on China's social and developmental conditions. It is a core document for China's sustainable development as it provides principles for national sustainable development. China's Agenda 21 is also highly practical as it sets out targets and actions in each of the 78 program that are closely linked to government's work plan.

In the foreword, the White Paper states the strategic status of sustainable development: "Formulating and implementing China's Agenda 21 and taking the path of sustainable development are choices China must make in order to ensure its future development into the next century". The Agenda has 20 chapters and 78 program areas, encompassing the four domains of overall sustainable development strategy, social sustainable development, economic sustainable development, and rational utilization and protection of resources and the environment. At the same time it covers a wide range of issues, such as population, economics, society, resources and environment. In the domain of rational utilization and protection of resources and the environment, the White Paper identifies sustainable development and conservation of marine resources as an important program area and lists activities for: improving an integrated mechanism for marine resource management; conservation of marine life; development and protection of coastal belts and island resources; and development of oceanographic science and technology with the development of demonstration projects.

China's Agenda 21 is the first policy document officially emphasizing marine affairs under the framework of sustainable development. Sustainable development and conservation of marine resources are priorities in China's Agenda 21 and an essential part of China's sustainable development.

For better implementing the marine related program in China's Agenda 21, and promoting the sustainable development and utilization of marine resources, the Chinese Government issued *China Ocean Agenda 21* in 1996. This agenda sets out the strategies, targets and actions for the sustainable development of the oceans. After release, *China Ocean Agenda 21* became a policy guideline for China's marine sustainable development.



According to *China Ocean Agenda 21*, sustainable use and coordinated development of the ocean and its resources are the core principle for China's ocean development in the 21st century. In order to implement this guiding principle, the document proceeds to set out a number of basic policies, including: to establish and develop ocean industries in a sustainable way; to improve economic and social welfare of coastal communities in ocean and coastal development; to conserve and sustainable use of ocean living resources; to promote ocean sustainable development based on progress in science and technology; to establish integrated marine management; to protect the marine environment; to improve ocean observation, forecasting, pre-warning and disaster-mitigation; to strengthen international cooperation; and to promote public participation in ocean affairs.

**White Paper on the Development of China's Marine Programs:** On May 28, 1998, the Information Office of China's State Council published the, *White Paper on the Development of China's Marine Programs*, to further implement marine sustainable development strategy. The White Paper points out that as a developing country with a long coastline, China attaches great importance to marine development and protection and regards this as one of the national development strategies. China must also regard utilization and protection of the ocean as a long-term strategic task for sustainable economic development.

This 12,000-Chinese-character White Paper elaborates on China's marine programs in six aspects: marine sustainable development strategy; rational development and utilization of marine resources; protection and preservation of the marine environment; development of oceanographic science, technology and education; implementation of comprehensive marine management; and international cooperation in maritime affairs.

As a high level and influential marine policy in China, the White Paper established China's marine sustainable development strategy, bringing the concept of marine sustainable development into both public discussion and policy-making in China. The White Paper makes clear that marine sustainable development strategy should follow key principles, including but not limited to: overall planning for marine development; rational use of marine resources and promoting the coordinated development of marine industries; achieving a balance between the exploration of marine resources



and the protection of the marine environment; reinforcing marine technology research and development; setting up a comprehensive marine management system; and actively participating in international cooperation in the field of marine development.

**Plans concerning marine economy development and marine environment protection:** With the increasingly important role of marine affairs in social and economic development, China's economic and social development plans have placed more emphasis on marine affairs in recent decades.

*The Outline of the Tenth Five-Year Plan for National Economic and Social Development (2001)* sets out directions for the development of marine programs including; enhancing marine resource protection and management; strengthening research and development in marine technology; promoting the development of marine industries; and strengthening sea area use and management.

*The Outline of the Eleventh Five-Year Plan for National Economic and Social Development (2006)* for the first time dedicates a separate chapter to marine issues, clearly setting out the need to raise ocean awareness, protect ocean ecology, and carry out comprehensive ocean management. The *Eleventh Five-Year Plan* also sets out specific measures to protect the marine environment, including key coastal and marine areas such as the Bohai Sea, Yangtze River and Pearl River Estuaries, and important coastal and marine habitats such as mangroves, coastal wetlands and coral reefs. The Plan places particular emphasis on policy guidance regarding marine environmental protection.

*The Outline of the Twelfth Five-Year Plan for National Economic and Social Development (2011)* also has a separate chapter on marine affairs: Chapter 14. Promote the development of marine economy, with two sections: Optimizing marine industrial structure, and Strengthening comprehensive marine management.

In addition to domestic economic and social development plans, in January 2008 the State Council published the *Planning Outline of National Marine Program Development*, which lays out specific requirements regarding the aims and goals of



protecting marine ecological habitats. This shows China's emphasis on maintaining healthy ocean and coasts and its determination to develop the marine economy in a sustainable and environmental friendly way.

### **Legislation for marine sustainable development**

Since the *Marine Environment Protection Law* was passed in 1982, the Chinese Government has implemented a series of additional pieces of legislation to promote the sustainable development of the ocean and coasts and the conservation of marine habitats. By the beginning of the 21st century, the Chinese Government had already set up a relatively complete marine legal system and supporting legislation and regulations. The establishment and implementation of these laws and regulations has accelerated progress on the protection of the marine environment, improved marine management, and promoted ecological restoration within China, effectively promoting the sustainable development of the ocean and coasts. However, challenges remain in the implementation of such legislation, and in the engagement of authorities and the fulfillment of their responsibilities, including, for example, the necessary enforcement.

A number of crucial pieces of legislation now guide activity and provide a basis for future policy decisions:

***The Marine Environmental Protection Law of the People's Republic of China*** (formulated in 1982, revised in 1999) is China's fundamental law for the protection of the marine environment and establishes the basic principles of protecting marine resources, preventing pollution, maintaining ecological balance, securing human health, and promoting sustainable socio-economic development. Within the Chinese legal system of marine environmental protection, the first category is generic and applicable to all marine environmental protection-related activities, such as: monitoring and management, pollution control, marine spatial planning, emergency response to major marine pollution incidents, marine protected areas, and the damage liability system. The second category focuses on the management of specific issues and consists of supporting legislation for the implementation of the law. These issues include: prevention of pollution from shipping, offshore oil and gas exploration and marine dumping; prevention of pollution from ship dismantling, the building of coastal infrastructure and marine engineering works; and the prevention of land-based pollution.



***Law of the People’s Republic of China on the Administration of the Use of Sea Areas.*** Before the 1980s, although various marine activities were restricted to certain marine areas, in principle, there was no legislation on the use of sea areas. In May 1993, the Ministry of Finance and the State Oceanic Administration jointly published the *Law on the Administration of the Use of Sea Areas*. The legislation, which received the endorsement of the State Council, clearly proposes the establishment of ‘maritime licensing’ and payment for the use of sea areas, contributing to the initial establishment of an administrative system for the use of sea areas. *The Law on the Administration of the Use of Sea Areas* was passed in 2001 and officially put into force in 2002, marking the formal establishment of the management system for the use of sea areas. The basic sea area management regime includes a functional zoning system, a sea area use payment system, and a property/ user rights system. China has completed the development of a national, provincial, municipal and county-level zoning scheme for coastal waters and a usage charge standard that is the basis of sea area management.

***Law of the People’s Republic of China on Island Protection.*** Under active promotion by the National People’s Congress, the law was adopted during the 12<sup>th</sup> session of the 11<sup>th</sup> National People’s Congress Standing Committee in 2009. The law has five key elements, including: an island conservation plan; the protection of island ecological habitats; ownership of uninhabited islands; the protection of special islands; and the monitoring and control of island use. The legislation explicitly indicates the duties of all levels of government administration in marine management regarding the protection and development of islands. Its introduction symbolizes the legalization of China’s management, protection and development of islands.

***The Fisheries Law of the People’s Republic of China*** covers all fisheries-related activities including marine fisheries. This law was adopted in 1986, and revised twice in 2000 and 2004. In 1987, the Ministry of Agriculture released the Fisheries Law implementation guidelines which outline rights and management processes regarding the exploitation of fisheries resources. They also set specific rules regarding aquaculture, fisheries, and the enhancement and protection of fishery resources. The law established a system of harvesting permits and seed stock permits for aquaculture, and determined allowable catch and a licensing system for the fisheries industry. The law also regulates fishing areas, seasons, fishing methods and tools as



well as enhances fishery resources conservation systems by implementing fishery resources protection fee system, fishing bans, and restriction measures. State and local authorities within the purview of the legislation also issued a number of supporting regulations and implementation measures.

To conclude, against a backdrop of socio-economic development and a determination to further put into practice proper scientific concepts, China's policies, laws and legislation regarding the sustainable development of the ocean and coasts are continuously improving. Marine management has evolved from administrative controls into an integrated management approach combining legal, economic, and technical tools.

Since marine sustainable development was recognized as a guiding principle in China's marine affairs, China has made multiple-level efforts to explore the path of marine sustainable development by issuing laws, policies and plans and providing other means of supports in fields of marine economic development, marine environment protection, marine science and technology as well as coastal community development. These efforts have yielded increased economic benefits, improved social welfare as well as enhanced environment protection capacity in China's coastal areas.

### **Contributions of oceans to economic and social development**

China's eastern coastal areas, the most economically developed parts of China, are experiencing rapid economic growth. In 2012, GDP of the eleven coastal provinces/municipalities topped 31 trillion RMB, accounting for more than 60% of domestic GDP. Marine economy provides strong supports to the sustained and healthy economic growth in China's coastal provinces.

In recent years, the contribution of marine sectors to domestic economic development has grown rapidly. In 2012, China's marine gross production (GOP)<sup>113</sup> reached 5.0087 trillion RMB with an average annual growth rate of about 13% (Figure 1), accounting

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113. GOP includes value-added from marine tertiary industries; marine secondary industries; and marine primary industries. Ref. Statistical Bulletin of China's Marine Economy in 2008; SOA.



for 9.6% of the domestic GDP (Figure2) and 15.9% of the coastal provinces GDP<sup>114</sup>. In terms of value-added, the marine sectors contributed 5.397 trillion RMB, or 5.63% of domestic GDP and 9.33% of the GDP of the coastal provinces. This rapid development of the marine economy has promoted employment in coastal areas.

In the past 30 years of economic reform in China, the structure of marine industries has undergone profound changes. While marine salt production and fisheries were once the leading industries, now the five most important (main) players are: marine transportation; marine tourism; fisheries; offshore oil and gas; and shipbuilding. In 2012, marine transportation and coastal tourism alone constitute up to 57.2% of GOP. Other sectors including marine energy, seawater resources, marine engineering, biopharmaceuticals, and marine science and education are now also playing an important supporting role.

In recent years, China has recognized the emerging role of marine-based Blue Economy and its importance to domestic economy. Blue Economy has also become a top topic in academic discussion and policy-making. The Chinese Government has made efforts to develop Blue Economy and explored its potential value to economic growth. In April 2010, China's State Council approved the establishment of the Shandong Peninsula Blue Economic Zone as one of three pilot zones for the development of China's marine economy. The economic zone covers 159,500 square kilometers of offshore waters and 64,000 square kilometers of land in six cities and two coastal counties. A development plan for the economic zone was approved by the State Council in early 2011 which instructed the Shandong Provincial Government to coordinate and strengthen the development of its land and marine economies, especially in emerging marine industries. Since the establishment of the economic zone, the area has experienced unprecedented growth in marine economy with a growth rate of 10.2 percent in the first quarter of 2013, exceeding the provincial average by 0.5 percent. The rapid growth shows that the blue economic zone is becoming a new engine of economic growth in China.

Oceans provide people with essential living spaces as well as important sources of income. Marine related industries generally support employment in coastal areas,

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114. Statistical Bulletin of China's Marine Economy (2001–2009); SOA.

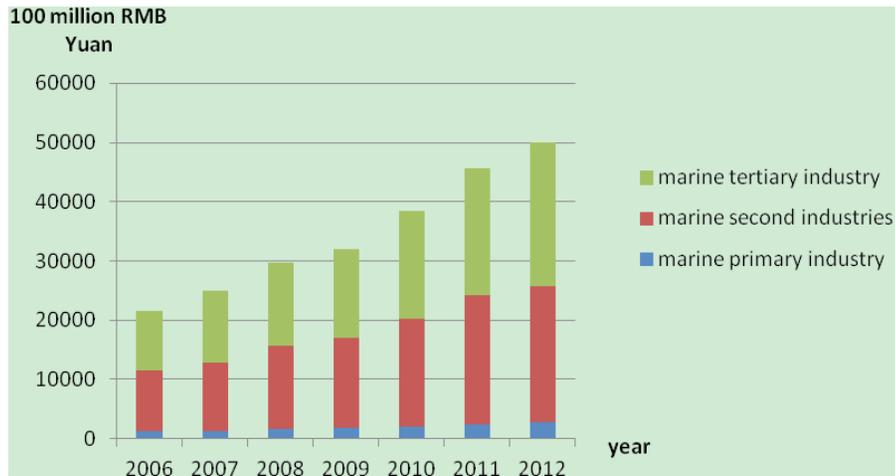


Figure 1 Growth of China's marine gross production (GOP) (2006-2012)

Source: State Oceanic Administration (SOA): China Marine Statistical Yearbook, 2006-2012; SOA: China Marine Economic Statistical Bulletin, 2012.

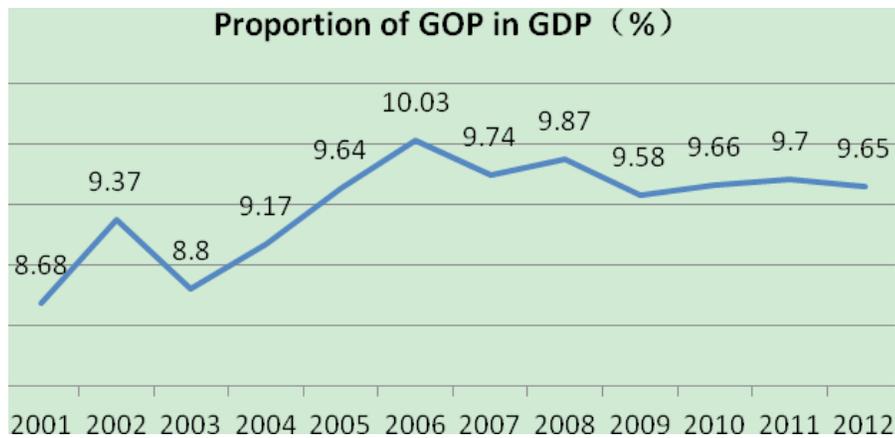


Figure 2 Contribution of marine economy to the domestic economy (2001-2012)

Source: SOA: China Marine Statistical Yearbook, 2002-2012; SOA: China Marine Economic Statistical Bulletin, 2012.

especially in fisheries and tourism. Employees in China's marine related industries have increased from 29.60 million in 2006 to 34.20 million in 2011, representing an increasingly large contribution to local employment.

## Marine environmental protection

China has made marine environmental protection a high priority. The legislation on



marine environmental protection is strengthened and the institutional capacity for marine environmental protection is enhanced. Also China is a signatory to a number of international environmental treaties and conventions such as the Global Programme of Action for Protection of the Marine Environment from Land-based Activities (GPA). Through these efforts, offshore pollution is effectively controlled and water quality in some sea areas has improved in recent years.

In accordance with marine protection legislation, the Chinese Government has worked to develop marine environmental and ecological monitoring systems and control pollution from land-based sources and offshore activities. From 2004, the State Oceanic Administration (SOA) initiated a national inshore ecological monitoring zone system, 18 monitoring zones including typical ecosystems such as estuaries, gulf areas, corals, mangroves and seagrass beds were established, covering 52 thousand square kilometers. As these zones represent the most important inshore ecosystems in China, the monitoring project generates basic knowledge on China's coastal ecosystems and provides a scientific basis for the implementation of integrated coastal management.

In recent years, China has implemented innovative tools on marine environmental protection such as establishing marine ecological-redlining zones. In 2012, SOA issued the, *Opinions on Establishing Ecosystem-Red line for conserving the Bohai Sea*, which designates important marine ecological functional areas that are ecologically sensitive and vulnerable, as marine ecological-redlining zones and thus require strict and properly classified pollution control. It also requires that pollution from land-based sources is reduced by 10%–15% in marine ecological-redlining zones by 2020.

To mitigate the threats on marine habitats from high-speed coastal development and in order to stop marine biodiversity loss, the government is committed to expanding MPA areas, and enhancing restoration and rehabilitation of coastal wetlands, mangroves, coral reefs and other critical habitats. By 2012, China established more than 200 marine natural reserves with a total area of 33 thousand square kilometers.

## **Disaster risk reduction**

China has been actively developing disaster prevention and mitigation systems against



typhoons, storm surges and other marine disasters. At present, China has initially formed a three-dimensional ocean observations network. The observed elements related to the effects of climate change are mainly tide gauge (sea level), water temperature, salinity, current and sea ice, weather and climate factors, etc. In recent years, special research tasks related to climate change, rising sea levels, and air-sea boundary layer have been undertaken in implementation of China's Marine and Coastal Integrated Survey and Evaluation project.

China's ocean disaster forecast and warning network includes the National Marine Environmental Forecast Center, three forecast centers in the Bohai Sea, East China Sea and Yellow Sea, as well as forecast agencies in eleven provincial authorities. These forecast centers release daily marine environmental information on sea temperature, waves, flow, etc. through official websites. During high risk periods for storms, tsunamis and sea ice, forecasting and warning alarms are released in real time.

To enhance its marine disaster emergency response capacity, China has established national emergency plans for various types of marine disasters, including: the Storm Surge, Waves, Tsunamis and Ice Disaster Emergency Plan; the Red Tide Disaster Emergency Plan; the Maritime Search and Rescue Emergency Plan; the Offshore Oil Spill Accident Emergency Plan; and others. These emergency plans clarify the criteria and procedures for disaster forecast, alarm, reporting and organizing work, to guarantee fast and sufficient response. To gain an up to date knowledge of the status of sea level rise, coastal erosion and saltwater intrusion on a timely basis China has re-verified the tidal datums at 94 tide gauge stations along the coastline and established tidal alarm levels for key coastal sections over the past five years

China has also made efforts to better understand the impact of climate change on oceans by developing a climate change observation network. During the Eleventh Five-Year Plan period (2005–2010), China upgraded more than 70 marine observation stations, five air-sea CO<sub>2</sub> exchange flux monitoring vessels, and organized air-sea CO<sub>2</sub> exchange flux monitoring along 20 profiles in waters under China's jurisdiction. In addition, a three-dimensional marine observation network consisting of shore (island)-based stations, buoy stations, ship-platforms and satellite remote sensing covering China's offshore waters has been established.



## Marine science and technology

Marine science and technology are foundations for marine economic development, marine environment protection and coastal development, and can provide key solutions for better protecting the marine environment, increasing economic benefits and improving the social well-being of coastal communities. China is dedicated to enhancing marine science and technology capacity through increased scientific funding, well-organized research projects, and marine training and education.

China's Marine and Coastal Integrated Survey and Evaluation Project was initiated in 2003, with the aim of identifying China's marine resources and monitoring the states and changes of the marine environment. Supported by outcomes of this project, a digital network "iocean" was established encompassing all types of marine environmental information from eleven coastal provinces.

China has also made endeavors to ensure the sustainable use of coastal and marine resources by technological innovation. To promote marine renewable energy utilization, China has made continuous investment in exploration technologies and the commercialization of offshore wind power, tidal range stream power, wave power and tidal current stream power. In 2010, the first tidal range power station on scale of ten thousand KW, San Men Station started construction. With twenty thousand KW of designed capacity, San Men Station will be the largest tidal range power station in China.

With the State Council's establishment of the South China Sea and its Surrounding Ocean Marine Cooperation Framework Plan (2011–2015), the State Oceanic Administration (SOA) and the Ministry of Education jointly set up the Chinese Government ocean scholarship. This initiative, which promotes students' understanding of the impact of climate change on the ocean, includes candidates from developing economies including from the regions surrounding the South China Sea, and the Pacific and Indian oceans<sup>115</sup>.

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115. State Oceanic Administration People's Republic of China [http://www.soa.gov.cn/xw/hyyw\\_90/201301/t20130116\\_23754.html](http://www.soa.gov.cn/xw/hyyw_90/201301/t20130116_23754.html). 2013/09/11



## Integrated marine management

In response to the initiatives of Agenda 21 of the 1992 UN Conference on Environment and Development, the Chinese Government is committed to establishing integrated marine management. Xiamen has created an Integrated Coastal Zone Management (ICZM) model characterized by “legislation first, centralized coordination, scientific support, integrated legal enforcement, funding guarantee, and public participation”<sup>116</sup>. This successful model is regarded as an ICZM demonstration site not only for East Asian countries but also for countries around the world.

From the beginning of the 21st century, the Chinese Government has been improving its marine management system through establishing a legal system, strengthening the enforcement of laws and regulations, improving marine management capabilities, and, in 2002, implementing its own marine functional zoning scheme. A relatively comprehensive system of marine policies, laws and regulations has been established. The marine legislation system, including *the Marine Environment Protection Law*, *the Law on the Administration of the Use of Sea Areas*, *the Fisheries Law*, *the Law on Island Protection* and related regulations, provide a strong legislative basis in support of China’s marine sustainable development.

In 2013, the 1<sup>st</sup> meeting of the 12<sup>th</sup> National People’s Congress decided to reorganize the State Oceanic Administration and create a high-level inter-department coordinating body, the National Oceanic Commission. This decision strengthened the coordinating ability of SOA and promoted science-based policy making on marine affairs and will help implement integrated marine management in China.

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116. The Third Ocean Institute and Xiamen University. *The Strategic Action Plan of Ecosystem Based Jiulong River Watershed and Xiamen Bay Management*. 2009.

**APEC Marine Sustainable Development Report  
(Part 2)**

**Economy Report**

**Submitted by Hong Kong, China**



# Sustainable Fisheries Development in Hong Kong, China

This paper will introduce the fisheries industry of Hong Kong, China. It will discuss the work of the Government and the Committee on Sustainable Fisheries on fisheries management measures towards the sustainable development of the fisheries industry.

## The Fisheries Industry in Hong Kong

Located at the southeast coast of China in the sub-tropical region facing the South China Sea, Hong Kong has a land area of about 1 100 square kilometers. The marine territory of Hong Kong covers about 1 650 square kilometers. Hong Kong has a relatively long coastline and has about 100 small islands (Figure 1).

The fisheries industry, including capture fisheries and fish farming, has a long history in Hong Kong.

In 2012, about 4 000 vessels are engaged in capture fisheries, of which about 1 100 are trawlers of various types (mainly pair trawlers, stern trawlers, hang trawlers and shrimp trawlers). They are mostly 20–35 m in length and they mostly fish in the traditional fishing grounds of the South China Sea. The remaining vessels are largely sampans and small fishing boats engaged in inshore fishing using techniques such as gill-netting, hand-lining, and purse-seining. They mostly operate on a family basis within Hong Kong waters. In 2012, Hong Kong's fishing fleet had a production of about 155 000 tonnes valued at approximately HK\$2,300 million. Over 50% of the fish catch was landed locally.

Local fish farming can be categorized into marine fish culture and pond fish culture. In 2012, about 2 000 fishermen are engaged in marine fish culture. They operate in 26 designated fish



culture zones. The total size of the fish culture zones are about 209 hectares (about 2 square kilometers). The production of marine fish culture in 2012 was about 1 300 tonnes, amounting to about HK\$117 million in value. Pond fish culture is practised mainly in northwestern Hong Kong. The total area of fish ponds is about 1 000 hectares (about 10 square kilometers) with a production of about 2 300 tonnes in 2012. Pond fish culture has a total value of approximately HK\$57 million, and the fish are mostly supplied to the local market.

In line with the declining global capture fisheries resources in the past decades, the production in Hong Kong is also in decline since the late 1980s. The catch has also changed from large, slow-growing, high-value species (such as groupers, croakers) to small, fast-growing, low-value ones. Although the catch composition in the South China Sea can still be considered diverse, some commercial species are already fully exploited or over-exploited.

### **Implementation of Sustainable Fisheries Measures**

The Committee on Sustainable Fisheries (the Committee) was established in 2006 to advise the Administration on the long term goals and feasible options towards sustainable development of the local fisheries industry. Chaired by the Director of Agriculture, Fisheries and Conservation, the Committee comprised various stakeholders such as Legislative Council members, representatives from the fisheries industry, and academics and experts.

The Committee released its report in 2010. To promote the sustainable development of the local fisheries industry, as well as to protect, conserve and rehabilitate the marine environment and fisheries resources in Hong Kong waters, the Government has since then been gradually implementing the following fisheries management strategies recommended by the Committee –

- (a) promoting modernized and sustainable practices;
- (b) controlling fishing effort of capture fisheries; and
- (c) conservation and enhancement of fisheries resources.

#### **A ban on trawling activities**



Banning trawling activities in Hong Kong waters was one of the key measures proposed to help restore the depleted seabed and fisheries resources. Trawling is a non-selective fishing method which captures fish of all sizes irrespective of their commercial and ecological values. It damages the seabed and is detrimental to the marine ecosystems, and has an adverse impact on the catch value of the fisheries sector. A ban on trawling activities will gradually restore the marine ecosystems to an ecologically sustainable level, which will in turn promote the diversity of marine life and safeguard the ecological integrity of our marine environment.

The fisheries sector benefits from a ban on trawling as it is conducive to restructuring the local fishing industry into a more sustainable one. Slow-growing fish and species of high value will be allowed to grow and reproduce in Hong Kong waters. The availability of sustainable stocks of high-value species would, in turn, improve cost efficiency and the operating environment for the fisheries industry.

Hong Kong is among the first economies in the world to achieve banning trawling, one of the most destructive fishing methods. The legislation that bans trawling activities in Hong Kong waters came into force on 31 December 2012. To assist the fishermen affected by the trawl ban, the Government has introduced a one-off assistance scheme which includes granting ex-gratia payments to affected trawler owners, buying out affected inshore trawlers from trawler owners who voluntarily surrender their vessels, and providing one-off assistance to affected local deckhands employed by the affected inshore trawler owners and affected fish collector owners.

### **Controlling and maintaining fishing effort**

A series of complementary fisheries management measures were implemented in 2012 to further control the fishing effort with a view to bringing the fishing industry back to a sustainable path. They include limiting new entrants to maintain an appropriate level of fishing effort by establishing a registration system for local fishing vessels, restricting fishing activities of local non-fishing vessels and prohibiting fishing activities of non-local vessels in Hong Kong waters. Under the registration system for local fishing vessels, fishing licences would be issued to local fishing vessels for and equipped to be used for fishing in local waters<sup>117</sup>. Not only does the licensing system serve to control access to fisheries resources, it also provides the Government with added information pertaining to the fishing industry thereby facilitating effective management. The revised legislation

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117. In the past, fishing vessels did not require a license to fish in local waters.



also provides for the designation of fisheries protection areas (FPAs) to protect important fish spawning and nursery grounds.

The Government has strengthened enforcement effort and conducted joint operations with the relevant authorities to combat illegal fishing, including enforcement action against destructive fishing practices detrimental to fisheries and the marine ecosystem such as the use of explosive, toxic substances, electricity, dredging and suction devices, which have long been prohibited under the laws of Hong Kong.

### **Promoting sustainable fisheries practices**

The Agriculture, Fisheries and Conservation Department (AFCD) has been providing training courses for fishermen. AFCD launched, in 2010, a tailor-made training programme to assist fishermen in developing sustainable fisheries and related operations. Priorities have been given to trawler fishermen affected by the trawl ban. To suit the needs of the fishermen, the programme includes lectures and practical sessions to provide fishermen with the latest fisheries knowledge, which will enable them to switch to sustainable practices such as recreational fishing and aquaculture.

To promote marine conservation and fishermen traditional culture, AFCD helps fishermen venture into fisheries-related ecotourism by launching, in collaboration with relevant stakeholders, a pilot scheme on marine-based fisheries ecotour in northeastern Hong Kong waters in 2010. AFCD provided practical training and experience for fishermen engage in ecotours through the pilot scheme, which has since been extended to other regions of Hong Kong.

### **Promoting sustainable aquaculture practices**

To promote future sustainable aquaculture development, the Government conducted a review of the operation of existing fish culture zones (FCZs) in 2012. The review has identified a few FCZs with surplus carrying capacities. A pilot scheme was launched in 2013 to issue a limited number of new licences for sustainable culture practice in those FCZs.



AFCD continues to assist local fish farmers in acquiring hatchery and nursery technology. It set up an experimental hatchery in 2008 to provide the necessary technical support and training to local fish farmers. Sustained efforts are being made to identify suitable new species with good market potential and promote them to fish farmers. It helps fish farmers secure a stable supply of fish fry at lower costs. A notable example is the introduction of quality fish Jade Perch in 2011. AFCD has successfully transferred the culture and fry rearing techniques of Jade Perch to local fish farmers.

To enhance fish health management, a Good Aquaculture Practices Programme has been implemented to help fish farmers prevent, diagnose and contain fish diseases. AFCD staff visit fish farms regularly to collect water and fish samples for analysis. Seminars are held for farmers to learn new techniques and good management practices. AFCD monitors red tides and sends red tide warnings through support groups at the FCZs, the department's website and press releases.

AFCD launched a voluntary Accredited Fish Farm Scheme (AFFS) in 2005 to help local fish farmers raise production standards of the farms and the quality of cultured fish. Participating fish farms are required to adopt a set of aquaculture best practices. Quality assurance tests, including analyses of drug residues and heavy metals in fish, are also conducted to ensure that all cultured fish meet food safety standards before they are sold at market. In addition, AFCD has been actively providing technical assistance to local fish farmers since 2009 in developing organic aquaculture. The marketing of these quality aquaculture products has been promoted through the Fish Marketing Organization (FMO)<sup>118</sup>.

### **Conservation of marine habitats and resources**

To protect the marine environment and reduce the impact of engineering works and water pollution, the Government enforces the restrictions in marine parks and marine reserve, the legislation governing environmental impact assessments, water pollution control, and has been implementing schemes to strengthen control of pollution sources and sewage treatment. According to the relevant legislation, development projects involving foreshore and seabed require assessment of potential environmental impact on relevant aspects, including fisheries, together with appropriate environmental mitigation measures.

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118. The FMO is a non-profit making statutory body established by law for the orderly marketing of marine fish in Hong Kong.



The Chief Executive announced in his 2013 Policy Address the setting up of a \$500 million Sustainable Fisheries Development Fund to enhance the overall competitiveness and sustainability of our fisheries industry. After extensive consultation with the industry, we have devised the Fund's scope of subsidy, as well as eligibility and assessment criteria. The Fund will be used to help local fishermen identify new fisheries resources and fishing grounds in the South China Sea, develop sustainable fishing operations and leisure fishing in Hong Kong waters, spearhead the modernization of local aquaculture, promote local fisheries products and their certification, and increase fisheries resources. In January 2014, the Finance Committee of the Legislative Council approved the funding for the setting up of the Sustainable Fisheries Development Fund. We will accept funding applications in the first half of 2014.

Looking ahead, we are making preparation for designating fisheries protection areas (FPAs) to protect important fish nursery and spawning grounds in Hong Kong waters. We plan to consult stakeholders on the designation of FPAs, including the management measures that are to be implemented within the FPAs. Measures that are under consideration include restricting or prohibiting the use of specified methods and gear; restricting the capture of species of certain size; designation of "no-take" zone in FPAs; and implementation of "closed season" to protect spawning fish and fry from fishing during certain periods of a year.

### **International cooperation**

The Government has been working closely with other economies through active participation in various regional and international fora, including the Ocean and Fisheries Working Group of the Asia-Pacific Economic Cooperation (APEC), with a view to facilitating opportunities that promote the sustainable use of fisheries, aquaculture, and marine ecosystem resources. Hong Kong, China is also a full member of the Network of Aquaculture Centres in Asia and the Pacific (NACA).

### **Conclusion**

The fisheries industry and its related culture has for many years been an integral part of Hong Kong's economy and social fabrics. The Government will continue to assist fishermen in developing sustainable operations, manage fisheries resources by controlling fishing effort, and cooperate with international organisation on sustainable fisheries development. The



sustainable development of the fisheries industry will allow fishermen to be self-reliant, improve their livelihood and their ability to cope with the changing operating environment. Not only would this provide job opportunities for the fisheries community, it would also enable the continued supply of fresh and good quality fisheries products to the people of Hong Kong.

Agriculture Fisheries and Conservation Department  
Hong Kong, China  
January 2014

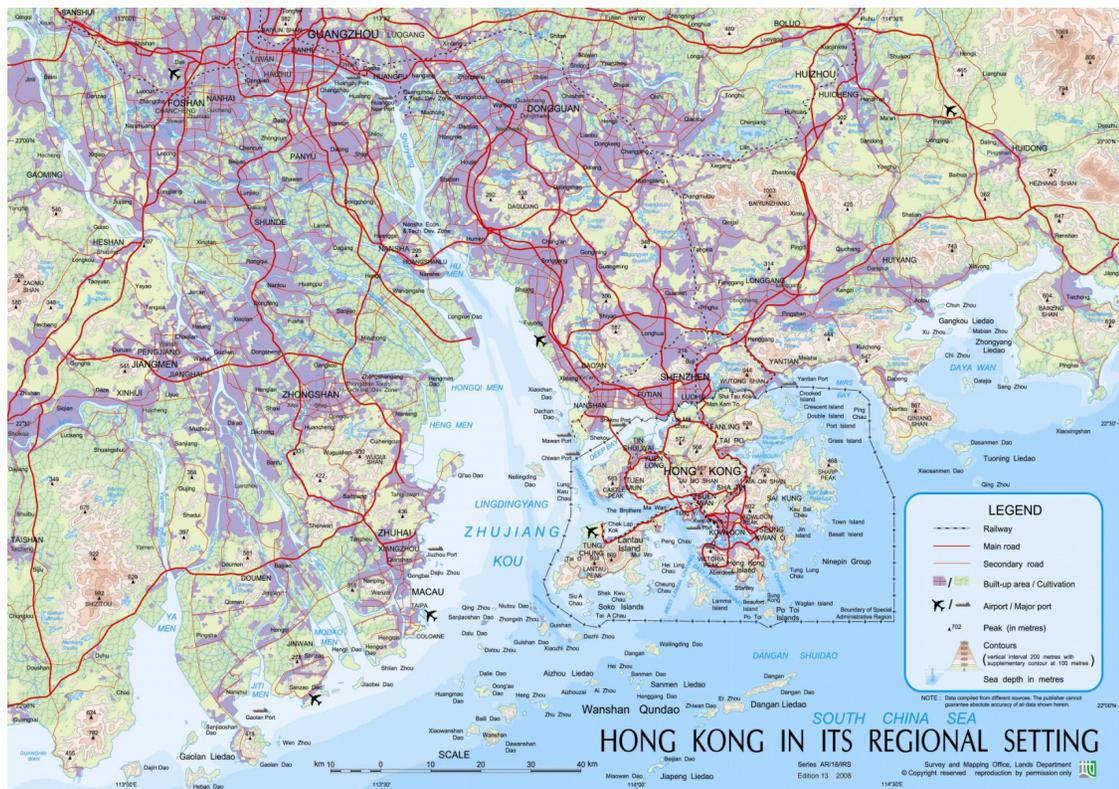


Figure 1 Hong Kong and its regional setting.

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**APEC Marine Sustainable Development Report  
(Part 2)**

**Economy Report**

**Submitted by Japan**



Japan has updated the Plan of Ocean Policy in April 2013, as an approval of the Cabinet in which all the Ministers, including Prime minister were participated, in accordance with the Act of Oceans Policy. The Plan delivered the measure to be taken in more five years. The policy measures with regard to the Sustainable Development are as follows.

The first Plan of Ocean Policy has established in 2007. Five years after the first Plan was established, it was deemed appropriate to move into a new phase as an oceanic nation taken account of the changes in circumstances and environmental of oceans.

The Plan directed the measures which the Japanese Government should take comprehensively and systematically for the conservation and preservation of marine environment, etc. as below.

## **Efforts for ensuring biodiversity**

### **(1) Strategic efforts for conservation of biodiversity**

- In accordance with the National Biodiversity Strategy 2012–2020, promote measures for the conservation and sustainable use of biodiversity, and steadily implement Japan’s initiatives to achieve the Aichi Biodiversity Targets.
- Under coordination among related agencies, appropriately implement international agreements such as the Convention on Biological Diversity (CBD), and documents such as the outcome of the United Nations Conference on Sustainable Development(Rio+20), and other commitments.

### **(2) Identification of marine zones important for conservation of biodiversity, etc.**

- From the perspective of ensuring biodiversity, identify marine zones that are ecologically and biologically important by FY2013. Based on the identified marine zones, taking into account the characteristics of ecological systems of each marine zone, and social, economic and cultural factors, promote the establishment and management of marine protected areas, and network of marine protected areas.



- Collect and compile information by FY2016 about rare marine organisms by assessing endangered marine organisms by the level of their chance of extinction in order to ensure that measures related to the conservation of marine biodiversity are established and steadily implemented. In addition, take measures to protect endangered seabirds and help breeding.
- From the perspective of securing biodiversity in accordance with the characteristics of the ecological systems, implement action plans that meet the characteristics of each ecological system, such as the Action Plan to Conserve Coral Reef Ecosystem in Japan. In particular, to promote conservation of coral reefs in East Asia, under the framework of the International Coral Reef Initiative (ICRI), continually implement the ICRI East Asia Regional Strategy on MPA Networks 2010.

### **(3) Appropriate promotion of establishing marine protected areas and improved management of the areas**

- By considering marine protected areas as a method to conserve marine biodiversity and to achieve the sustainable use of the ecosystem service, with the target of appropriately preserving and managing 10% of coastal zones and marine zones by 2020, with coordination among related agencies, take measures to improve the management of such areas and appropriately establish marine protected areas.
- By considering marine protected areas as a method to conserve resources, take measures to promote the coexistence of conservation of marine ecosystem and biodiversity and the sustainable development of fisheries by improving the establishment and management of the areas.
- Take initiatives to designate and expand national and quasi-national parks, and designate marine areas in national or quasi-national parks with superior undersea or sea views as marine park areas.

### **(4) Efforts to make areas foster a range of ecological systems**

- Promote appropriate conservation and development of seagrass bed/algal bed, tidal flats, coral reefs and other areas in order to promote the purification of water quality, maintenance of biodiversity, development of fishery resources and sustainable use of marine zones.



## Efforts for reducing environmental burden

### (1) Initiatives to respond to global environmental changes

- Continue sophisticated marine surveys to understand the impact and other effects on marine ecosystem from rising sea temperatures from global warming, rising sea levels mainly due to continental ice sheets melting, and acidification of the oceans. In addition, implement research on the assessment of the impact on the marine environment by taking measures to improve the sophistication of numerical models to reproduce or forecast these environmental changes.
- Implement research on global environmental changes, including marine surveys to address global environmental issues, by participating in the Argo project, Global Ocean Observing System (GOOS), International Ocean Carbon Coordination Project (IOCCP), Global Ocean Ship-based Hydrographic Investigations Program (GO-SHIP), Global Earth Observation System of Systems (GEOSS) 10-year Implementation Plan and other programs, in cooperation with related agencies both in Japan and overseas. In addition, make proactive contributions to activities of the Intergovernmental Panel on Climate Change (IPCC), which provides policymakers and other parties with scientific, technical and socioeconomic assessments related to establishment and implementation of international global observation plans and global warming.
- Offer support to Partnerships in Environmental Management for the Seas of East Asia (PEMSEA), Global Marine Assessment (GMA), related efforts made by the United Nations Environment Programme (UNEP), and other programs in order to strengthen international coordination and cooperation structures for the marine environment.

### (2) Efforts in costal zones, etc.

- In Tokyo Bay, Ise Bay, the Seto Inland Sea, make efforts to promote the total pollutant load control by carrying out the Seventh Total Pollutant Load Control (FY2014 as the target year) and measures to achieve the next total pollutant load control target. At the same time, promote the Bay Renaissance Project mainly by implementing pollutant load reduction measures, environmental improvement measures and environmental monitoring. In addition, with regard to the Seto Inland Sea, in light of a report from the Central Environment Council, change the Future Vision of the Seto Inland Sea and Environmental Conservation and Recovery, the basic plan based



on the Law concerning Special Measures for Conservation of the Environment of the Seto Inland Sea (Law No. 110 of 1973). Hold discussions to identify causes and factors for environmental deterioration and develop images of restoration and procedures with regard to the Ariake Sea, the Yatsushiro Sea and other seas. At the same time, promote deliberations based on the Law concerning Special Measures for the Rejuvenation of Ariake Sea and Yatsushiro Sea (Law No. 120 of 2002).

- While assessing the actual situation of article washed ashore and examining countermeasures, provide support to local governments in dealing with such article and developing waste disposal facilities that are necessary for treating article including that washed ashore. Moreover, provide support to coastal management organizations in dealing with driftwood and other materials on an emergency basis.
- By paying full attention to the convenience of users, such as in securing access to the seaside, and the conservation of superior seashore landscapes and the habitat environment for organisms, in addition to the disaster protection of coasts, take measures to develop coastal preservation facilities.
- Strengthen measures to prevent illegal dumping, including littering, and measures to promote beautification of rivers to reduce articles flowing into marine zones via rivers.
- Build wastewater treatment plants and introduce advanced wastewater treatment to reduce the burden of pollutants flowing down from land areas.

### **(3) Prevention of marine pollution**

- Based on the 1996 Protocol to the London Convention, the Act on Prevention of Marine Pollution and Maritime Disaster has been revised, and disposal of articles in the sea has been, in principle, prohibited. Accordingly, appropriately implement the newly adopted permission system and develop appropriate supervising and monitoring methods in relation to compliance with laws and regulations.
- From the perspective of compliance with international agreements, such as the International Convention for the Prevention of Pollution from Ships (MARPOL 73/78) that is overseen by the Marine Environment Protection Committee (MEPC) of the International Maritime Organization (IMO), take appropriate control measures for discharge of oil, noxious liquid substances and garbage from ships, securing of waste



oil reception facilities, and other matters. At the same time, make preparations for the entry into force of the International Convention for the Control and Management of Ships' Ballast Water and Sediments.

- Based on frameworks such as the National Contingency Plan on marine pollution by oil and noxious liquid substances, enhance systems to control spilled oil and other pollutants by properly arranging environmental information concerning coastal marine zones for enabling effective controlling activities, developing equipment to control and recover spilled oil, providing lectures and training to related agencies, and appropriately dealing with compensation in the case of oil pollution incidents. In addition, to achieve safe navigation for ships, recover spilled oil caused by ship accidents and other incidents. Moreover, take appropriate measures regarding compensation for oil pollution incidents from ocean-going ships that enter Japanese ports.

#### **(4) Radiation monitoring**

- Continue monitoring seawater, marine soil and marine organisms with regard to marine radiation monitoring, under coordination among related ministries and agencies.
- With regard to monitoring related to the accidents at the Tokyo Electric Power Company's Fukushima Daiichi Nuclear Power Station, in accordance with the comprehensive monitoring plan and in cooperation with related agencies, monitor levels of radioactive materials present in seawater, marine soil and marine organisms in the surrounding marine areas of the plant, coastal marine zones, offshore marine zones and open ocean marine zones. In addition, improve and strengthen monitoring by taking into account routes of radioactive materials that flow into the sea from land via rivers. Moreover, implement necessary measures based on results of monitoring as described above.

#### **(5) Efforts to reduce emissions of greenhouse gases in marine-related fields**

- To reduce emissions of greenhouse gases in ports, promote a modal shift from land transport to maritime transport, and comprehensively take measures toward lower carbon by promoting energy-saving cargo-handling machines used in port activities, use of renewable energy and expansion of income sources of carbon dioxide.



- Promote research and development and the use of innovative energy saving technologies for ships, and promote experiments and the use of innovative energy saving maritime transport systems in order to encourage energy saving and reduced greenhouse gas emissions in maritime traffic. At the same time, promote early commercialization and use of ships that use natural gas, which has superior environmental-related performance, as fuel.
- With regard to submarine carbon dioxide capture and storage, to ensure appropriate judgment of results of assessment of environmental impact implemented by operators, implement surveys of ecological systems and the chemical characteristics of seawater and bottom sediments in Japanese coastal waters.



**APEC Marine Sustainable Development Report  
(Part 2)**

**Economy Report**

**Submitted by Republic of Korea**



## Oceans and Coastal Sustainable Development Outlines

The Republic of Korea has annual estimation of 100 trillion (KRW) of production capacity of ocean biodiversity, that is, it comprises vast oceanic energy and mineral resources for the use of future generation. The annual value-added total revenue, created by marine industry per se, is 21 trillion (KRW) in 2005, and its out-turn revenue is approximately 70 trillion (KRW) of which takes up 8% of total Gross Domestic Production (GDP) of the Republic of Korea.

At the United Nations Conference on Environment and Development (UNCED), which was held in 1992, oceans and coastal resources' sustainable development and its integrated management system regime had been recommended thereon, the Government of Republic of Korea (hereinafter, 'the Government') has continuously made efforts to developing ocean economy, environment, conservation of biodiversity, and ocean technologies. The Government of Republic of Korea, in particular, the Ministry of Oceans and Fisheries (hereinafter, 'the Ministry') prepares and implements oceans and fisheries related policies in such as marine industry, fisheries, ports, ocean environment, science & technologies, and etc. The Ministry had established most high-level comprehensive scheme in the field of oceans and fisheries in 2000; that is so called, '1<sup>st</sup> Ocean Korea 21'. Together with newly restructuring of the Ministry, in order to act responsibly and accordingly against abrupt changing environment of oceans in the 21<sup>st</sup> century as well as a long-term vision of ocean and fisheries policies, the Ministry has drafted and established '2<sup>nd</sup> Ocean Korea 21', which includes the use of ocean science and technologies, fisheries, ocean logistics, maritime safety, maritime diplomacy, and etc.; this new version of national commitment will be used as a fundamental code of conduct that facilitates the conservation and sustainable use of oceans. In particular, The Government of Republic of Korea had successfully convened the '2012 Yeosu Expo', theming 'The Living Ocean and Coastal'. In addition to the Expo, the Government of Republic of Korea held 'East Asia Ocean Conference' in July 2012, which had brought up the issue of 'Blue Economy', as a result of convening such an event, the Republic of Korea grips a leading role in global initiative on 'Blue Economy'.

## The Promotion and Development of Ocean Economy

### A. Trends and Conditions on Ocean Economy Development

In accordance with news presented by the Ministry in 2014, marine and fisheries industries



has indicated a growth rate of 12.2% annually from 1990 to 2008. Such increments resulted from and to opening a new industry sectors in which instills a foundation of growth and development such areas as ocean planting, shipping, bio-aquaculture, energies, and so on; that is, it is a mixture and fusion of traditional industry of fisheries, marine, and shipping and newly developed technologies from such fields. The Government of Republic of Korea aims at increasing contributions constantly toward a higher GDP throughout creating new businesses on marine industry, including, inter alia, Bio-Technology (BT), Information and Communication Technology (ICT), and Environment Technology (ET).

Taking a glimpse on an overview and trend of Korean aquaculture and harvesting fisheries, over the whole fisheries production, the proportion of total aquaculture sector had increased 24.2% to 46.8% in the year of 1990 and 2012, respectively; furtherance, more than a half of total supply consist of, and throughout, the aquaculture over the whole fisheries industry. However, fisheries sector is now facing an intractable crisis on such as ageing population, global economic aggravation, marine environment pollution, and climate changes. In order to tackle this phenomenon down, the Government of Republic of Korea sets an aim, for a visionary future industrialization in the field of fisheries, at implementing sustainable fisheries policies, taking into account viable projects such as sustainable aquaculture research and development (R&D) investment, marine forest enhancement, and etc.

In light of the perspective of shipping, ports, and logistics, the Republic of Korea not only had grown rapidly in the beginning of 2000, but also had achieved at the top 5 ranked in its quantities of shipping globally. The transports quantity is 13.4 million tons and its container shipping amounts 23,440,000 TEU. In particular, the port of Busan had been assigned with 17,680,000 TEU and continued its ranking as world number 5 container ports around the globe. But, post to the middle of year 2000, global economy turned into gray, especially shipping industry so impacted tremendously, bearing in this mind, the Korean Government is preparing policies such as the infusion of shipping and financial industries, renewing old port facilities into a new one, marine-focused economic zone, and so on, enabling national and provincial industrial potentials and capacities to the apex.

Concerning to the marine tourism and leisure, due to increased leisure time amongst Korean people and the ease of accessibility of coastal area, there seems significant an increase for the demand of marine leisure sport, marine ecosystem tourism, cruise tours. The Korean Government now sets a vision of the 'North-Eastern Marine Tour Herb Action', in order to activate cruise tour, in doing so, relevant law and regulation have been billed, drafted, and



amended, accordingly, as well as recruiting professionals in such field; therefore, it is expected that highly value-added tourism industry will be promoted and furnished in Korea.

In Korea, offshore and shipbuilding takes up 60% of the global orders, which is amounted 140 billion USD in 2010. Drill Ship, after the year 2000, had taken up orders of 100%, and in case of Floating Production Storage and Offloading, after the year 2006, had taken orders of 90% worldwide. In order to promote continuous growth and strengthen relevant services' capacity, the Korean Government incrementally takes steps toward achieving these goals.

## **B. Policy Efforts Made for Ocean Economy Development**

The fierce competition between nations is accelerating abruptly, due to depletion of land resources worldwide, for ascertaining un-used and un-pioneered ocean resources that can be a vital tool for the development. Considering that environmental pollution, wanting of edible water, and so on, human-being is facing such catastrophic series of problems; mitigating as such, there are continuous international efforts to use oceans as a solution, in its perspective and recognition, pursuing to the sustainable use of the ocean. Given the fact that much expansion of investment is in fact visible in such areas as R&Ds on marine resources, energy development, environment management, that is, these efforts, with a view to promoting national economy, ensure sustainability of available marine spatial. The Korean Government confirmed a middle and long term planning that the Government will invest 6.9 trillion (KRW) in the field of marine and fisheries R&D until 2020. In line with clarifying the role of R&D in the field of fisheries and marine sectors and giving supports on law and orders, this grand plan, together with efforts on developing policies, is set to invest on the ground of practicality of R&D, fostering participation from private stakeholder and leading with key pioneering technologies so as to promote and enhance the fisheries and marines industry as a whole. Linking major elements of ICT, BT and ocean climate to produce synergies by making aquaculture automation, fishery species industry, fisheries resource prediction system, furtherance there will be a plan to promote marine tour, leisure, healthcare industry in which considers different coastal characteristics and natures of the various regions. In addition, the Government prepares policies, in order to strengthen international status, which uses northern and southern polar resource extraction and through its relevant fundamental researches. With regard to creation of jobs in the field of marine and fisheries, the Government is aggressively moving toward setting a priority via tailored policies on marine industry workforce training strategies. At this juncture, the Government, so as to implement specific actions on 'Blue Economy', focuses on investing in human resources and



infrastructure facilities of marine economy, and prepares a new opportunity by developing marine renewable energy, greenhouse gas mitigation/reduction technology, and future industrialization of aquaculture sector.

## Conservation and Management of Sustainability on Marine Environment and Ecosystem

### A. Current Status on Marine Environment and Ecosystem

Marine environment management in Korea begun by setting ‘Marine Pollution Prevention Law’ in 1977 that implements vast parts of contents of then International Convention, ‘MARPOL 73/78’. Thence, uses and development of coastal area had been rapidly progressed after 1980s, in particular, during 1995, there had been maleficent red tides that raised peoples’ awareness as an emerging social problem; since people’s interest about conservation of marine environment obviously had awakened the awareness, hence, there were urgent needs for implementing precautionary approaches and integrated management of the marine environment. The Government had in effect changed fundamental policies, and had successfully amended ‘Marine Environment Management Law’ in 2007, by implementing precautionary approaches management system such as marine usage impact assessment system, coastal pollution counting management scheme, strengthening regulation on waste marine dumping scheme, establishing marine environment management comprehensive plan, and marine environment estimation system for frequent inspection of the status.

In October 2006, the Government had enacted the ‘Marine Ecosystem Conservation and Management Law’ in order to conserve and manage marine ecosystem more systematically, and thereafter had established in 2009 ‘1<sup>st</sup> Marine Ecosystem Conservation and Management Grand Plan (2009–2018)’. In addition, starting from 2006 with a cycle of 10 years period, the Government would conduct marine ecosystem grand plan, and, as a result, according to such, if there is a need for any special protection on marine scenery and marine ecosystem, the Government had established Marine Protected Area (MPA) on such area and managed it accordingly. In case of apparent increase rate of reduction of marine organism that needs an extra protection, the Government designated such species as a ‘protection required marine organism’, and manages it accordingly.

There has been discovered a total of 9,534 species in Korean marine coast; 6,110 species



(64.1%) is marine animal; 1,048 species (11%) is marine plant; 2,172 species (22.8%) is plant plankton; and 204 species (2.1%) is animal plankton. Marine invertebrate comprises 81.7%, which is the highest percentages amongst marine animal; marine invertebrate consists of 4,989 species; fishery consists of 987 species; marine reptile and mamma consist of 37 species. In coastal wet land, a total of 1,141 species of marine plant is inhabitable in such area; marine animal consists of 955 species and marine plant consists of 186 species. But, due to unexpected increases of ocean temperatures and marine ecosystem changes, subtropical species appear and the Government continuously prepares and implements a systematic tool that prevents these vulnerable ecosystems.

### **B. Efforts on Policy for Conservation of Marine Environment and Ecosystem**

Marine ecosystem filters pollutant materials, prevents shore erosion, and works an important function, providing oxygen that comprises 30% to 50% of earth requires on daily exhaustion. In particular, ocean coastal, sea algae, and mud flat not only providing by means of traditional functions as a natural habitat and a spawning ground for marine organism, but also creating, on the aspect of industrialization, highly value-added values in such sectors as marine tour industry, marine ecology industry, and so on. Pursuant to 'Marine Environment Management Law', the Ministry had designated, and under her supervision, coastal area as marine conservation regions (Bay of Gamak, Bay of Deukman, Wan-Do Island, Bay of Hampyeong) that requires a continuous management for fostering in the protection of fisheries resources; that is, these areas have a tendency of ease of conservation for ecosystem and marine environment. In contrast to, where there lacks sufficient maintenances and falls shorts on marine environment standards, or where there is an apparent obstacle of feasible maintenance on marine environment conservation, is designated to, and is under her supervision, coastal areas (Bay of Busan, Bay of Ulsan, Bay of GwangYang, Bay of Masan, Coast of Incheon and Siwha Lake). In order to improve environment of specially declared marine coasts, it sets out limits of permission and emissions of pollutant materials; The coastal pollution total management system, which allows its permissible quantities below the level, starts by, and have successfully implemented, the most pollutant area of 'Bay of Masan'. Based upon these successful cases, the Government plans to continue expanding its implementation to the other severely pollutant areas.

There are currently twenty-one earmarked spots of Marine Protected Area (MPA), consisting of marine ecosystem protected area and coastal wetland protected area, and the total area is 463 km<sup>2</sup>. In case of coastal wetland, five specified spots, comprising 163.49 km<sup>2</sup>, are



registered in accordance with 'The Ramsar Convention on Wetland'. In order to promote a better management of marine protected area, regular monitoring, enforcement for the assessment of monitoring efficiency, hosting a meeting for conservation of national marine protected area, supports of people participation monitoring system, development of marine protect area hand-on experience program, and supports for mud-flat visiting center, these activities are in operation. The Ministry has a plan to designate and increase the number of MPAs constantly to thirty-one spots by the year of 2018. Furthermore, whereas the damages caused by coastal development, for mud-flat restoration, the Ministry specifies eighty-one restoration spots and seven of those area (Sacheon, Suncheon, Gochang, Shinan and so on) are currently being restored since 2010, and had nominated fifty-two species as marine protected organisms, furtherance planning to expand the list of such designation. For the sustainable conservation of marine environment and ecosystem, the Government has actively participated, in international efforts, with, and aims at building stronger ties, international cooperating bodies, including, inter alia, Coordinating Body on the Seas of East Asia, Northwest Pacific Action Plan, and PEMSEA, so as to maintain a mutual relationship inter se and to improve marine environment of the earth and ecosystem services.

## Marine Energy and Resources Sustainable Use and Development

### A. Current Status and Trends on Marine Energy and Resources Use and Development

On the view of global perspective, it is inevitable to search and find a new source of energies and resources from the ocean, owing to surging of energy consumption and depleting of land resources. Especially, pursuant to the United Nations Convention of the Law of the Sea, as the exclusive economic zone (EEZ) scheme has been introduced, and is undertaking its roles internationally, there has been a surging of competition between coastal nations for the development of marine resources. What is more, the globe is facing problems such as, as a result of depletion of fisheries stocks, owing to the emission of greenhouse gases and ocean acidification, lacking major sources of supplying proteins, and food security. In order to respond systematically on the wanting of resource and energy crisis, the Government has launched strong R&D projects in which ensures marine clean energy by utilizing tidal electronic power generation, wave-force power generation, and wind energy power generation. For instance, the Government is driving a concurrent project at south-western marine wind energy power generation, and an experiment of tidal electronic power generation is on its provisional operation as well as preparing to construct a provisional wave-force power generation around the Jeju Island. In addition, acting responsively according



to international agreements such as Convention on Biodiversity (CBD), Access to genetic resources and Benefit-Sharing (ABS), International Union for the Protection of New Varieties of Plants (UPOV), and so on, the Government had begun a project called 'Marine Bio 12'. That is, the Government progressively pursues at investigating and researching projects that uncovers natural resources (natural gas, oil, etc.) underneath, and within, the territorial sea and EEZ.

### **B. Efforts on Ensuring National Growth Power via Ocean Energy and Resource Development**

In order for the Government to prepare possible exhaustion of fossil fuel and food security, by using alternative way of generating powers such as tidal, wave, and wind electronic generation ensures marine energy and secures natural resources, the Government will promote such plans continuously. The Government ensures to construct infrastructure of industrialization and develop technologies; for instance, it is to build a tidal energy power complex for Eco-friendly tidal power generation and ocean power farm. Furthermore, the Government further pushes to develop core-technologies by applying complex usage of ocean energies such as various ways of wave power generation technology development, a buoyant ocean wind power generation complex, a complex power generation of mixture of wind, tide, wave, and etc. For ensuring the root material of bio-technology derived from various organism material searching and discovering genetic resources, it is to expand the investment about the drug target discovery development of marine natural drugs as a new business for the next generation. The Government systematically implements, so as to generate the unlimited values of the ocean, via 'Ocean Science Technology Roadmap (2020 MTRM)', for the creation of a new ocean industry, usable technology development, and secures the further oceanic resources.

### **Direction and Challenges on Sustainable Ocean and Coast**

The ocean not only provides necessary energies that require for the survival of humankind, but also functions to control climate of the earth. The coastal area, which is adjacent to land, is used as an alternative space for land-related activities such as manufacturing, farming, and tourism; more than 50% of world population resides within the regions; 70% of cities had settled down in that region; in sum, it is the socio-economic place where a variety of ocean related activities such as fisheries, logistics, and shipping are concentrated and infused. As it had become apparent that supplies of food and energy from land hit its limits recently,



humankind accordingly started to invent ocean-related scientific technology innovatively that led to discover food, energy, minerals, and so on, in which deposited underneath continental shelf or sea bed. However, given the fact that not considering environmental receptive capacity of the ocean, this phenomenon adversely impacts on ocean ecosystem, as a result, leading to the depletion of fisheries resources and the deterioration of quality of ocean water. The Government has been using ocean and its coastal area in place of land as an alternative space on oceans usage and development in accordance with national economic development policy. These intensified use and development of ocean impact directly and indirectly to the ocean ecosystem, and ocean ecosystem has been threatened largely, owing to hazardous material caused by marine accidents; for instance, it is a shipping collision which spills oils into ocean.

Therefore, the Government has established 4<sup>th</sup> Ocean Environment Comprehensive Plan (2011–2020) and 2<sup>nd</sup> Integrated Coastal Management Plan (2011–2021) in order to have sustainable use of ecosystem and to prevent damages on ecosystem due to complex and diversified nature of ocean use. In the context of 2<sup>nd</sup> Integrated Coastal Management Plan, it contains five strategic-focused promoting agendas for fulfilling scheduled ocean usages on the basis of potentials and values of future industry. In particular, this plan distinguishes coastal sea area zoning, considering coastal natural environment, characteristics of usage, future potential value and so on; hence, the Government has a plan to promote coastal management technology development, coastal erosion plan, and natural coastal line restoration for coastal disaster plan, coastal scenery management system, and environmental management for the use and action of coastal development. Besides, the Government actively makes an effort to participate international arrangements/conventions, as being a signatory, such as International Convention For the Control and Management for Ship's Ballast Water and Sediments (BWM), International Convention for the Prevention of Marine Pollution from Ships (MARPOL), and the Treaty of London. The Government tries to expand the investment on ocean science and technology in order to bring out uncountable potentials of the ocean. Ocean R&D not only broadens its sector in ocean technology researching station, telecommunication marine climate satellite development, ice breaker vessel and etc. in which are considered to a large infrastructure, but also widens its spectrums onto ocean resource development, marine biotechnologies, climate changes, and other marine environmental technologies. The Ministry of Oceans and Fisheries, in 2013, has expanded its fiscal budgets as 230 billion won annually so as to promote, by using marine organism and genetic resources, marine biotechnology development, since 2004.



The Republic of Korea, initiated by successfully convening ‘Yeosu Expo 2012’, maintains ecosystem services for the sustainable use of resources and conservation of oceanic spatiality as well as constructing an economic ecosystem total management scheme that creates a value-added economy via human consumption and usage. By means of facilitating as such, taking into account socio-economic demands and natural tendencies of resources and oceanic spatiality, it is expected to enhance green-values of ocean spaces via ecosystem based approaches and management, leading efficient ocean developments.

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\*General Note: There are several activities and programs underway in the United States related to this topic, at the national, regional, state and local levels, as well as with international partners. This is not a complete or exhaustive list, but rather serves to share information on the most significant efforts and policies related to the topics identified in the APEC Marine Sustainable Development Report Part 1. It is based loosely on the outline of Chapter 3 of Part 1 of the MSD Report.

### **Contribution of Ocean Sectors to Economies (short overview)**

Executive Order 13547 (2010) established a comprehensive, integrated national policy for ocean and coastal stewardship in the United States (National Ocean Policy) by adopting recommendations of the Interagency Ocean Policy Task Force, establishing the National Ocean Council to guide implementation, and providing for the development of coastal and marine spatial plans. It describes specific actions the U.S. federal government will take to bolster our ocean economy, improve ocean health, support local communities, strengthen our security, and access the best available information, including: Providing better forecasting of ocean conditions and events to protect beachgoers and consumers from threats to their health and safety; Sharing more and better data about severe storms and sea level rise, which will help coastal communities prepare for threats; Supporting voluntary regional marine planning based on regional and local priorities, a handbook for which was published in July 2013; Improving the Federal permitting process to save time and money for ocean-based industries and taxpayers, while protecting health, safety, and the environment; Restoring important habitats that protect communities and support healthy ocean resources; and Improving our capability to predict conditions and prevent negative impacts as activity in the Arctic increases.

### **Sustainable Management and Protection of the Marine Environment (List of treaty obligations, domestic laws, programs, etc.)**

#### ***Ecosystem-Based Management and Integrated Coastal Management***

- The U.S. National Ocean Policy identifies coastal and marine spatial planning (CMSP) as one of nine priority implementation objectives and outlines a flexible framework for effective CMSP to address conservation, economic



activity, user conflict, and sustainable use of the ocean, our coasts, and the Great Lakes. The CMSP framework provides, for the first time, a science-based and transparent road map for coastal communities to directly, objectively, and inclusively plan the future of their waters. To this end, the CMSP framework supports regional planning processes in which those who are most familiar with, and most affected by, the region's ocean and coasts are empowered and given the data, tools, and responsibility to make informed decisions about how their waters are to be used for this and future generations.

- The U.S. Coastal Zone Management Act (CZMA) of 1972 provides for management of the nation's coastal resources, including the Great Lakes, and balances economic development with environmental conservation. The CZMA outlines two national programs, the National Coastal Zone Management Program and the National Estuarine Research Reserve System. The 34 coastal zone management programs aim to balance competing land and water issues in the coastal zone, while estuarine reserves serve as field laboratories to provide a greater understanding of estuaries and how humans impact them. The overall program objectives of the CZMA remain balanced to “preserve, protect, develop, and where possible, to restore or enhance the resources of the nation's coastal zone.”
- The U.S. National Coastal Zone Management (CZM) Program is a voluntary partnership between the federal government and U.S. coastal and Great Lake states and territories (states) authorized by the Coastal Zone Management Act (CZMA) of 1972 to address national coastal issues. Thirty-four of 35 eligible states, territories, and commonwealths currently participate. Of these, six (Georgia, Illinois, Indiana, Minnesota, Ohio, and Texas) have approved coastal management programs since 1992. Together, these programs protect more than 99 percent of U.S. coastline and address a wide range of issues including coastal development, water quality, public access, habitat protection, energy facility siting, ocean governance and planning, coastal hazards, and climate change.

### ***Marine Pollution***

- The U.S. Coastal Nonpoint Pollution Control Program, which falls under



Section 6217 of the Coastal Zone Act Reauthorization Amendments (CZARA), is jointly administered by NOAA and the Environmental Protection Agency (EPA). The program was established in 1990 to encourage better coordination between state coastal zone managers and water quality experts to reduce polluted runoff in the coastal zone. It is unique in that it establishes a set of management measures for states to use in controlling polluted runoff. The measures are designed to control runoff from six main sources: forestry, agriculture, urban areas, marinas, hydromodification (shoreline and stream channel modification), and wetlands and vegetated shorelines, or riparian areas. These measures are backed by enforceable state policies and actions, and by state authorities that will ensure implementation of the program.

- The U.S. Clean Water Act (CWA) establishes the basic structure for regulating discharges of pollutants into the waters of the United States and regulating quality standards for surface waters. The CWA made it unlawful to discharge any pollutant from a point source into navigable waters, unless a permit was obtained. EPA's National Pollutant Discharge Elimination System (NPDES) permit program controls discharges. Industrial, municipal, and other facilities must obtain permits if their discharges go directly to surface waters. Under the Clean Beaches Plan (2004), EPA has worked to achieve two major goals: promoting recreational water quality programs nationwide and creating scientific improvements that support timely recreational water monitoring and reporting
- There are several regional efforts within the United States that have set targets to reduce nutrient pollution (e.g., Gulf of Mexico Watershed Nutrient Task Force), and nonpoint pollution is addressed through several federal programs including watershed management planning under the Clean Water Act (and to a lesser extent through the Coastal Zone Management Act) and U.S. Department of Agriculture National Resource Conservation Service programs and state efforts.
- The United States is also directly involved in the UNEP Global Program of Action for the Protection of the Marine Environment from Land-Based Activities (GPA), which benefits coastal States worldwide. The United States and the GPA share a common aim to catalyze and facilitate sustained action to prevent, reduce, control, and/or eliminate degradation of the marine and



coastal environment by land-based sources of pollution (LBS). The United States has provided direct technical assistance and advice to governments in the development of their National Programs of Action to prevent, reduce, control and/or eliminate marine degradation from land-based activities and to use National Programs of Action as vehicles to promote LBS activities and raise environmental awareness. An integrated watershed and coastal area management approach is utilized to address land-based sources of pollution.

- The NOAA Marine Debris Program is authorized by Congress to work on efforts to address marine debris through the Marine Debris Act, signed into law in 2006 and amended in 2012. The Act requires the program to “identify, determine sources of, assess, prevent, reduce, and remove marine debris and address the adverse impacts of marine debris on the economy of the United States, marine environment, and navigation safety.” Through this work, Marine Debris Action Plans have been established in some regions of the United States (ex: Hawai’i Action Plan to reduce impacts in Hawai’i by 2020). A U.S. government Interagency Marine Debris Coordinating Committee has also been created to ensure coordination across the U.S. government to address marine debris.
- The United States participates in negotiations through the International Maritime Organization aimed at preventing marine pollution at sea, including MARPOL, the London Convention and London Protocol, the International Conventions on Oil Pollution Preparedness, Response and Co-operation (OPRC), and other efforts that aim to prevent marine pollution from hazardous substances and ballast water. The United States became a party to the London Convention in 1975, and we have signed but not yet ratified the London Protocol (LP).
- The U.S. National Response Team (NRT) is an organization of 15 Federal government departments and agencies responsible for coordinating emergency preparedness and response to oil and hazardous substance pollution incidents. The NRT provides technical assistance, resources and coordination on preparedness, planning, response and recovery activities for emergencies involving hazardous substances, pollutants and contaminants, hazmat, oil, and weapons of mass destruction in natural and technological disasters and other environmental incidents of national significance. The Environmental



Protection Agency (EPA) and the U.S. Coast Guard (USCG) serve as Chair and Vice Chair, respectively. The National Oil and Hazardous Substances Pollution Contingency Plan (NCP) and the Code of Federal Regulations (40 CFR part 300) outline the role of the NRT and Regional Response Teams (RRTs) located throughout the United States. The response teams are also cited in various federal statutes, including Superfund Amendments and Reauthorization Act (SARA) – Title III and the Hazardous Materials Transportation Act [HMTA].

### ***Marine Invasive Species***

- The U.S. National Invasive Species Council (NISC) was established by Executive Order to ensure that Federal programs and activities to prevent and control invasive species are coordinated, effective and efficient. NISC members are the Secretaries and Administrators of 13 federal government departments and agencies, who provide high-level coordination on invasive species; NISC is co-chaired by the Secretaries of Commerce, Agriculture, and the Interior. NISC receives advice from and consults with the Invasive Species Advisory Committee, a group of nonfederal experts and stakeholders chartered under the Federal Advisory Committee Act of 1972. Important NISC actions and duties include:
  - Drafting and revising of the U.S. National Invasive Species Management Plan (Plan)
  - Drafting of the Interdepartmental Invasive Species Performance Budget
  - Reviewing progress under the Plan and the Executive Order establishing NISC
  - Working with the U.S. Department of State to provide input for international invasive species standards

### ***Conservation of Coral Reefs and Other Vulnerable Habitats***

- In support of the National Ocean Policy, the NOAA Fisheries Office of Habitat Conservation is working to help “establish and implement an integrated ecosystem protection and restoration strategy that is science-based and aligns



conservation and restoration goals at the federal, state, tribal, local, and regional levels.” The Office of Habitat Conservation’s Restoration Center has restored more than 2,000 projects nationwide.

- The National Coastal Condition Reports describe the ecological and environmental conditions in U.S. coastal waters. Preparation of these reports represents a coordinated effort among the EPA, NOAA, US Geological Survey, US Fish and Wildlife Service, coastal states, and the National Estuary Programs. Reports summarize the condition of ecological resources in the coastal waters of the United States and highlight several exemplary federal, state, tribal, and local programs that assess coastal ecological and water quality conditions.
- The U.S. Geological Survey (USGS) Biological Informatics Office (BIO) makes a significant contribution to documenting and conserving biodiversity. Through the USGS Pacific Basin Information Node in Hawaii, many U.S. federal, state, and municipal agencies along with private sector businesses and academia collaborate to share data amongst themselves and with non-governmental organizations, other countries, and international organizations. USGS takes an active lead in biodiversity conservation through the Pacific Biodiversity Information Forum (PBIF). The Pacific Biodiversity Information Forum (PBIF) seeks to develop a complete, scientifically sound, and electronically accessible Pacific biological knowledge base and make it widely available to local, national, regional and global users for decision-making information system focused on marine biodiversity.
- The United States is concerned about the vulnerability of coral reefs and the important role they play in sustainable development. As part of our efforts, the United States has supported increased efforts to promote economically and environmentally sound management of coral reefs, including promotion of watershed management and hotel pollution prevention practices, the creation of regional networks of marine parks, and systems to link climate change assessment to coral monitoring efforts. The United States is a founding member and strong supporter of the International Coral Reef Initiative (ICRI).
- Many programs and agencies within the U.S. federal government have mandates to establish and protect areas in the oceans and Great Lakes; this can include estuaries, marine sanctuaries, fisheries and protected species’ habitats.



## **Sustainable Management and Protection of Marine Resources (List of treaty obligations, domestic laws, programs, etc)**

### ***Sustainable Fisheries and Aquaculture***

- On June 19, 2006, the U.S. Senate approved by unanimous consent the Magnuson-Stevens Fishery Conservation and Management Reauthorization Act of 2005 (MSRA) which contains provisions regarding overfished stocks, and also aims to help improve international fishery management and conservation compliance, with an emphasis on strengthening controls on illegal, unreported, and unregulated (IUU) fishing and ensuring other nations provide comparable protections to populations of living marine resources at risk from high seas fishing activities.
- Pursuant to obligations under the MSRA, the United States routinely raises the issue of preventing trade or import of IUU-caught fish and living marine resources, whose sustainability is threatened by international trade, in both bilateral consultations and multilateral meetings and negotiations, as discussed throughout this report. In addition, the United States has advocated in the World Trade Organization (WTO) and other trade related bodies for reduction or elimination of subsidies that contribute to overcapacity and illegal fishing activities.
- U.S. marine fisheries are also scientifically monitored, regionally managed, and legally enforced under a number of requirements, including ten national standards, under domestic obligations. The National Standards are principles that must be followed in any fishery management plan (FMP) to ensure sustainable and responsible fishery management. National Standard 9 is specific to bycatch, and provides that Conservation and management measures shall, to the extent practicable, (a) minimize bycatch and (b) to the extent bycatch cannot be avoided, minimize the mortality of such bycatch.
- Under the Magnuson-Stevens Act, once a fish stock is identified as overfished, a rebuilding plan must be put into place. The Act requires that the period to rebuild a stock to Maximum Sustainable Yield (MSY) levels not exceed 10 years, but it permits a longer time period in certain cases.



- Related to sustainable fisheries and aquaculture management is the need to address the increasing threat of ocean acidification. The draft Strategic Plan for Federal Research and Monitoring on Ocean Acidification (April 2011) by the Interagency Working Group on Ocean Acidification established a National Ocean Acidification Program to lead U.S. coordination of ocean acidification activities between the Federal agencies, and with academic institutions, industry, and other private sector and international partners. This office is instrumental in facilitating international dialogue on ocean acidification by conducting international outreach, providing educational opportunities to the international community, and creating and maintaining a web portal to facilitate information exchange, international coordination, and access to information in multiple languages.
- The United States is involved with two ongoing efforts that aim to increase international collaboration and coordination on ocean acidification research, observations and monitoring: the IAEA's International Coordination Center and the Global Ocean Acidification Observing Network (GOA-ON).
- The United States released its Strategic Plan for Federal Research and Monitoring of Ocean Acidification in March 2014. Recognizing the need for a comprehensive interagency plan to address the increasing impacts of ocean acidification, the United States Congress passed the Federal Ocean Acidification Research and Monitoring Act of 2009 (FOARAM Act). The FOARAM Act called for coordination among U.S. federal government agencies on work related to ocean acidification. The Act also called for developing a strategic research plan to guide "Federal research and monitoring on ocean acidification that will provide for an assessment of the impacts of ocean acidification on marine organisms and marine ecosystems and the development of adaption and mitigation strategies to conserve marine organisms and marine ecosystems." This plan is essential to guide federal ocean acidification investments and activities over the next decade and beyond. It will provide a better understanding of the process of ocean acidification, its effects on marine ecosystems, and the steps that must be taken to minimize harm from ocean acidification. The plan is organized around the following seven priority areas 1) research, 2) monitoring, 3) modeling, 4) technology development, 5) socioeconomic impacts, 6) education and outreach and 7) data management.



- In 2011, the U.S Department of Commerce and NOAA released national sustainable marine aquaculture policies, which focus on: encouraging and fostering sustainable aquaculture that increases the value of domestic aquaculture production and creates American business, jobs, and trade opportunities; making timely management decisions based on the best scientific information available; advancing sustainable aquaculture science; ensuring aquaculture decisions protect wild species and healthy coastal and ocean ecosystems; developing sustainable aquaculture compatible with other uses; working with partners domestically and internationally; and promoting a level playing field for U.S. aquaculture businesses engaged in international trade, working to remove foreign trade barriers, and enforcing our rights under U.S. trade agreements.
- Efforts are also underway with U.S. federal, state, and tribal partners on a variety of initiatives stemming from the 2011 Aquaculture Policies, the National Ocean Policy Implementation Plan, and NOAA's mandates under the Magnuson Stevens Act and the National Aquaculture Act.
  - The National Shellfish Initiative to increase shellfish farming and restoration.
  - A Technology Transfer Initiative is being developed to foster partnerships that showcase innovative practices, jump start private sector investments, and create employment opportunities in coastal communities.
  - Rules are currently being developed to implement a Fishery Management Plan for Regulating Offshore Marine Aquaculture in the Gulf of Mexico—the first comprehensive regional approach to authorizing aquaculture in federal waters. The public will have an opportunity to comment on the draft rule before it is finalized.

### ***Managing Marine Renewable Energy***

- In the United States, the primary focus on marine renewable energies to date has been on investing in research and development. In 2009, the final regulations for the Outer Continental Shelf (OCS) Renewable Energy Program, which was authorized by the Energy Policy Act of 2005, provided a framework



for issuing leases, easements and rights-of-way for OCS activities that support production and transmission of energy from sources other than oil and natural gas. The U.S. Department of the Interior's Bureau of Ocean Energy Management (BOEM) is responsible for overseeing offshore renewable energy development in Federal waters. The U.S. Department of Energy (DOE) leads U.S. efforts to assess marine and hydrokinetic (MHK) energy resources and is supporting testing and deployment of wave and tidal energy projects and efforts to foster a commercial market for MHK devices. DOE also supports research into the effects of MHK technologies on aquatic ecosystems, including how to avoid or mitigate such effects when possible, which will result in comprehensive models and guidelines that inform future placement of marine and hydrokinetic devices and arrays to ensure safe, sustainable deployment. DOE represents the United States in the Ocean Energy Systems Implementing Agreement, an intergovernmental collaboration between countries established by the International Energy Agency in Paris.

#### ***Facilitating trade by ocean connectivity***

- Much of the United States' multilateral work in the regulation of international shipping to address the safety and security of ships and the prevention of pollution from ships occurs at the International Maritime Organization.
- The U.S. Coast Guard and the Maritime Administration within the U.S. Department of Transportation, along with other Federal government agencies, are responsible for dealing with various issues related to waterborne transportation that facilitates trade.

#### **Disaster Risk Reduction and Resilience (List of treaty obligations, domestic laws, programs, etc)**

The United States Environmental Protection Agency's Climate Ready Estuaries program works with the National Estuary Programs and other coastal managers at the local level to: 1) assess climate change vulnerabilities, 2) develop and implement adaptation strategies, 3) engage and educate stakeholders, and 4) share the lessons learned with other coastal managers. Since 2008, 14 NEPs have received targeted



support to identify climate change vulnerabilities, develop adaptation plans, and begin to implement selected actions within these plans.

The Coastal Storms Program is a NOAA-led initiative that brings together organizations from all sectors to a specific region for the sole purpose of making communities safer by reducing the loss of life and negative impacts caused by coastal storms. Each Coastal Storms Program initiative lasts three to five years and brings additional manpower, focus, and funding toward this goal. Since it was initiated in 2002, the Coastal Storms Program has invested in projects in six regions, with current work focused in the Gulf of Mexico and Pacific Islands.

Through the Famine Early Warning System Network (FEWS NET), the National Atmospheric and Space Administration (NASA), U.S. Geological Survey (USGS), U.S. Department of Agriculture (USDA), NOAA, and USAID are working in collaboration with local, regional, and international partners to provide early warning and vulnerability information on emerging or evolving food security issues. A primary goal of the FEWS NET program is to produce high quality information for disaster and crisis prediction. Program professionals in the United States monitor data and information—including remotely sensed as well as ground-based data on meteorological, crop, and rangeland conditions—for early indications of potential threats to food security.

The United States has been a major contributor and supporter of the technology infrastructure for tsunami and coastal hazards warning, and has championed the effort to link national and regional warning systems to the planned Global Earth Observation System of Systems (GEOSS). The United States convened the first Earth Observation Summit in 2003 with 34 participating nations. That number has grown to 56 nations. This international effort to achieve interoperable, sustained observation systems is necessary to save lives and mitigate catastrophic economic impacts while shortening disaster recovery time. The primary purpose of an early warning system is to provide timely and accurate forecasts and warnings of coastal flooding and associated hazards caused by tsunamis, storm surge and hurricanes..

Through Radio and Internet for the Communication of Hydro-Meteorological and Climate-Related Information for Development (RANET), USAID and NOAA are working



with a range of humanitarian and meteorological organizations to provide useful weather and climate information to rural communities. The RANET program, which operates in Africa, South and Southeast Asia, and the Western Pacific, uses reserve capacity on the WorldSpace digital satellite system to transmit forecasts, bulletins, imagery, seasonal assessments, and data to remote areas. The goal of the program is to provide environmental information that assists governments and populations in coping with hydro-meteorological hazards and environmental fluctuations. RANET also supports the formation of community groups and associations that are instrumental in disseminating information and extending the network to new communities.

NOAA has in place domestic plans and programs related to increasing community resilience (Weather Ready Nation), and improvements to accuracy and lead times of forecasts and warnings related to severe weather, droughts and tsunamis, through the Warn on Forecast program, the National Integrated Drought Information System (NIDIS) and the Tsunami Program.



**Asia-Pacific  
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Part I of this report is produced by

Yan LIU, Xuan ZHU, Wanfei QIU, Allison REED, Wing-Kuen CHOW, Yeon-Fong LIANG,  
Jiyeon CHOI, Gabriel Anthonius WAGEY, S. Zelenuhin, Dongmei TANG, Benrong PENG,  
Zhenghua LIU, Qiulin ZHOU, Bo WEI, Danfeng WENG and Quan WEN.

APEC MSD Center/ China SOA CIMA

E mail: [apecmsd@gmail.com](mailto:apecmsd@gmail.com)

Website: <http://www.apecmsd.cn/>

Part II of this report is produced by APEC member economies

For

**Asia-Pacific Economic Cooperation Secretariat**

**35 Heng Mui Keng Terrace**

**Singapore 119616**

**Tel: (65) 68919 600**

**Fax: (65) 68919 690**

**Email: [info@apec.org](mailto:info@apec.org)**

**Website: [www.apec.org](http://www.apec.org)**

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