

Newsletter from **NOWPAP CEARAC**

Northwest Pacific Action Plan
Special Monitoring & Coastal Environmental Assessment
Regional Activity Centre

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Greetings from CEARAC

Yuichi Nagasaka, CEARAC Director

One of the major works in United Nations Environment Programme (UNEP) is Regional Seas Programme. Of 18 programmes around the world, Northwest Pacific Action Plan (NOWPAP) was adopted in 1994 by four member states, namely China, Japan, Korea and Russia, to protect, manage and develop marine and coastal environment of the region. Each member hosts one regional activity centre (RAC), and Special Monitoring and Coastal Environmental Assessment Regional Activity Centre (CEARAC) was established in the Northwest Pacific Region Environmental Cooperation Center (NPEC) in 2002 by finalization of Memorandum of Understanding (MoU) between UNEP and NPEC. As its name states, CEARAC has worked on monitoring and assessment of marine and coastal environment and development of special monitoring and assessment tools using remote sensing technique.

In recent years, CEARAC has implemented various activities on marine litter, eutrophication and marine biodiversity. Current projects are assessment of major pressures on marine biodiversity in the NOWPAP region and feasibility study towards assessment of seagrass distribution in the NOWPAP region. CEARAC also organized workshops and meetings in 2017 including the First International Workshop on Assessment of Seagrass Distribution in the NOWPAP Region.

As for annual NOWPAP events held among the member states in rotation, NOWPAP International Coastal Cleanup (ICC) campaign and the 22nd NOWPAP Intergovernmental Meeting (IGM) were held in Toyama City this year. Taking an opportunity of IGM22, Toyama Prefectural Government and NPEC co-organized Toyama Symposium on International Cooperation for the Environment, and activities of NOWPAP and CEARAC were introduced to Toyama people.

In addition to such chances, I strongly expect that this CEARAC newsletter helps its readers understand 'CEARAC' and get interested in conservation of marine and coastal environment both in Toyama Bay and wider NOWPAP region.



Activities in 2017

1. Organization of Meetings

● The 15th CEARAC Focal Points Meeting

The 15th NOWPAP CEARAC FPM was held on 29-30 August 2017 in Toyama, Japan with the participation of CEARAC Focal Points and alternate, representatives of NOWPAP RCU, other Regional Activity Centres (RACs) of NOWPAP, the Intergovernmental Oceanographic Commission/Sub-Commission for the Western Pacific (IOC/WESTPAC) and one Japanese researcher.



The CEARAC Focal Points Meeting is a NOWPAP arrangement consisting of representatives of the NOWPAP members in order to promote smooth and effective implementation of special monitoring and assessment of the marine and coastal environment.

The meeting reviewed the progress of on-going CEARAC activities for the 2016-2017 biennium and also discussed the new activities for the 2018-2019 biennium. The draft workplan and budget of CEARAC



activities for the 2018-2019 biennium was agreed to be submitted to the 22nd NOWPAP IGM which was held on 19-21 December 2017 in Toyama.

The workplan for the 2018-2019 biennium includes two new specific projects:

- (1) Development of a CEARAC Medium-term Strategy on marine biodiversity
- (2) Development of tool for mapping seagrass distribution in the NOWPAP region

Report and Documents of CEARAC FPM15: <http://cearac.nowpap.org/fpm/fpm15.html>

● CEARAC Expert Meeting on Eutrophication Assessment in the NOWPAP Region

The CEARAC Expert Meeting on Eutrophication Assessment in the NOWPAP region was organized in Qingdao, China, on October 18, 2017.

*For more information, see the report by Dr. Zhiming Yu in "Experts' Voices" on page 7

2. Reports of main projects for the 2016-2017 biennium

Activity on Marine Biodiversity (Assessment of the major pressures on marine biodiversity in the NOWPAP region)

Since 2010, CEARAC has implemented activities related to marine biodiversity conservation. Based on the experience of developing a common procedure for assessment of the eutrophication status (NOWPAP Common Procedure), development of a new assessment method of marine environment for marine biodiversity conservation has been proposed at the 14th CEARAC FPM. However, there is a big gap of data availability among the NOWPAP member states, and the participants of the meeting concerned about the difficulty of implementing the proposed activity. After discussion during the meeting, a new project “Assessment of major pressures on marine biodiversity in the NOWPAP region” was proposed and approved.

The experts from the member states conducted information collection for this activity: scientific papers on impacts of three major pressures (eutrophication, non-indigenous species, and habitat alteration) on marine biodiversity, and central/local governments’ strategies on marine biodiversity conservation. Then, Secretariat of CEARAC compiled the submitted national reports and developed a draft report which was reviewed by the experts at the 1st workshop on Major Pressures on Marine Biodiversity in the NOWPAP Region (24 October 2017, Tokyo, Japan). After refinement and more review by CEARAC FPs and NOWPAP FPs, the report will be published by the end of 2017.

The 1st Workshop on Major Pressures on Marine Biodiversity in the NOWPAP Region

The 1st Workshop on Major Pressures on Marine Biodiversity in the NOWPAP Region was held on 24 October 2017 in Tokyo, Japan.

This workshop was held in order to review the first draft of a report “Assessment of Major Pressures on Marine Biodiversity in the NOWPAP Region” prepared by CEARAC Secretariat and to discuss the detailed contents of the report.

Four experts, Dr. Bei HUANG (China), Dr. Yasuwo FUKUYO (Japan), Dr. Young Nam KIM (Korea) and Dr. Tatiana ORLOVA (Russia) participated in the workshop.

The Secretariat of CEARAC, Dr. Takafumi YOSHIDA, introduced the contents of the first draft of the report. This report was prepared based on the pilot assessments implemented in all NOWPAP member states in the 2014-2015 biennium, and it aims to show the current status of three major pressures, namely eutrophication, non-indigenous species and habitat alteration in the NOWPAP region. In order to explain the current status of major pressures, the Secretariat used the DPSIR framework. DPSIR framework is one of the assessment methodologies to understand the relationships between DRIVERS, PRESSURES, STATES, IMPACTS and RESPONSES on environmental issues.

Agreeing to apply the DPSIR framework to this report, the experts reviewed the first draft and gave several comments.

Through the discussion during the workshop, the participants agreed on the following points;

- Secretariat of CEARAC will contract the experts who participated in this workshop to check the availability of additional data for DPSIR assessment and support preparing the second draft for review by CEARAC FPs
- This report focuses on only sea areas where the pilot assessments were conducted. If there is any additional information found from the past NOWPAP activities, they will be added to this report.
- In the chapter of “Conclusion and recommendation”, differences of important pressures among the member states and limitation of available data will be explained. In addition to this, what kind of data is necessary for deeper understanding of the status in the NOWPAP region will be mentioned.

This workshop is the first time which aims to prepare the report. This was the first occasion for the experts and Secretariat of CEARAC to get together to develop a report. As it was very successful, Secretariat of CEARAC will organize the same type of workshop in the process of future publication of CEARAC reports.

Activity on Seagrass (Feasibility study towards assessment of seagrass distribution in the NOWPAP region)

Feasibility study towards assessment of seagrass distribution in the entire NOWPAP region was conducted in the 2016-2017 biennium as one of CEARAC specific project.

To grasp availability of filed data on seagrass, which is helpful for mapping the distribution of seagrass by using satellite images, literature review was carried out by the national experts in each NOWPAP member state. Through the process, seagrass species observed in the NOWPAP region were listed up and threats to seagrass in the NOWPAP region were reviewed.

From a cost analysis to detect the distribution of seagrass by using satellite images in the selected sea areas in the NOWPAP region, it was considered unrealistic to take the conventional approach for mapping the distribution of seagrass in the entire NOWPAP coastal zones. Instead, it was suggested to use cloud computing services and freely available satellite images for mapping the distribution of seagrass in the NOWPAP region to save time and money needed to analyze satellite images. Following this suggestion, NPEC, as the hosting body of CEARAC, submitted a research proposal for funding to develop a web- based tool for mapping the distribution of seagrass using cloud computing services in 2017.

The 1st International Workshop on Assessment of Seagrass Distribution in the NOWPAP Region

First international workshop on assessment of seagrass distribution in the NOWPAP region was organized in Himi, Toyama, Japan on August 3, 2017

*For more information, see the report by Dr. Maria Potouroglou in “Experts’ Voices” on page 6.



Date: August 3, 2017 (13:00 - 17:00)
Venue: Himi-Gakko International Center
Organizer: Northwest Pacific Region
Supporters: Toyama Prefecture, Himi City, NOWPAP R21

Purpose of workshop:
 Seagrass and seaweed beds provide various ecosystem services such as habitat, spawning and nursery grounds and places of food production for aquatic biota. They also help reduce the absorbing nutrients nitrogen and phosphorus and absorb and fix CO₂ by photosynthesis. United Nations Environment Programme (UNEP) call such stored carbon in the seas “Blue Carbon” and it is recognized to mitigate the climate change in the coastal areas. However, loss of seagrass and seaweed beds have globally reported by anthropogenic activities such as trawling and its supports, aquaculture, coastal development, etc. The Northwest Pacific Region Environmental Cooperation Center (NPEC) with cooperation of Special Ministry and Coastal Environment Assessment Regional Activity Centre of Northwest Pacific Action Plan (NOWPAP) CEARAC, has been carrying out a study to understand the distribution of seagrass and threats to seagrass with assistance of the NOWPAP member states (China, Japan, Korea and Russia). National experts invited in this project will get together and discuss availability and limits of available seagrass distribution data by means of satellite data and quality of open access database acquisition of a large scale seagrass distribution in the Northwest Pacific. In addition, seagrass and seaweed beds transboundary coastal areas in the NOWPAP region.
 The special participation of those who interested in the culture and analysis of satellite images and its application to the marine environment researchers.

Time	Topic of presentation
13:00 - 13:30	Keynote speech UNEP/IOC/UNEP / 21 March (Tokyo) / Carbon Storage potential of Blue Forests: prospects for development their carbon mitigation on the NOWPAP region
13:30 - 14:00	Department of Commerce, Yokohama College of Commerce / Dr. Toyohiko Komatsu Estimated worldwide <i>Zostera</i> for seagrasses and projecting future distribution of seagrasses in Japan
14:00 - 14:10	-Break-
14:10 - 14:30	State Key Laboratory of Tropical Ocean Development, Chinese Academy of Sciences / Dr. Yang Dingfeng
14:30 - 14:50	Department of Commerce, Yokohama College of Commerce / Dr. Toyohiko Komatsu
14:50 - 15:10	Department of Oceanography, Chonnam National University / Dr. Keungho Kim
15:10 - 15:30	Laboratory for Marine Management of Coastal Regions, Pacific Geographical Institute of the Far Eastern Branch of the Russian / Dr. Valerii Zharikov
15:30 - 15:40	-Break-
15:40 - 16:00	Case studies towards assessment of seagrass distribution in the NOWPAP region. Application Development Group, Research and Development Department, Remote Sensing Technology Center of Japan / Dr. Takayuki Sawada Large scale seagrass mapping using satellite images in Japan
16:00 - 16:30	Organization for Marine Science and Technology, Nagasaki University / Dr. Shengyu Yu, Nanyang Monitoring seagrass productivity using low-cost data logging technology
16:30 - 17:00	Overall discussion towards assessment of seagrass distribution in the NOWPAP region. Practical table of contents of the feasibility study towards assessment of seagrass distribution in the NOWPAP region NOWPAP CEARAC / Dr. Gunki Torachi

3. Cooperation with NOWPAP Partners and Organizations

2017 NOWPAP-TEMM Joint Workshop on Marine Litter Management and International Coastal Cleanup

The 2017 NOWPAP-TEMM Joint Workshop on Marine Litter Management and International Coastal Cleanup was held on 19-20 September 2017 in Toyama, Japan, which was organized by NOWPAP RCU, Ministry of the Environment, Japan and the Northwest Pacific Region Environmental Cooperation Center (NPEC), host organization of CEARAC.



The workshop was held on 19 September under participation of Marine Litter Focal Points and researchers/experts on marine litter of the NOWPAP member states. After opening remarks from the Ministry of the Environment, Japan, Toyama Prefectural Government and NOWPAP RCU, the participants made presentations in three sessions.

In the first session, “progress of marine litter management in the NOWPAP member states”, Marine Litter Focal Points reported the actions against marine litter in each member state. Then, in the second session, “addressing challenges of microplastics”, researchers/experts of each member state introduced microplastic monitoring and its results. Finally in the third session, “From global to regional to local action”, international partners, IETC (International Environmental Technology Center), YSLME (Yellow Sea Large Marine Ecosystem project), and FAO (Food and Agriculture Organization) introduced their activities on marine litter through internet communication.

Since microplastic has become the one of the most concerning issues in the NOWPAP member states, all of the member states have started monitoring survey and some member states started countermeasures against it.



On 20 September, NOWPAP ICC was held in Rokudouji beach in Toyama. Rokudouji beach is one of the most polluted coasts by marine litter in Toyama prefecture.

All workshop participants, several local people and university students cleaned the beach together. Total 60 bags (500 kg) of marine litter were collected from the 2-hour cleaning.

Experts' Voices

From seagrass mapping to blue carbon exploration in the North West Pacific Region

**Dr. Maria Potouroglou (Blue Forests Project)
UNEP/GRID-Arendal**



The role of coastal blue forests ecosystems - primarily mangrove forests, seagrass meadows and tidal marshes - in mitigating climate change, has become well recognised over the recent years. In addition to storing significant amounts of carbon, these ecosystems are highly valuable because they provide a wide range of benefits, supporting biodiversity and human well-being. Human disturbances can affect the magnitude of these carbon sinks, as well as the rest of ecosystem benefits, through habitat loss and alteration, eutrophication, and coastal development among others.

An important step in sustaining their unique sets of benefits and intrinsic values is the prioritisation of their conservation and sustainable use, as well as the development of restoration programs.

Following the international policy engagement of the UN Environment/GEF Blue Forests Project, I was invited to lead the discussions on methodologies for assessing the blue carbon storage potential of seagrasses at the 1st International Workshop on the Assessment of Seagrass Distribution in the NOWPAP Region, held on August 3rd, 2017 in Toyama, Japan.

In the workshop, experts from the NOWPAP member states discussed the applicability and limit of detecting seagrass distribution by using satellite data, and develop a future workplan towards the assessment of seagrass distribution in the whole region.

Influenced by the current state of scientific knowledge, coastal blue forests ecosystems are starting to be integrated into national and regional policy and management across the globe. However, the state of blue carbon scientific knowledge in the NOWPAP Region is currently limited. Three pathways forward were discussed at the workshop, which could be pursued separately or concurrently:

1. Regulatory enforcement – Assessment of existing regulatory policies where the value of seagrass carbon can support conservation or other management goals.
2. A market-based mechanism - Carbon finance supporting the sustainable management and/or restoration of seagrass meadows.
3. An educational and awareness program – Improving the understanding of the value of seagrass meadows with the general public, management authorities, policy makers and other coastal stakeholders.

In addition, a regional seagrass carbon approach could support NOWPAP Region member states in meeting their commitments to numerous international conventions. There is a unique opportunity for countries to address these commitments by developing and implementing both biodiversity conservation and climate change mitigation and/or adaptation agenda, with multiple co-benefits.

For more information on GEF Blue Forests Project, please visit www.gefblueforests.org



2017 CEARAC Expert Meeting on Eutrophication Assessment in the NOWPAP Region

Dr. Zhiming Yu
Institute of Oceanology Chinese Academy of Sciences



The 2017 CEARAC expert meeting on eutrophication assessment in the NOWPAP region was held on 18 October 2017 in Qingdao, China. The meeting reviewed the on-going CEARAC activities on the trial application of the screening procedure, which is part of the NOWPAP Common Procedure for eutrophication assessment. The meeting also discussed the refinement of current assessment method and a future plan on coastal eutrophication assessment. The meeting is summarized as follows:

1. Overview of the progress on the trial application of the Screening Procedure

The Secretariat of NOWPAP CEARAC, Dr. Genki Terauchi, introduced the background of the expert meeting by briefly presenting the on-going CEARAC activities for the trial application of the screening procedure, aiming at the identification of the potential eutrophic zones in the NOWPAP sea area. He also introduced some current progress of the activity, such as the construction of the WebGIS map for eutrophication assessment.

2. Four national reports on identification of potential eutrophic zones and two invited reports on eutrophication and HABs

Dr. Zhiming Yu, Dr. Genki Terauchi, Dr. Juyun Lee and Dr. Vladimir Shulkin are four national experts of coastal eutrophication from China, Japan, Korea and Russia, respectively. They presented their working reports in terms of the assessment methods and diagnosis of coastal eutrophication in the NOWPAP region. Besides assessment results, the national experts also put forward the existing problems and their suggestions in their reports, such as inclusion of nutrients data in the screening procedure because of limited

COD data; hypoxic condition; refinement of assessment criteria in case no satellite Chl-a is available; revision of criteria in case some coastal areas were finally identified as non-eutrophic zones although red tide and hypoxia were - constantly occurring there.

Dr. Yasuwo Fukuyo, an emeritus professor from University of Tokyo, gave an invited report on Eutrophication and HAB in the NOWPAP region. He also provided several suggestions to improve the Web-based map on potential eutrophic zones in the NOWPAP region including the uniformity of threshold to define hypoxia, adding explanation of observation method in HAB events and revision of hypoxia icon to avoid misleading. Dr. Luo from National Marine & Environmental Monitoring Center, State Oceanic Administration of China, gave an invited report on



Eutrophication operational monitoring in China. He introduced the eutrophication index method using COD, inorganic nitrogen and active phosphate for eutrophication assessment in Chinese coastal areas.

3. Discussion and suggestions on current progress and future plan

After discussion on current progress and future actions, the attendants of the expert meeting agreed the following items: continuation of the activity on coastal eutrophication assessment in the NOWPAP region; uniformity of criteria of the screening procedure as well as in the WebGIS map, such as hypoxia; refinement of the Screening Procedure including selection of parameters, such as nutrients data; updating satellite Chl-a information on annual basis by CEARAC; reconstruction of WebGIS map to make it accessible from China; and organization of CEARAC expert meeting on eutrophication assessment on a regular basis in the future.

After having 15 year experience

Dr. Yasuwo Fukuyo
Tokai University



After having 15 year experience, I retired the focal point position of NOWPAP/CEARAC by the end of 2017. I attended the first CEARAC Focal Point Meeting (FPM) held in Toyama in February 2003, and recognized the support by CEARAC for research on harmful algal blooms (HABs) in the Regional Sea (RS). Occurrence of HABs

had been known at that time, but frequency and size of HABs in terms of duration and geographic size were not much serious, comparing with those occurred in Seto Inland Sea of Japan, outside of the RS. Therefore, I felt it slightly incomprehensible to set HABs monitoring as a prioritized topic in NOWPAP. This curious feeling lasted several years, and gradually disappeared along with the development of discussion on HAB status and trend in the RS with Directors of CEARAC, i.e., Mr. Hiroyuki Ishitobi, Mr. Masanobu Miyazaki and Mr. Takeshi Ogawa, and also researchers, i.e., Mr. Hitoshi Kikawada, Dr. Genki Terauchi and Dr. Takafumi Yoshida. I recognized that precautional action with intensive monitoring of environmental condition such as nutrients level and its changing trend, in addition to observation of case number of HAB occurrences, was most important for NOWPAP/CEARAC. One of the actions is collection of information of HAB mitigation and management implemented in the NOWPAP member states, and it was published in a booklet on countermeasures. This booklet was highly appreciated by many scientists in the world, when the CEARAC Secretariat distributed it to participants of the conferences and workshops on Harmful Algal Blooms organized by International Society for the Study on Harmful Algae (ISSHA). Most publication on HAB were on ecology, biology and biochemistry of harmful algae and events, but the CEARAC booklet filled the gap between scientists and stakeholders who wished to apply basic science information to daily social life activities. Homepage of one of the most harmful species endemic in the RS, *Cochlodinium*, was also prepared with intention to get more understanding from public on harmful species. I still remember clearly the intensive discussion on target of the webpage with Dr. T. Yoshida, and we concluded to make it understandable for junior high school students, as they are important generation for future of the RS.

Precautional action must be most important for organizations working on environmental observation and its conservation such as RACs of NOWPAP, and I could learn this importance from my 15 years' experience working with FPs of the member states and CEARAC Secretariat. We need to think about not only current condition, but also 10 or 50, or even 100 years future shape of the RS to keep sound with abundant resources for future generations. I was so happy to work as one of the FP in the CEARAC and wish its development of more activities for the RS.

15 December 2017

Yasuwo Fukuyo

CEARAC Focal Points

Country	Name	Organization
China	Ms. Guihua DONG	China National Environmental Monitoring Center
	Dr. Junlong LI	China National Environmental Monitoring Center
Japan	Mr. Katsunori YANO	Ministry of the Environment Japan
	Dr. Joji ISHIZAKA	Nagoya University
	Dr. Yasuwo FUKUYO	Tokai University
Korea	Mr. Jae Yong CHOI	Ministry of Oceans and Fisheries
	Dr. Young Nam KIM	Korea Marine Environment Management Corporation
	Dr. Eun Chan YANG	Korea Institute of Ocean Science & Technology
Russia	Dr. Vladimir SHULKIN	Far Eastern Branch of the Russian Academy of Sciences
	Dr. Tatiana ORLOVA	Far Eastern Branch of the Russian Academy of Sciences

Workplan for 2018-2019 biennium

The 22nd Intergovernmental Meeting was held 19-20 on December in Toyama, Japan. The meeting approved the report of the four regional activity centres (CEARAC, DINRAC, MERRAC and POMRAC) on their activities during the 2016-2017 biennium and the workplan for the 2018-2019 biennium. In the 2018-2019 biennium, CEARAC will conduct the following activities.

Major Activity	Tasks
Organization of Meetings	<ul style="list-style-type: none"> - Focal Points Meeting (FPM) in 2018 and 2019 - Expert Meeting in 2019
Maintenance of Website	<ul style="list-style-type: none"> - Periodical update of web contents - Upgrade of Marine Environmental Watch System - Reconstruction of CEARAC websites using cloud computing technology
<p style="text-align: center;">Specific Projects</p> <p>1 Development of the CEARAC Medium-term Strategy on marine biodiversity in the NOWPAP region</p>	<ul style="list-style-type: none"> (1) Collection of relevant information on marine biodiversity (2) Review of collected information by marine biodiversity experts (3) Organization of marine biodiversity workshop and meeting for development of CEARAC Medium-term Strategy on marine biodiversity (4) Development of the CEARAC Medium-term Strategy on marine biodiversity
2 Development of a tool for mapping seagrass distribution in the NOWPAP region	<ul style="list-style-type: none"> (1) Detection of potential seagrass habitat (2) Development of a tool for mapping seagrass distribution (3) Construction of web-based service for mapping seagrass distribution
3 Consideration of future direction of NOWPAP marine biodiversity activities	<ul style="list-style-type: none"> (1) Collection of information on marine biodiversity activities in other regional seas programmes (2) Organization of series of meetings with other RACs
Marine litter (RAP MALI)	Regional overview of national efforts to address microplastics

Published by the CEARAC Secretariat

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Northwest Pacific Action Plan (NOWPAP)**

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