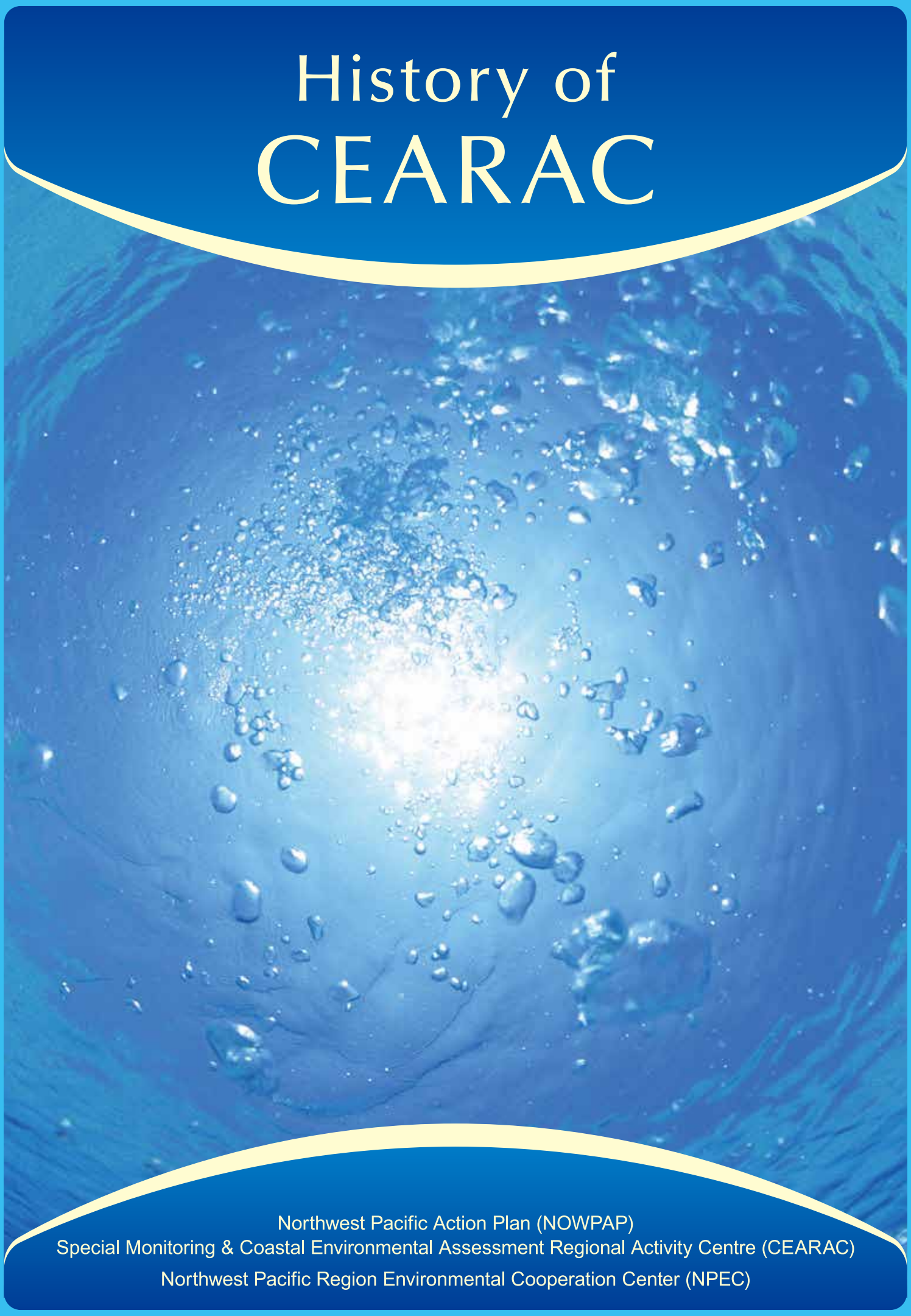
History of CEARAC



Northwest Pacific Action Plan (NOWPAP)
Special Monitoring & Coastal Environmental Assessment Regional Activity Centre (CEARAC)
Northwest Pacific Region Environmental Cooperation Center (NPEC)

Kazuya Kumagai

Message from Director of CEARAC

The Northwest Pacific Region Environmental Cooperation Center (NPEC) was designated as Special Monitoring & Coastal Environmental Assessment Regional Activity Centre (CEARAC) of the Northwest Pacific Action Plan (NOWPAP) in 1999. Since then, with the support of all Toyama residents and relevant organizations, CEARAC has implemented its activities to contribute to the conservation of the marine environments. Marking its 15th anniversary since the designation, CEARAC publishes a booklet to introduce its history and achievements.

Geographically, the Northwest Pacific region is rather small; however, it is a significant area for monitoring and assessing the state of the marine environment. Constant and long-term monitoring and assessment are essential for the regular conservation of the environment, and CEARC will continue contributing to conservation actions of the Northwest pacific sea area in cooperation with the United Nations Environment Programme, the governments of Japan, China, Korea and Russia, Toyama Prefectural government, and relevant international/regional/local organizations.

It will be a great pleasure for me and CEARAC staff if this booklet could help deepen understanding the state and the situation of the marine environment in the Northwest Pacific region as well as the past and present activities of NOWPAP and CEARAC.

Takakazu Ishii

Message from Governor of Toyama Prefecture

Presently the world is facing various environmental problems from local level to global level, namely treatment and disposal of municipal solid waste, global warming and marine litter. Human activities are a major cause of these issues; therefore, not only the central governments but also local governments have to take appropriate actions to address the problems.

Here, Toyama is the first prefecture in Japan to ban free distribution of plastic bags at supermarkets. Promotion of environmentally friendly practices, revitalization of “satoyama-rin” (country-side forest) by using the tax specifically designed for forest conservation (“Mizu-to-Midori-no-Morizukuri’), introduction of small hydropower generation and solar power generation are other examples which residents of Toyama have involved in.

Special Monitoring & Coastal Environmental Assessment Regional Activity Centre (CEARAC) and Regional Coordination Unit (RCU) of the Northwest Pacific Action Plan (NOWPAP) have their offices in Toyama City, and Toyama prefectural government and residents of Toyama have great interest in their activities.

By now, CEARAC has implemented various projects including but not limited to development and dissemination of marine environmental monitoring by using remote sensing and eutrophication assessment and published guidelines on marine litter under generous support and guidance by the Ministry of the Environment, Japan.

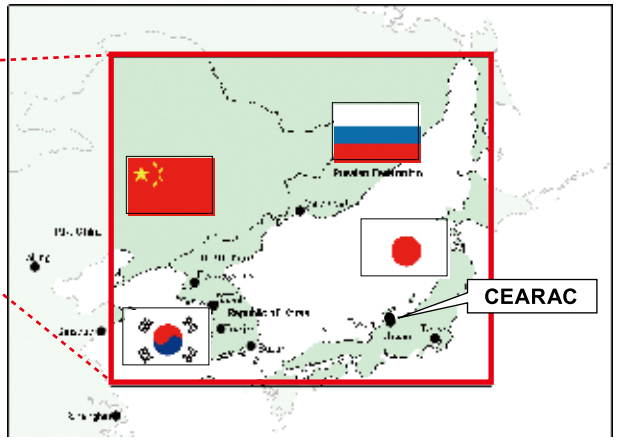
Further, CEARAC has initiated activities to develop a new assessment tool for marine biodiversity conservation and mapping of seagrass and seaweed. In their past and present activities, Toyama Bay has been selected as a case study site, so, both the local government and the residents expect that CEARAC achieves fruitful outcomes.

Toyama Prefectural government will continue working in close cooperation and coordination with NOWPAP and CEARAC and contribute to the conservation of our irreplaceable marine environments.

What is the Special Monitoring & Coastal Environmental Assessment Regional Activity Centre (CEARAC)?

The Northwest Pacific Region Action Plan (NOWPAP), which aims to conserve the marine environments of the Northwest Pacific region, was established as one of the Regional Seas Programmes (RSP) in the United Nations Environment Programme (UNEP) as a framework for international cooperation for the purpose of conserving global marine environments and continuing to enjoy their benefits in the future. Based on cooperation among the People's Republic of China, Japan, the Republic of Korea and Russian Federation, NOWPAP has implemented activities for conserving the shared marine environments in the region. Special Monitoring & Coastal Environmental Assessment Regional Activity Centre (CEARAC) is one of the four Regional Activity Centres (RACs) of NOWPAP, and the Northwest Pacific Region Environmental Cooperation Center (NPEC) has been designated as CEARAC.

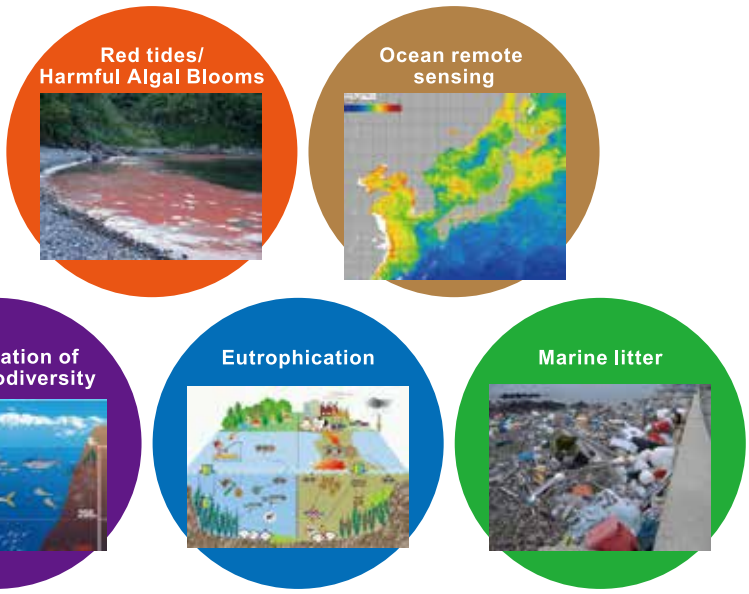
18 regional sea action plans: Antarctic, Arctic, Baltic, Black Sea, Caspian, Eastern Africa, East Asian Sea, Mediterranean, North-East Atlantic, North-East Africa, North-East Pacific, North-West Pacific, Pacific, Red Sea and Gulf of Aden, ROPME Sea Area, South Asian Seas, South-East Pacific, Western Africa and the Wider Caribbean



NOWPAP's four Regional Activity Centres

Name	Location	Activities
Special Monitoring & Coastal Environmental Assessment Regional Activity Centre (CEARAC)	Toyama (Japan)	Developing coastal environmental assessment methods and tools including using remote sensing techniques
Data & Information Network Regional Activity Centre (DINRAC)	Beijing (China)	Developing a region-wide data and information exchange network
Marine Environmental Emergency Preparedness and Response Regional Activity Centre (MERRAC)	Daejeon (Korea)	Developing effective measures in response to marine pollution incidents (e.g. oil spills)
Pollution Monitoring Regional Activity Centre (POMRAC)	Vladivostok (Russia)	Monitoring atmospheric deposition of contaminants as well as river and direct input of contaminants

NOWPAP region is a semi-closed sea area surrounded by countries with rapid economic development, and various environmental problems such as eutrophication are occurring at present. CEARAC has been implementing various activities to understand the status of the marine environments in order to propose management methods of the marine ecosystems and countermeasures against the problems.

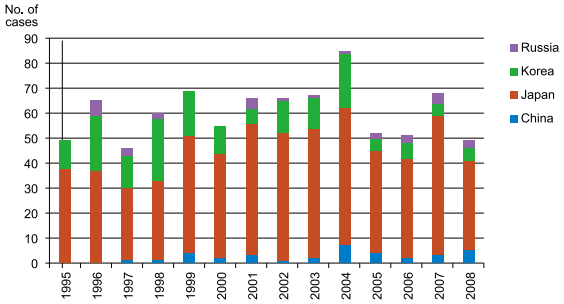


History and Achievements of CEARAC

Red tides/ Harmful algal blooms (HABs)

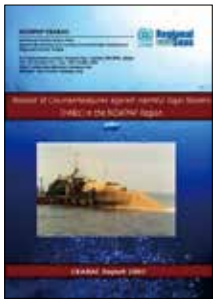
Red tides and harmful algal blooms (HABs) are environmental problems that cause serious damage such as massive fish kills. At present, significant damage by red tides has been reported in Kyushu and the Seto Inland Sea in Japan as well as in some areas in China and Korea.

Information on the occurrences of red tides is very important in developing effective countermeasures in the future. Therefore, CEARAC published a report on information on red tide occurrences and red tide monitoring systems in the NOWPAP member states. CEARAC also published a booklet of countermeasures against HABs.



Occurrences of red tide in China, Japan, Korea and Russia

Integrated report on HABs



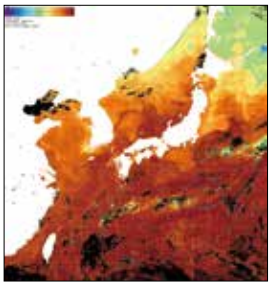
Countermeasures against HABs

Remote sensing of the marine environments

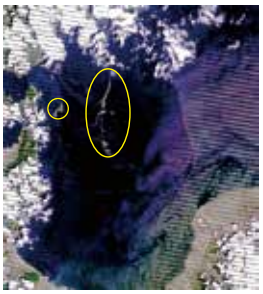
Satellite remote sensing is a very efficient observation technology which allows to obtain information of a wide area at one time. Monitoring the state of sea area by remote sensing can help detect and address the problems at an early stage.

Currently, it is possible to observe various types of environmental conditions from satellites such as sea surface temperature, chlorophyll-a concentration, sea level and wind speed at sea. In order to promote monitoring of marine environment by utilizing information from satellites, CEARAC published technical reports which introduce available satellite images and past and current remote sensing activities in the NOWPAP region. CEARAC has also conducted four training courses on remote sensing data analysis and 91 people from 14 nations and regions (including NOWPAP member states) have taken part in the courses.

In recent years, CEARAC has launched a new activity on seagrass bed mapping with remote sensing.



Sea surface temperature in the NOWPAP region observed by satellite



Red tide in Toyama Bay observed by satellite (NPEC)

Integrated Report on Ocean Remote Sensing (left)
Training Course on remote sensing data analysis (right)

1997

Establishment of Northwest Pacific Region Environmental Cooperation Center (NPEC)

1999

NPEC designated as CEARAC by UNEP

2003

First CEARAC Focal Points Meeting

Marine litter

A large amount of litter including plastic waste drifts in the ocean and is washed up on the shore, causing very serious problems all over the world. Marine litter is also harmful to seabirds and sea animals. Their entanglement by discarded fishing gear is often reported. Much of the marine litter is products used in people's daily lives and drifted into the sea via rivers and other routes. Therefore, stopping the input of land-based waste is effective for prevention of marine litter.
NOWPAP began its activities on marine litter in 2006, and in 2008 the member states agreed on NOWPAP Regional Action Plan on Marine Litter (RAP MALI).
Then, each member state has implemented relevant activities against marine litter for understanding the present situation as well as for prevention of its generation, and appropriate collection and treatment.
To support their activities, CEARAC provides information on marine litter based on marine litter monitoring guidelines, best practices for prevention of marine litter input, and relevant activities on 3Rs (recycle, reuse and reduce). Further, in order to solve the marine litter problem, it is important for every citizen to be aware of the problem and to make an effort to refrain from generating litter as much as possible. CEARAC has also developed materials to increase public awareness on this environmental problem.

Marine litter on the beach
(Tobishima Island, Yamagata Prefecture)

Distribution of marine litter on the beaches in the NOWPAP region

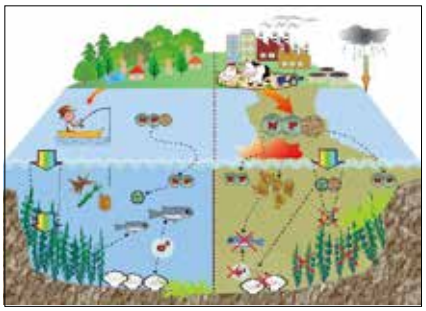
Monitoring guidelines on marine litter on the beaches

Best practices for preventing marine litter input from land-based sources in the NOWPAP region

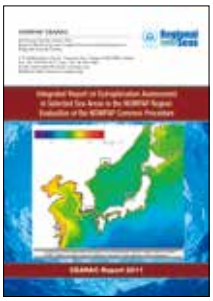
Public awareness material for citizens

Eutrophication

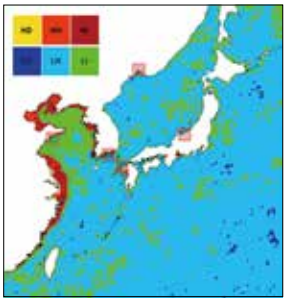
Eutrophication is a phenomenon of abnormal increase of phytoplankton and degradation of water quality caused by excessive input of nutrient loads (nitrogen and phosphorus).
Eutrophication may leads to red tide occurrences and hypoxia (oxygen depletion) in the sea. Because of dense population in the NOWPAP coastal area, increased amount of nutrient loads in household effluent and wastewater from industries and agricultural fertilizers go into the sea area and give negative influences to the marine environments.
CEARAC developed a common procedure (NOWPAP Common Procedure) to assess the eutrophication status in NOWPAP sea area.
CEARAC also applies remote sensing techniques to detect potentially eutrophic areas in the NOWPAP region.



Healthy ecosystem (left) and ecosystem in which eutrophication has occurred (right)



Report on assessment of eutrophication in selected sea areas of the NOWPAP region



Assessment of eutrophication by satellite remote sensing

2005 — International Workshop on marine litter by NPEC

2006 — Starting marine litter activities by NOWPAP

2007 — Starting development of eutrophication assessment procedure by NPEC

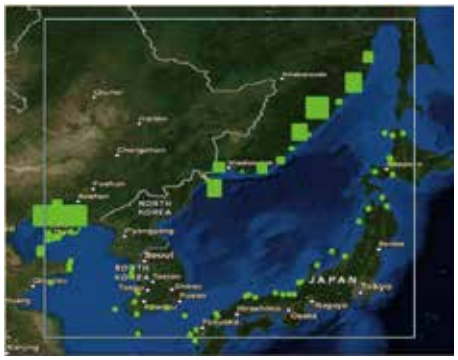
2008 — Starting eutrophication activities by NOWPAP

2009 — Starting development of a new tool for marine biodiversity conservation

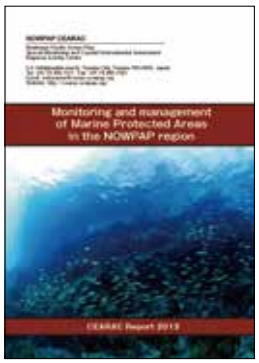
Marine biodiversity

Thanks to diverse features of the marine environments, such as coral reefs in the southern area and sea ice in the northern area, 8,000-meter deep sea and the Kuroshio Current and the Oyashio Current, the NOWPAP region is one of the sea areas with rich ecosystems with diversed marine life in the world. In order to conserve biological diversity, in 2010 at the 10th Conference of the Parties to the Convention on Biological Diversity (COP 10), held in Nagoya City, the Aichi Targets were agreed upon, among which Aichi Target 11 aims to conserve at least 10 % of world's coastal and marine areas by establishing marine protected areas (MPAs) by 2020.

However, establishment of MPAs still falls short of this Aichi Target, and in particular, the entire MPA areas in the NOWPAP region is about 2%. To promote more establishment of MPAs in each member state, CEARAC published a report to introduce definitions and management/monitoring practices of MPAs in the NOWPAP member states.



Distribution of marine protected areas in the NOWPAP region



Report on monitoring and management of marine protected areas in the NOWPAP region

Seagrass/seaweed bed mapping by using remote sensing techniques

Seaweed and seagrass beds are called the 'cradle of the sea,' and are a very important place for the growth of marine organisms in their early stages. Since seagrass and seaweed absorb carbon dioxide (a cause of global warming) and nutrient load (a cause of eutrophication), they play a crucial role for coastal ecosystems. However, due to pollution and land reclamation by the development of coastal areas in recent years, the areas of seaweed and seagrass beds have greatly reduced, and it is necessary to understand the present situation and take effective measures to maintain (or increase) the areas.

CEARAC is now working on seaweed and seagrass bed mapping with remote sensing techniques to detect their status and changes in distribution associated with changes in surrounding environments.

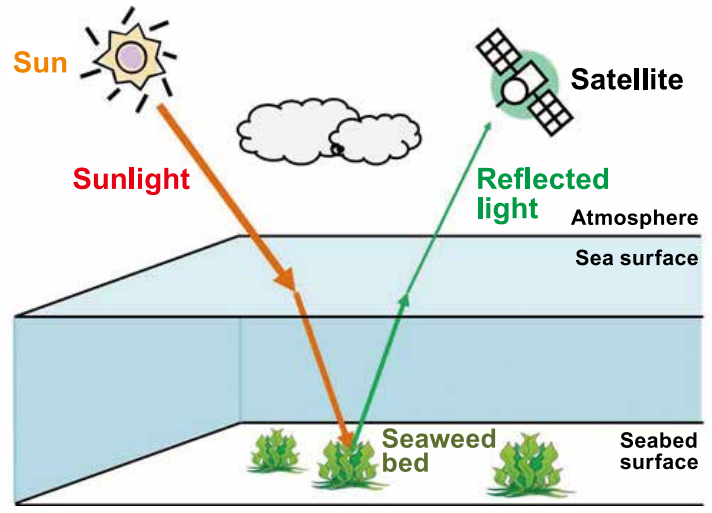


Image of monitoring seaweed/seagrass beds by using satellite remote sensing

2010 — Starting marine biodiversity activities by NOWPAP

2013 — NPEC became Public Interest Incorporated Foundation

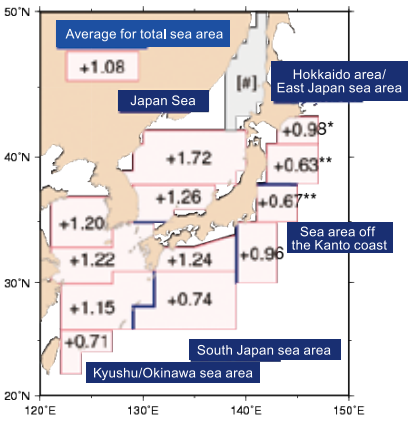
2014 — Development of seagrass and seaweed bed restoration map in Tohoku region by NPEC

2014 — Starting seagrass bed mapping activities by NOWPAP

Emerging issues in the NOWPAP region

Influence of global warming

Global warming gives adverse effects to the sea such as increases in sea water temperature and sea acidification. It is reported that the sea surface temperature rises faster in the NOWPAP region than in other sea areas, and this temperature rise may change flows of sea water and distribution of marine organisms. It has also been pointed out that ocean acidification may affect the growth of phytoplankton, zooplankton, marine coral and shelled organisms. Through various activities such as assessment and monitoring with remote sensing, CEARAC tries to understand the trend and current status of the marine environments.



Trend in long-term changes in the average sea surface temperature in the NOWPAP region

Changes in population and economy

Compared to other parts of the globe, the coastal areas of the NOWPAP member states have highly concentrated population. Land-based pollution load, industrial, agricultural and fishing activities have serious negative impacts on the marine environments and resources in the Northwest Pacific region. Therefore, it is necessary to establish appropriate management practices based on the deeper knowledge and understanding of the marine environments and resources in this area for their sustainable use. CEARAC will continue developing and proposing more appropriate approaches and methods to achieve the goal: conservation of the marine environments.

Changes in population in the coastal areas in the NOWPAP member states

Unit: 1 million persons

Year	Japan	China	South Korea	Russia
2002	34.4	272.6	46.1	1.4
2012	33.6	285.4	51.8	1.3

Source: State of the Marine Environment Report for the NOWPAP region, NOWPAP POMRAC(2014)

Changes in gross domestic product in the NOWPAP member states

Unit: 1 billion USD

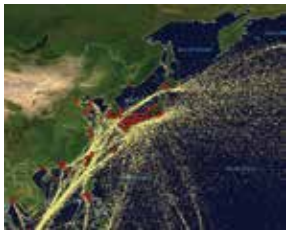
Year	Japan	China	South Korea	Russia
2000	4,730	1,192	533	259
2012	5,935	8,358	1,129	2,029

Source: Statistics of World 2014 (Statistic Bureau, Ministry of Internal Affairs and Communications)

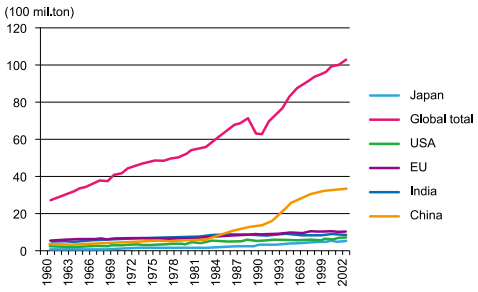
Increased use of sea areas

The Northwest Pacific region is an important maritime transportation route. Oil spills such as the Nakhodka oil spill accident and non-indigenous species introduced by ballast water of ships also pose threats to the conservation of marine biodiversity. To date, there have not been many reports on damage caused by non-indigenous species in the NOWPAP sea area; however, this is one of the emerging issues to be paid more attention.

In addition, in order to secure supply of marine resources, fishing acting including fish farming is becoming more vigorous, especially in China. However, excessive aquaculture activities may cause eutrophication and red tides, so while considering the characteristics and appropriate usage of the marine environments and resources in the NOWPAP region, CEARAC will propose sustainable and effective and efficient management methods to the NOWPAP member states.



Maritime transport in the Northwest Pacific



Global use of marine resources

Future

Achievements of CEARAC

CEARAC Websites

Home page


HAB Integrated Website

Cochlodinium Homepage


Marine Environmental Watch Project Homepage


Portal Site on Remote Sensing (RS)

International conferences held by CEARAC

2003	1st CEARAC Focal Points Meeting	Feb. 25-28
	1st NOWPAP Working Group 3 (HABs) Meeting	Oct. 28-30
	1st NOWPAP Working Group 4 (RS) Meeting	Dec. 1-3
2004	2nd CEARAC Focal Points Meeting	Mar. 15-17
	2nd NOWPAP Working Group 4 (RS) Meeting	Oct. 14-15
	2nd NOWPAP Working Group 3 (HABs) Meeting	Nov. 25-26
2005	1st International Workshop on HAB in the Northwest Pacific Region	Jun. 30 – Jul. 1
	3rd CEARAC Focal Points Meeting	Sep. 15-16
2006	4th CEARAC Focal Points Meeting	Mar. 8-9
	3rd NOWPAP Working Group 3 (HABs)/ Working Group 4 (RS) Meetings	Jul. 6-7
	4th International Workshop on Remote Sensing of the Marine Environment in the Northwest Pacific Region	Aug. 1-2
2007	2nd NOWPAP Workshop on Marine Litter	Mar. 28-29
	1st NEAR-GOOS - NOWPAP Joint Training Course on Remote Sensing Data Analysis	Sep. 3-7
	5th CEARAC Focal Points Meeting	Sep. 18-19
2008	6th CEARAC Focal Points Meeting	Mar. 6-8
	4th NOWPAP Working Group 3 (HABs)/ Working Group 4 (RS) Joint Meeting	Sep. 10-12
	2nd NOWPAP Training Course on Remote Sensing Data Analysis	Nov. 1-5
2009	7th CEARAC Focal Points Meeting	Sep. 14-15
2010	8th CEARAC Focal Points Meeting	Sep. 13-15
	Marine Biodiversity Forum in the Northwest Pacific Region	Oct. 15
2011	Expert Meeting on Marine Biodiversity and Eutrophication in the Northwest Pacific Region	Aug. 4-5
	9th CEARAC Focal Points Meeting	Sep. 6-7
	NOWPAP/PICES/WESTPAC Joint Training Course on Remote Sensing Data Analysis	Oct. 8-12
2012	10th CEARAC Focal Points Meeting	Apr. 17-18
2013	NOWPAP/NEASPEC Joint Workshop on Marine Biodiversity Conservation and Marine Protected Areas in the Northwest Pacific	Mar. 13-14
	Expert Meeting on Marine Biodiversity and Eutrophication in the Northwest Pacific Region	Aug. 5-6
	11th CEARAC Focal Points Meeting	Sep. 11-12
	NOWPAP- PICES Joint Training Course on Remote Sensing Data Analysis	Oct. 21-25
2014	12th CEARAC Focal Points Meeting	Jul. 2-3

Northwest Pacific Action Plan (NOWPAP)
Special Monitoring & Coastal Environmental Assessment Regional Activity Centre (CEARAC)

NOWPAP CEARAC
http://cearac.nowpap.org.

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