1 Background

In CBD COP 10 held in 2010, post-2010 targets (Aichi Targets) as well as Decision X/29 (Decision on marine and coastal biodiversity) were agreed. Following the results/decisions of COP10, it is expected that activities on conservation of marine biodiversity will be promoted in international/regional/national levels. Same as other international organizations, it is important for NOWPAP to promote activities on marine biodiversity.

With such a background, an expert meeting was held to discuss CEARAC activities on marine biodiversity (4-5 August 2011, Toyama, Japan). The participants introduced activities related to conservation of marine biodiversity in the NOWPAP member states and other regions and provided advice/suggestions on possible activities CEARAC can implement for the next biennium, 2012-2013, as well as future directions of CEARAC.

The following candidate activities were suggested for the next 2 years.

1. To develop the criteria for selecting ecologically and biologically significant areas (based on CBD criteria) which will contribute to designation of MPAs in each NOWPAP member state, and to implement a case study for applying the developed criteria in the NOWPAP region
2. To develop a framework of common indicators for assessment of marine environment and ecosystem status in the NOWPAP region, and to implement a case study for applying the framework
3. To assess the effectiveness of existing MPAs in each NOWPAP member state

The Secretariat of CEARAC reviewed each idea and prepared the following two activities to be implemented in the next biennium.

At the 9th NOWPAP CEARAC FPM, Focal Points will be required to set priorities for these two activities for approval at the 16th NOWPAP IGM.
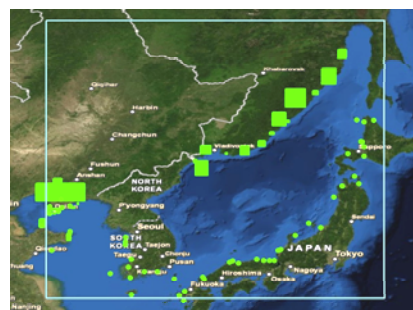
Activity I

Developing the criteria for selecting ecologically and biologically significant sea areas in the NOWPAP region

1   Background

Target 11 in Aichi Targets is that "10% of the world sea areas are designated as MPAs by 2020." Following this decision, each NOWPAP member state might be working on selection and establishment of MPAs. However, these future MPAs inside of their territorial seas and EEZ will not be always located in the NOWPAP region. In other words, increase of MPAs number or coverage in the member states does not lead to increase of MPAs coverage in the NOWPAP region. Actually, current MPAs inside of NOWPAP sea area cover only 0.2% of the entire NOWPAP area (as of 2010). Expansion of MPAs or relevant areas is crucial for activating conservation of marine biodiversity in the NOWPAP region. Basically, MPAs are designated in each country based on their national regulations/standards; however, CEARAC believes that expansion of protected sea areas by referring to concept of ecologically and biologically significant areas, set by CBD, as a complementary means, can help in successful conservation of marine biodiversity in the NOWPAP region.

Country	Number of PAs	Area (hectares) of PAs
China	20	1,367,206
Japan	23	436,235
Republic of Korea	22	357,333
Russia	14	1,956,770
Region	**79**	**4,117,544**

Source: "Threats to Marine and Coastal Biodiversity in the NOWPAP Region"

by Northwest Pacific Action Plan (2010)

2   Objective

Objective of this activity is to develop the criteria for selecting ecologically and biologically significant sea areas in the NOWPAP region based on the criteria of CBD EBSA (Annex 1).

3   Main tasks

3.1 Organization of Expert Meeting and/or Workshop

CEARAC will organize an expert meeting and/or a workshop in order to discuss the criteria of ecologically and biologically significant sea areas in the NOWPAP region. To develop the criteria,

CEARAC will refer to the criteria of EBSAs designed for the high seas and deep sea by CBD.

Each NOWPAP member state will be required to nominate an expert to discuss the criteria and to review the draft criteria for the NOWPAP region.

3.2 Collection of information on sea areas significant for marine ecosystem conservation and sustainable use of fishery resources

In the NOWPAP region, some sea areas have characteristic features such as water temperature fronts, upwelling areas, fishery grounds and spawning grounds, which are significant for marine ecosystem conservation and fishery resources. They will be candidates for ecologically and biologically significant sea areas. Experts who are nominated by CEARAC FPs will be required to collect information on sea areas significant for conservation of marine ecosystems and fishery resources in their countries and to introduce such areas at an expert meeting and/or a workshop.

4   Expected outcomes and future direction

Based on the discussion with experts of the NOWPAP member states, the criteria for selecting ecologically and biologically significant areas for the NOWPAP region will be developed in the 2012-2013 biennium.

After the 2012-2013 biennium, using the criteria, CEARAC will make a list of the ecologically and biologically significant sea areas in the NOWPAP region, which may contribute to enhance MPAs coverage in the NOWPAP member states. CEARAC will also establish the GIS Map introducing the marine ecosystem status in the NOWPAP region using the outputs of this activity.

5   Potential partners

In order to develop the criteria for ecologically and biologically significant areas, it is necessary to understand the current situation of MPAs in the NOWPAP region. So, CEARAC Secretariat will utilize the database on MPAs in the NOWPAP region established by NOWPAP DINRAC.

OSPAR has already set the EBSAs in their region and published a status report. Their experience and knowledge will be very useful for CEARAC's activity. So, CEARAC will invite an OSPAR representative to the expert meeting and/or the workshop to learn their experience and knowledge first-hand.

6 Schedule

Proposed schedule will be as follows.

Time		Actions	Main body
2012	Q2 10th CERAC FPM	● Approval of workplan and budget by CEARAC FPM ● Nomination of experts for this activity	CEARAC and FPs
	Q2 to Q4	● Collection of information on sea areas significant for marine ecosystem conservation and sustainable use of fishery resources in each member state	CEARAC and experts
2013	Q1	● Organization of an expert meeting or a workshop to discuss the criteria	CEARAC and experts
	Q2-Q3	● Development of a draft criteria for selecting ecologically and biologically significant areas for the NOWPAP region	CEARAC and experts
	Q3 (11th CEARAC FPM)	● Review of the draft criteria	CEARAC and FPs
	Q4	● The criteria for ecologically and biologically significant areas for the NOWPAP region	CEARAC
2014-		● Listing up the candidate sea areas based on the criteria ● Development of the NOWPAP marine ecological GIS Map	CEARAC and experts

7   Budget

| Contract	Timing	Output	To be completed	Counterpart	Budget (US$)
Collection of information on sea areas significant for marine ecosystem conservation and sustainable use of fishery resources	2012 Q2	Information on sea areas significant for marine ecosystem conservation and sustainable use of fishery resources	2012 Q4	Expert in China	2,000
				CEARAC	In-kind
				Expert in Korea	2,000
				Expert in Russia	2,000
Organizing an expert meeting and/or a workshop to discuss the criteria for the NOWPAP region	2013 Q1	First draft of criteria for the NOWPAP region		CEARAC	14,000
Total					20,000

Distribution of MPA   Information on marine environment

Information on marine life
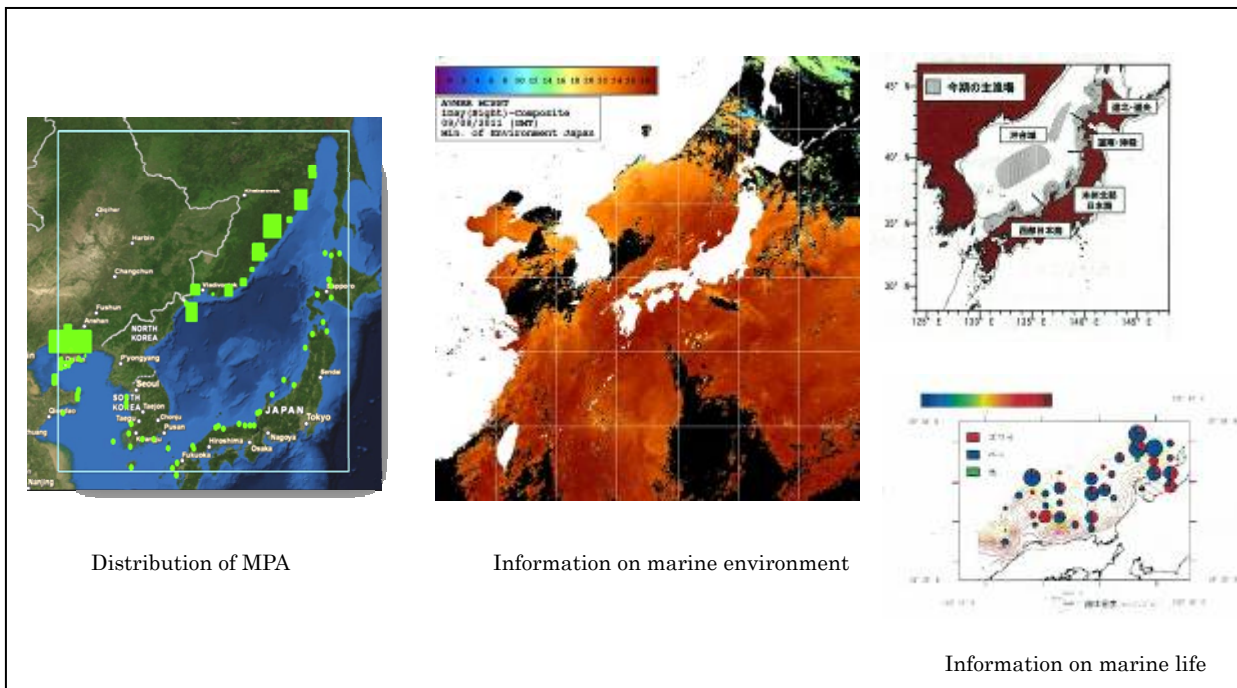
Image of NOWPAP Marine Ecosystem GIS MAP

Annex 1

EBSA Criteria（COP9 Decision IX/20: Marine and coastal biodiversity Annex I）

Criteria	Definition	Rationale	Examples	Consideration in application
Uniqueness or rarity	Area contains either (i) unique ("the only one of its kind"), rare (occurs only in few locations) or endemic species, populations or communities, and/or (ii) unique, rare or distinct, habitats or ecosystems; and/or (iii) unique or unusual geomorphological or oceanographic features	- Irreplaceable - Loss would mean the probable permanent disappearance of diversity or a feature, or reduction of the diversity at any level.	*Open ocean waters* Sargasso Sea, Taylor column, persistent polynyas. *Deepsea habitats* endemic communities around submerged atolls; hydrothermal vents; sea mounts; pseudo-abyssal depression	- Risk of biased-view of the perceived uniqueness depending on the information availability - Scale dependency of features such that unique features at one scale may be typical at another, thus a global and regional perspective must be taken
Special importance for lifehistory stages of species	Areas that are required for a population to survive and thrive.	Various biotic and abiotic conditions coupled with species-specific physiological constraints and preferences tend to make some parts of marine regions more suitable to particular life-stages and functions than other parts.	Area containing: (i) breeding grounds, spawning areas, nursery areas, juvenile habitat or other areas important for life history stages of species; or (ii) habitats of migratory species (feeding, wintering or resting areas, breeding, moulting, migratory routes).	- Connectivity between life-history stages and linkages between areas: trophic interactions, physical transport, physical oceanography, life history of species - Sources for information include: e.g. remote sensing, satellite tracking, historical catch and by-catch data, vessel monitoring system (VMS) data. - Spatial and temporal distribution and/or aggregation of the species.
Importance for threatened, endangered or declining species and/or habitats	Area containing habitat for the survival and recovery of endangered, threatened, declining species or area with significant assemblages of such species.	To ensure the restoration and recovery of such species and habitats.	Areas critical for threatened, endangered or declining species and/or habitats, containing (i) breeding grounds, spawning areas, nursery areas, juvenile habitat or other areas important for life history stages of species; or (ii) habitats of migratory species (feeding, wintering or resting areas, breeding, moulting, migratory routes).	- Includes species with very large geographic ranges. - In many cases recovery will require reestablishment of the species in areas of its historic range. - Sources for information include: e.g. remote sensing, satellite tracking, historical catch and by-catch data, vessel monitoring system (VMS) data.
Vulnerability, fragility, sensitivity, or slow recovery	Areas that contain a relatively high proportion of sensitive habitats, biotopes or species that are functionally fragile (highly susceptible to degradation or depletion by human activity or by natural events) or with slow recovery.	The criteria indicate the degree of risk that will be incurred if human activities or natural events in the area or component cannot be managed effectively, or are pursued at an unsustainable rate.	*Vulnerability of species* - Inferred from the history of how species or populations in other similar areas responded to perturbations. - Species of low fecundity, slow growth, long time to sexual maturity, longevity (e.g. sharks, etc). - Species with structures providing biogenic habitats, such as deepwater corals,	- Interactions between vulnerability to human impacts and natural events - Existing definition emphasizes site specific ideas and requires consideration for highly mobile species - Criteria can be used both in its own right and in conjunction with other criteria.

|			sponges and bryozoans; deep-water species. *Vulnerability of habitats* - Ice-covered areas susceptible to ship-based pollution. - Ocean acidification can make deepsea habitats more vulnerable to others, and increase susceptibility to humaninduced changes.	
Biological productivity	Area containing species, populations or communities with comparatively higher natural biological productivity.	Important role in fuelling ecosystems and increasing the growth rates of organisms and their capacity for reproduction	- Frontal areas - Upwellings - Hydrothermal vents - Seamounts polynyas	- Can be measured as the rate of growth of marine organisms and their populations, either through the fixation of inorganic carbon by photosynthesis, chemosynthesis, or through the ingestion of prey, dissolved organic matter or particulate organic matter - Can be inferred from remote-sensed products, e.g., ocean colour or process-based models - Time-series fisheries data can be used, but caution is required
Biological diversity	Area contains comparatively higher diversity of ecosystems, habitats, communities, or species, or has higher genetic diversity.	Important for evolution and maintaining the resilience of marine species and ecosystems	- Sea-mounts - Fronts and convergence zones - Cold coral communities - Deep-water sponge communities	- Diversity needs to be seen in relation to the surrounding environment - Diversity indices are indifferent to species substitutions - Diversity indices are indifferent to which species may be contributing to the value of the index, and hence would not pick up areas important to species of special concern, such as endangered species - Can be inferred from habitat heterogeneity or diversity as a surrogate for species diversity in areas where biodiversity has not been sampled intensively.
Naturalness	Area with a comparatively higher degree of naturalness as a result of the lack of or low level of human-induced disturbance or degradation.	- To protect areas with near natural structure, processes and functions - To maintain these areas as reference sites - To safeguard and enhance ecosystem resilience	Most ecosystems and habitats have examples with varying levels of naturalness, and the intent is that the more natural examples should be selected.	- Priority should be given to areas having a low level of disturbance relative to their surroundings - In areas where no natural areas remain, areas that have successfully recovered, including reestablishment of species, should be considered. - Criteria can be used both in their own right and in conjunction with other criteria.

Activity II
Preparing the status report on MPAs in the NOWPAP region

1   Background

NOWPAP published brochure "Threats to Marine and Coastal Biodiversity in the NOWPAP region" in 2010 as a part of "Marine BD assessment and outlook series" published by UNEP. In this report, situation of MPA establishment in the NOWPAP member states was introduced. In October 2010, the Tenth meeting of the Conference of the Parties (COP10) was held in Nagoya, Japan. At the meeting, the Aichi Targets, which includes Target 11 as "10% of the world sea areas are designated as MPAs by 2020", were adopted. Following this decision, each NOWPAP member state might be working on selection and establishment of MPAs. To understand the current situation of MPAs in the NOWPAP region and to assess the status of monitoring and management in existing MPAs will provide useful information for designing future MPAs in the member states and conservation of marine ecosystems and sustainable use of fishery resources in the NOWPAP region.

Country	Number of PAs	Area (hectares) of PAs
China	20	1,367,206
Japan	23	436,235
Republic of Korea	22	357,333
Russia	14	1,956,770
Region	**79**	**4,117,544**
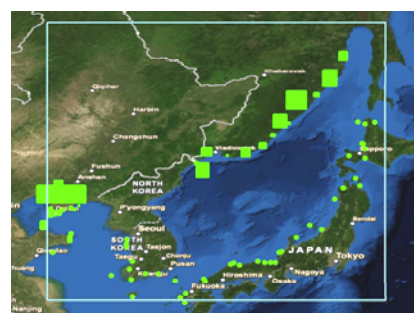
Source: "Threats to Marine and Coastal Biodiversity in the NOWPAP Region"

by Northwest Pacific Action Plan (2010)

2   Objective

Objective of this activity is to understand the current status of MPAs in the NOWPAP region through the assessment on the status of monitoring and management in the selected MPAs in the NOWPAP member states.

3   Main tasks

3.1 Development of regional overview on the current status of MPAs in the NOWPAP region

CEARAC Secretariat will collect information on the existing MPAs in the NOWPAP region using the database on MPAs established by NOWPAP DINRAC in 2007 and updated in 2011. Based on the collected information, CEARAC will prepare the latest regional overview on MPAs. In this overview, the number, covered areas and purposes of MPAs in the NOWPAP region will be

summarized.

3.2 Implementation of case studies for assessing the status of monitoring and management in the selected MPAs

Based on the regional overview of MAPs in the NOWPAP region, CEARAC FPs will select target sea areas to implement case studies for assessing the status of monitoring and management in MPAs as well as nominate appropriate experts who conduct the work.

Upon nomination, CEARAC will contract the experts for implementation of this activity. Each expert will be required to collect information on monitoring and management in the selected MPAs and to assess the current status. Then, they will prepare case study reports.

3.3 Publication of the status report on MPAs in the NOWPAP region

CEARAC will combine the regional overview and the case study reports, and will publish the status report on MPAs in the NOWPAP region.

The contents of this status report are as follows;

1. Regional Overview on MPAs in the NOWPAP region
2. Case Studies for assessing the status of monitoring and management in the selected MPAs
   2-1 Case study in China
   2-2 Case study in Japan
   2-3 Case study in Korea
   2-4 Case study in Russia
3. Analysis on the status of monitoring and management in the selected MPAs
   in the NOWPAP region
4. Future vision for the NOWPAP region

3.4 Data inventory on marine ecosystem in the NOWPAP region

In the activity 3.2, each expert will collect information on available data in the selected MPAs. Based on the case study reports submitted from the experts, CEARAC will summarize the data on MPAs in the NOWPAP region and develop a data inventory for selecting common indicators and assessing marine environment.

Data inventory

	Monitoring organization	Duration and frequency of monitoring	Monitoring items	Availability of data
MPA 1				

4   Expected outcomes and future direction

The Status Report on MPAs in the NOWPAP region will be published based on the regional overview and case studies in the selected MPAs. This status report will contribute not only to understanding of the current situation in the NOWPAP region but also to designing future additional MPAs in the NOWPAP member states.

Moreover, after the 2012-2013 biennium, CEARAC will start to select common indicators for assessment of marine environment in the NOWPAP region based on the developed data inventory.

5   Potential partners

To collect information on the current MPAs in the NOWPAP region, CEARAC will use the database on MPAs established by DINRAC. CEARAC will collaborate with DINRAC to make a regional overview on MPAs in the NOWPAP region.

PICES established a new working group in 2011 for development of ecosystem indicators to characterize ecosystem response to multiple stressors (Annex 2). CEARAC will introduce available indicators in the NOWPAP region which are collected through implementation of the case studies and development of the data inventory, and cooperate with PICES for development of common ecosystem indicators.

6 Schedule

Proposed schedule will be as follows.

Time		Actions	Main body
2012	Q2 10th CERAC FPM	• Approval of workplan and budget by CEARAC FPM • Nomination of experts for this activity	CEARAC and FPs
	Q2 to Q4	• Collection of information on MPAs using the database on MPAs of DINRAC • Preparing a regional overview	CEARAC
	Q3 to 2013 Q1	• Case studies for assessment on the status of monitoring and management in the selected MPAs	CEARAC and experts
2013	Q2-Q3	• Preparation of a draft status report on MPAs in the NOWPAP region • Development of a data inventory	CEARAC
	Q3 11th CEARAC FPM	• Review of the draft report	CEARAC and FPs, experts
	Q4	• Publishing the status report on MPAs in the NOWPAP region	CEARAC
2014-		Selecting common ecosystem indicators and implementing marine environmental assessment in the selected MPAs using common indicators	CEARAC and experts

7   Budget

Contract	Timing	Output	To be completed	Counterpart	Budget (US$)
Case studies for assessing the status of monitoring and management in MPAs	2012 Q3	Case study reports in the selected MPAs	2013 Q1	Expert in China	3,000
				CEARAC	In-kind
				Expert in Korea	3,000
				Expert in Russia	3,000
Publishing the status report on MPAs in the NOWPAP region	2013 Q3	Status report on MPAs in the NOWPAP region	2013 Q4	CEARAC	6,000
Total					15,000

PICES Working Group 28: Development of Ecosystem Indicators to Characterize Ecosystem Responses to Multiple Stressors (2011-2013)

Motivation: Marine ecosystems of the North Pacific, both coastal and offshore, are impacted by multiple emerging stressors, such as increased temperature, change in iron supply, harmful algal bloom events, invasive species, hypoxia/eutrophication and ocean acidification. These multiple stressors can act synergistically to change ecosystem structure, function and dynamics in unexpected ways that differ from single stressor responses. Further, it is expected that stressors will vary by region, and critical stressors in PICES' regional ecosystems should be identified and characterized to allow comparative studies on North Pacific ecosystem responses to multiple stressors that will help determine how ecosystems might change in the future and identify ecosystems that are vulnerable to natural and anthropogenic forcing.

ToR:

1. Identify and characterize the spatial (and temporal) extent of critical stressors in North Pacific ecosystems both coastal and offshore and identify locations where multiple stressors interact. Identify trends in these stressors if possible.

2. Review and identify categories of indicators needed to document status and trends of ecosystem change at the most appropriate spatial scale (e.g., coastal, regional, basin).

3. Using criteria agreed to at the 2011 PICES FUTURE Inter-sessional Workshop in Honolulu, determine the most appropriate weighting for indicators used for:

    a. documenting status and trends

    b. documenting extent of critical stressors

    c. assessing ecosystem impacts/change

4. Review existing frameworks to link stressors to impacts/change, assessing their applicability to North Pacific ecosystems and identify the most appropriate for application to North Pacific ecosystems.

5. Determine if ecosystem indicators provide a mechanistic understanding of how ecosystems respond to multiple stressors and evaluate the potential to identify vulnerable ecosystem components.

6. For 1-2 case studies, identify and characterize how ecosystems respond to multiple stressors using indicators identified above. Are responses to stressors simply linear or are changes non-linear such that small additional stressors result in much larger ecosystem responses? Do different parts of the ecosystem respond differently (e.g., trophic level responses)? How do stressors interact?

7. Publish a final report summarizing results with special attention to FUTURE needs. This WG will focus primarily on delivery of FUTURE Questions 3 and 1 (outlined below).