

1 Background

NOWPAP CEARAC developed Procedures for the assessment of the eutrophication status including evaluation of land-based sources of nutrients for the NOWPAP region (the NOWPAP Common Procedure) in June 2009 with the help of nominated experts in the NOWPAP member states. Then, the Procedure was used to assess the eutrophication status in the selected sea areas in the member states (Yangtze River Estuary and adjacent area in China, Northwest Kyushu sea area and Toyama Bay in Japan, Jinhae Bay in Korea, and Peter the Great Bay in Russia) in 2010-2011. In 2011, the results of the assessments were combined and published as the Integrated Report on Eutrophication Assessment in Selected Sea Areas in the NOWPAP Region: Evaluation of the NOWPAP Common Procedure.

Realizing the technical problems of the NOWPAP Common Procedure in its application to the selected sea areas and assessment of the eutrophication status of each sea area, the NOWPAP Common Procedure was refined and re-applied to selected sea areas in the NOWPAP region (a newly selected Jiaozhou Bay in China and the same areas in Japan, Korea and Russia in the previous assessment) in 2012-2013. At the same time, literature review on negative impact of eutrophication, ecological modeling and investigation of availability of monitoring data were conducted in comparison with the obtained assessment results. After reviewing the assessment results, the refined NOWPAP Common Procedure was finalized by the end of 2013, and an overview of the eutrophication status in the NOWPAP region will be published in 2014.

In the draft version of the refined NOWPAP Common Procedure (UNEP/NOWPAP/CEARAC/FPM 11/Ref4), there are two steps in assessing the eutrophication status: Screening Procedure (initial diagnosis) to detect symptoms of eutrophication with the minimum required parameters; and Comprehensive Procedure (second diagnosis) to assess the status and possible causes of eutrophication using the existing four categories (Degree of nutrient enrichment, Direct effects of nutrient enrichment, indirect effects of nutrient enrichment, and other possible effects of nutrient enrichment). As all of the selected sea areas for the 2012-2013 assessment showed symptoms of eutrophication in the past and/or at present, the Comprehensive Procedure was applied to each selected sea area for further assessment.

Although it is expected that the eutrophication status of entire NOWPAP sea area is to be assessed by each member state in the long run, autonomous application of the refined NOWPAP Common Procedure may not be fully realized due to lack of data and/or knowledge/techniques of coastal managers. Therefore, CEARAC proposes a new project for the 2014-15 biennium to apply the Screening Procedure to the entire NOWPAP sea area, and to identify potential eutrophic zones which require application of the NOWPAP Comprehensive Procedure. The proposal was reviewed and adopted at the Eleventh CEARAC FPM held on 11-12 September 2013 in Toyama.

2 Objective

Objective of this activity is to encourage autonomous use of the NOWPAP Common Procedure by the member states by applying the Screening Procedure of the refined NOWPAP Common Procedure to the entire NOWPAP sea area to identify potential eutrophic zones as well as to verify the suitability of the Screening Procedure.

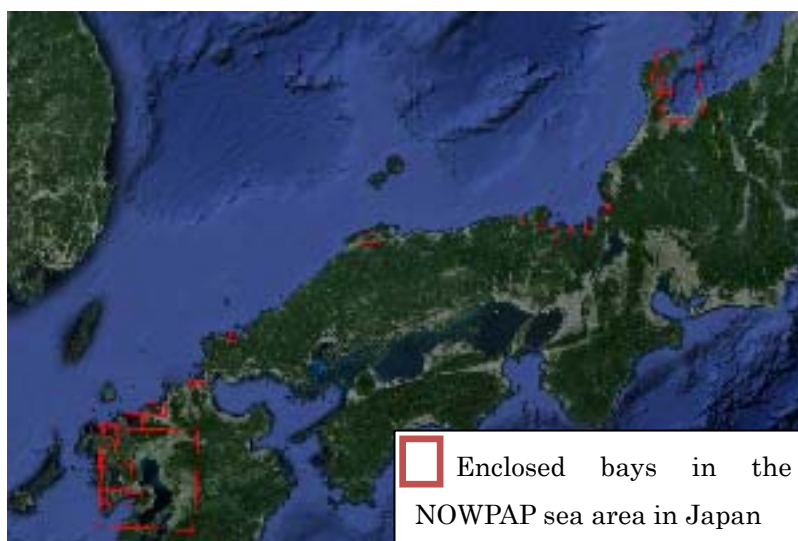
3 Tasks

3.1 Trial application of the Screening Procedure of the NOWPAP Common Procedure to the entire NOWPAP sea area

Three parameters will be used in the Screening Procedure: nutrient inputs and their residence time, occurrences of red tides, and chlorophyll-a concentration to identify potential eutrophic zones in the NOWPAP sea area. Nominated expert in each country shall carry out the following tasks 3.1.1, 3.1.2 and 3.1.3.

3.1.1 Collection and analysis of data on nutrient inputs and their residence time

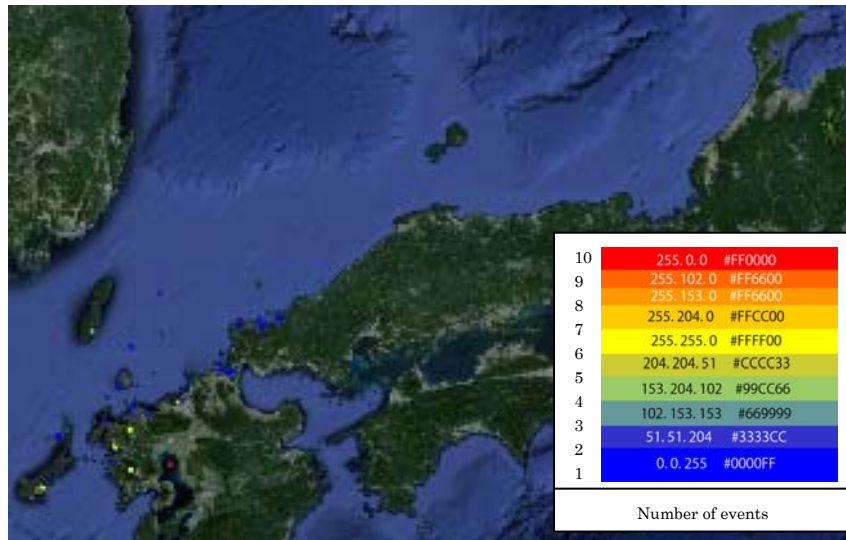
Experts in each member state selected by CEARAC Focal Points (FPs) will collect data on nutrient inputs and their residence time in enclosed bays in each country. Based on the analysis of such data, enclosed bays susceptible to nutrient inputs will be listed in each country. CEARAC will then develop a map on enclosed bays susceptible to nutrient inputs in the entire NOWPAP sea area.



Enclosed bays in the NOWPAP sea area in Japan

3.1.2 Collection of data and mapping of occurrences of red tides

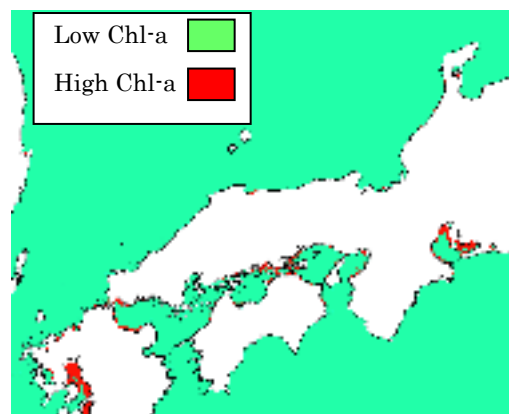
Experts in each member state selected by CEARAC FPs will collect information on occurrences of red tides in their respective sea areas, following the information collection rules shown in the HAB Reference Database in the CEARAC website. CEARAC will then develop a map on the occurrence of red tide events in the entire NOWPAP sea area.



Location of red tide events from 2006 to 2008 and their frequency in 10 grades

3.1.3 Development of satellite map of chlorophyll-a concentration

CEARAC will develop a map on chlorophyll-a (Chl-a) concentration based on the ocean color satellite data and will prepare a map on Marine Environmental Watch Project Homepage in the CEARAC website. In the map, NOWPAP area will be divided into two areas: high and low satellite Chl-a areas. Reference condition to determine high or low Chl-a level will be discussed by the nominated experts in each NOWPAP member state. Evaluation of satellite Chl-a, in comparison with *in-situ* Chl-a data, will be conducted in collaboration with the nominated experts in each NOWPAP member state.



High and low Chl-a areas divided by the mean satellite Chl-a value from 2011 to 2013.

3.2 Mapping potential eutrophic zones in the NOWPAP region

With the trial application of the Screening Procedure, CEARAC will develop an interactive web-based map on potential eutrophic zones by overlaying the three maps developed the tasks 3.1.1-3.1.3. The identified potential eutrophic zones will also be verified using existing literature, which clarify effectiveness and limitation of the Screening Procedure.

4 Expected outcomes

By applying the Screening Procedure of the refined NOWPAP Common Procedure to the entire NOWPAP sea area, it is possible that potential eutrophic zones are identified and visualized on a map. A interactive map will be constructed on the Marine Environmental Watch Project and will be open to the public.

5 Schedule

The time line of tasks in this activity is shown as follows.

Time	Action	Main body
2014 July	CEARAC FPM12 - Review and approval of the work plan and budget	CEARAC Secretariat and CEARAC FPs
Q3-Q4	Collection of information for application of the Screening Procedure	Experts of NOWPAP member states and CEARAC
2015 Q1-2	Trial application of the Screening Procedure in the refined NOWPAP Common Procedure	Experts of NOWPAP member states and CEARAC
Q3	Compilation of assessment results by application of the Screening Procedure	Experts of NOWPAP member states and CEARAC
Q4	Preparation of an interactive web-based map on potential eutrophic zones in the NOWPAP region	CEARAC Secretariat and consultant

6 Budget

Task	Timing	Output	To be completed	Main body	Budget (US\$)
Trial application of the Screening Procedure of the refined NOWPAP Common Procedure	2014 Q3 – 2015 Q2	Assessment results based on the Screening Procedure of the refined NOWPAP Common Procedure	2015 Q2	Expert in China	4,000
				Japanese Consultant	4,000
				Expert in Korea	4,000
				Expert in Russia	4,000
Preparation of an interactive web-based map on potential eutrophic zones in the NOWPAP region	2015 Q3 – Q4	An interactive web-based map on potential eutrophic zones in the NOWPAP region	2015 Q3 to Q4	Consultant	4,000
Total					20,000