

Annex XI

Proposal for development of procedures for assessment of eutrophication status including evaluation of land based sources of nutrients for the NOWPAP Region

1. Background

Importance of collaboration between WG3 and WG4 has been emphasized at the past NOWPAP WG3 and WG4 meetings. Especially since the 3rd NOWPAP WG3/WG4 joint meeting, joint activities between WG3 and WG4 to share common themes such as eutrophication and HAB have been suggested for future activities of CEARAC by the experts, and it was integrated into the mid- and long-term strategies of CEARAC and goals of NOWPAP WG3 and WG4.

Eutrophication Monitoring Guidelines by Remote Sensing for the NOWPAP Region were made in 2007 and are expected to take a role for enhancing utilization of remote sensing techniques into monitoring and assessment of HAB. However, remote sensing application methods for marine environment conservation still needs improvement in order to satisfy requirements of HAB experts.

In addition, Land Based Source for pollution was included in CEARAC activity based on the approved new direction for the NOWPAP at the 10th Inter-Governmental Meeting (IGM) (Toyama, Japan, 24-26 November 2005) of NOWPAP.

Recognizing these backgrounds, developing common procedures for assessment of eutrophication status, by utilizing remote sensing techniques, including evaluation of land based sources of nutrients for the NOWPAP region, is proposed as a joint activity between NOWPAP WG3 and WG4 for the 2008-2009 biennium.

2. Objective

Objective of this activity is developing useful procedures for assessment of eutrophication status (nutrient enrichment, HAB occurrence, and other direct and indirect effects from nutrient enrichment) by utilizing remote sensing techniques that can be shared among the NOWPAP members, based on lessons learned from a pilot study conducted in Toyama Bay.

3. Main tasks

CEARAC will develop draft procedures for assessment of eutrophication status by March 2008, based on the validation results from a pilot study to be conducted in Toyama Bay by NPEC in reference to activities against eutrophication in other regional seas. Draft table of

contents of the draft procedures is attached in Annex.

CEARAC will prepare a workplan for developing common procedures for assessment of eutrophication status by the 6th CEARAC FPM. Upon approval of the workplan by the CEARAC FPM, CEARAC will conclude MoU with national experts recommended by WG4 experts or WG4 experts themselves to review and refine the draft procedures.

Upon the conclusion of the MoU, experts are expected to review and refine the draft procedures prepared by CEARAC. Then, the result of review and refinement will be harmonized and compiled into the common procedures for assessment of eutrophication status for the NOWPAP region by a consultant hired by CEARAC.

The developed procedures for assessment of eutrophication status will be used to conduct case study in each NOWPAP member state in the near future.

4. Expected outcomes

The developed procedures will contribute to assessment of eutrophication status, including evaluation of land based sources of nutrients, by utilizing remote sensing techniques in each NOWPAP member state.

5. Schedule

Proposed schedule will be as follows.

Time		Actions	Main body
2008	Q1	• Preparation of workplan for development of procedures for eutrophication	CEARAC/ consultant
	Q1	• Review of prepared workplan by WG3/WG4 experts	WG3/WG4 experts
	Mar	• Completion of the draft procedures for utilizing remote sensing data for assessment of eutrophication status (the draft procedures)	NPEC / CEARAC
	Mar (6 th CEARAC FPM)	• Approval of workplan and budget for development of common procedures for assessment of eutrophication status	CEARAC FPs
	Q2	• Conclusion of MoU with national experts	CEARAC / national experts
	Q2 to Q3	• Review and refinement of the draft procedures	National experts
	Q3 (4 th WG3/WG4 Meetings)	• Review of interim progress of review and refinement of the draft procedures	WG3 and WG4 experts
	Q4	• Review and refinement of the draft procedures (continue)	National experts
2009	Q1 to Q2	• Harmonization of the result of review and refinement of the NOWPAP member states	CEARAC / consultant

	Q3	<ul style="list-style-type: none">• Review of harmonized draft (final draft) procedures for utilizing remote sensing data• Publication of procedures for utilizing remote sensing data for assessment of eutrophication status and refinement plan of the procedures	WG3 and WG4 experts /CEARAC FPs CEARAC / consultant
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Annex

Draft table of contents for procedures for assessment of eutrophication status including evaluation of land based sources of nutrients for the NOWPAP Region (1/2)

I Preparation

1 Selection of assessment area

The assessment area should be a marine area (e.g. inner bay or coastal area) that can be considered as having uniform characteristics, and an area with established water quality monitoring and assessment system.

2 Collection of relevant information

In order to identify the available or appropriate data for the assessment procedure, collect information on the water quality monitoring system implemented in the assessment area (e.g. implementing organization, name of monitoring system, monitoring locations, monitoring parameters and monitoring frequency etc.).

3 Division of assessment area into sub-areas

If necessary, divide the assessment area into sub-areas, for a more local-scale assessment of eutrophication status.

4 Selection of assessment parameters

List up and classify available water quality parameters into the following four categories, and select parameters appropriate for the assessment of eutrophication status.

4.1 Parameters that indicate nutrient enrichment

Nutrient loads, winter nutrient concentrations, N/P ratio, etc.

4.2 Parameters that indicate direct effects from nutrient enrichment

HAB occurrence, Chlorophyll-a concentration, phytoplankton, etc.

4.3 Parameters that indicate indirect effects from nutrient enrichment

Oxygen deficiency, changes or mortality of benthic organisms, fish mortality, organic carbon levels, etc.

4.4 Other possible parameters that indicate effects from nutrient enrichment

Algal toxins, etc.

5 Selection of monitoring sites of the assessment area

Select monitoring sites in the assessment area that have been conducting regular monitoring (preferably over 5 years) of the above selected assessment parameters. Data from the selected monitoring sites will be used for the following procedures.

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(2/2)**

II Data analysis

1 Analysis of monitoring data for establishing assessment levels

Establish the assessment level of each selected assessment parameter by analyzing the monitoring data of the assessment area.

2 Analysis of satellite data

Supplement the monitoring data with satellite-derived chlorophyll-a concentration data by calculating its mean and maximum chlorophyll-a concentration of the assessment area.

3 Analysis of monitoring data for the classification of assessment area

Analyze the monitoring data to grasp, for example the means (e.g. annual mean) and trends of each selected assessment parameter.

III Classification of assessment area

1 Initial classification

Classify the eutrophication status of each assessment parameter by comparing the values derived from the data analysis process with the assessment level.

2 Overall classification

Classify the eutrophication status of each assessment category by integrating the classification results of each assessment parameter. Finally, classify the assessment area into problem area, potential problem area or non-problem area by integrating the classification results of each assessment category.