

Workplan and budget for feasibility study towards assessment of seagrass distribution in the NOWPAP region

1. Backgrounds

Since its inception, Special Monitoring and Coastal Environmental Assessment Regional Activity Centre (CEARAC) has implemented various activities focusing on assessment of the state of the marine, coastal and associated freshwater environments. Since 2007, when the mid- and long-term strategies of CEARAC was developed, CEARAC has expanded its working areas from NOWPAP Working Group 3 (red tide and harmful algal blooms) and Working Group 4 (ocean remote sensing) to assessment of the status of eutrophication and development of new environmental assessment methods in the coastal areas using biological diversity as a main indicator. In the 2014-2015 biennium, three projects have been implemented based on the outcomes of past activities and in line with the CEARAC mid- and long-term strategies: (1) pilot assessment on the impacts of major threats to marine biodiversity in selected sea areas in the NOWPAP region; (2) trial applications of the screening procedure of the NOWPAP Common Procedure for eutrophication assessment; and (3) case studies on seagrass mapping in selected sea areas in the NOWPAP region.

In case of CEARAC's activity on eutrophication assessment, firstly, a common procedure to be used among the NOWPAP member states was developed (2008-2009). Next, eutrophication assessment was conducted in some selected sea areas in each NOWPAP member state (2010-2013) with the developed procedure. Then, in the 2014-2015 biennium, eutrophication assessment of the entire NOWPAP region was carried out although the used parameters were limited. With this transboundary assessment, an interactive web-based map of potential eutrophic zones in the NOWPAP region was constructed upon the website of Marine Environmental Watch project and it is being reviewed by the member state (UNEP/NOWPAP/CEARAC/FPM 14/Ref1). As eutrophication assessment started from the selected sea areas and expanded to the entire NOWPAP region, other CEARAC activities should also widen its geographical working area despite limitations of both financial and human resources.

Through case studies on seagrass mapping in the selected sea areas in the NOWPAP region in 2014-2015, a manual for seagrass and seaweed beds distribution mapping with satellite images, which was developed by Dr. Teruhisa Komatsu, was validated. Then, the next step expected would be to apply the developed methodology to the entire NOWPAP region. Although seagrass and seaweed beds are important in terms of their functions to maintain marine biodiversity and mitigate climate change, information on their distribution is very limited. Even the information on UNEP seagrass database is sparse and rather outdated.

Thus, a proposal to conduct feasibility study towards assessment of seagrass in the NOWPAP region was proposed as an activity of CEARAC in the 2016-2017 biennium. The proposal was then reviewed and adopted at the 13th CEARAC FPM held on 25-26 August 2015 in

Toyama.

2. Objective

Objective of this activity is to investigate the feasibility for assessment of seagrass distribution in the NOWPAP region, including identifying obstacles and required resources and/or tasks for implementing the assessment.

3. Tasks

3.1 Review of literatures on seagrass distribution and threats to seagrass

CEARAC will, with nominated national experts, collect and review literatures on seagrass distribution and threats to seagrass in each member state. Seagrass species and their distribution in the NOWPAP regions will be identified through the process.

Threats to seagrass such as urban/industrial runoff, urban/port infrastructure development, agricultural runoff, dredging, trawling, aquaculture, boat damage, shipping accident (e.g. oil spills) and changes in sea surface temperature in the NOWPAP region will be identified. Through the literature review process, applicability of remote sensing techniques to detect identified threats will also be reviewed for future monitoring.

3.2 Development of a seagrass database in the NOWPAP region

CEARAC will construct a database of seagrass distribution from their date of observation, location (latitude and longitude), and species of seagrass. A database will be designed for further mapping of their distribution by analysis of satellite images and constructed upon the website of Marine Environmental Watch project. The database should be easily and voluntarily updated by organizations and/or groups which work for restoration of seagrass. Involvement of organizations/groups will be promoted through possible opportunities such as the National Amamo (seagrass) Summit in Japan or other meetings of NGOs that promote conservation and restoration of seagrass in the NOWPAP region. Collected information in the database will also be registered to Ocean Biogeographic Information System (ORBIS).

3.3 Estimation of image analysis cost

CEARAC will estimate the cost of image analysis to assess seagrass distribution in the NOWPAP region based on the time and effort spent in the sea grass mapping case studies in the selected sea areas in the 2014-2015 biennium. First, a list of all available satellite images will be constructed from the past satellite data archives in each case study area. Then, spectral coverage and resolution of used sensors and the price of each satellite images will be studied for cost estimation. Then, the cost of image analysis to assess the current status of seagrass distribution and their changes from the past will be estimated for the coastal area, 20 meters below the surface of the sea.

3.4 Organization of International Workshop on assessment of seagrass distribution in the Northwest Pacific region

An international workshop on assessment of seagrass distribution in the NOWPAP region will be organized with inviting researchers in and out of the NOWPAP region. As an outcome of the international workshop, required actions for assessment of seagrass distribution will be compiled. The structure and contents of a feasibility study report will also be discussed at the international workshop.

3.5 Publication of a feasibility study report.

Based on the tasks from 3.1-3.4 and obtained knowledge through the past projects on eutrophication assessments, CEARAC will prepare and publish a feasibility study report including a draft workplan for assessment of seagrass distribution in the NOWPAP region for the future and share it among the NOWPAP member states as well as NOWPAP partners. Provisional table of contents of the feasibility study report is attached in annex A. The feasibility study report will have several options depending on the cost of satellite images and other resources including manpower to analyze satellite images.

4. Expected outcomes

Development of the seagrass database in the NOWPAP region will help mapping seagrass distribution with satellite images in the future. A feasibility study report to be published includes identified resources and tasks required for assessment of seagrass distribution, and it enables for CEARAC to mobilize a wide range of funding for the assessment. Collected information will also be contributed to Ocean Biogeographic Information System (OBIS) so as to increase information worldwide as well as to be utilized for setting marine protected areas.

5. Schedule

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

Time		Action	Main body
2016	April 14 th FPM	14th CEARAC FPM - Review and approval of the workplan	CEARAC Secretariat and FPs
	Q2 to Q3	- Collecting and reviewing literatures on seagrass distribution and changes - Making a list of satellite data archives in each case study area	National experts and CEARAC
	June 3-5	Participating seagrass summit in Japan - Collecting information	CEARAC Secretariat
	Q4	- Evaluating applicability of remote sensing techniques to detect identified threats to seagrass.	National experts and CEARAC
2017	Q1 to Q2	- Estimating image analysis cost for implementing assessment - Constructing seagrass database	National experts and CEARAC
	Q2 to Q3	- Organizing an international workshop for assessment of the of seagrass distribution in the NOWPAP region	National experts and CEARAC
	Q3 to Q4	- Preparing/Publishing a feasibility study report	CEARAC and consultant

6. Budget

Task	Time	Outcome	To be completed	Main body	Budget (US\$)
- Collecting/reviewing literatures on seagrass distribution and changes -Making list of satellite data archives in each case study area	2016 Q2	- List of literatures on seagrass distribution and changes in the NOWPAP region - List of available satellite images in selected sea areas in the NOWPAP region	2016 Q3	Expert in China	4,000
				Consultant in Japan	4,000
				Expert in Korea	4,000
				Expert in Russia	4,000
- Evaluation of applicability of remote sensing techniques for assessment of threats to seagrass	2016 Q4	- List of parameters for assessment of threats to seagrass	2016 Q4	CEARAC	-
- Estimating image analysis cost for assessment	2017 Q1	- Estimation of image analysis cost	2017 Q2	CEARAC	4,000
- Organizing International Workshop	2017 Q2-3	- Proceedings of International Workshop	2017 Q2-3	National experts and CEARAC	15,000
Preparing and publishing report	2017 Q3	- A feasibility study report including a draft workplan for assessment of seagrass distribution in the NOWPAP region	2017 Q3-4	CEARAC	5,000
Total					40,000

Annex A

Provisional table of contents of the feasibility study report

- **Executive summary**
- **Introduction**
- **Chapter 1 Summary of the feasibility study**
 - **Objectives**
 - **Outline of project**
 - **Methodology**
 - **Flow of the study**
- **Chapter 2 Seagrass in the NOWPAP region**
 - **Seagrass species in the NOWPAP region.**
 - **Threats to seagrass in the NOWPAP region**
- **Chapter 3 Mapping seagrass distribution by satellite images**
 - **A manual for seagrass and seaweed beds distribution mapping with satellite images**
 - **Case studies in the 2014-2015 biennium**
 - **Obstacles and limitation of using satellite images**
- **Chapter 4 Mapping seagrass distribution by satellite images**
 - **Available satellite images**
 - **Estimation of image analysis cost**
 - **Potential collaborators**
 - **Possible funding options**
- **Summary and recommendations**
 - **Summary**
 - **Recommendations**