Proposal for case studies of estimating seagrass blue carbon in selected sea areas in the NOWPAP region

1 Background

CEARAC has recognized the importance of seagrass beds in coastal areas in terms of conserving marine biodiversity and storing carbon, and developed a manual for seagrass and seaweed beds distribution mapping with satellite images (UNEP/NOWPAP/CEARCA/FPM 13/13 Annex XV) in 2015. Then, case studies on seagrass mapping were implemented in some selected sea areas in the NOWPAP region to validate the method in the manual. During the following 2016-2017 biennium, CEARAC carried out a feasibility study towards assessment of seagrass distribution in the entire NOWPAP region with satellite images, which provided obstacles and necessary resources and/or tasks in accurate estimation of seagrass beds in the entire NOWPAP region. In the current 2018-2019 biennium, CEARAC has been working on developing a web-based tool for mapping seagrass distribution by taking advantage of cloud computing. From 2020 on after the completion of the tool development, CEARAC expects to promote mapping seagrass beds in the region (Table 1).

United Nations has also emphasized a critical role of seagrass as blue carbon ecosystems along with mangrove and salt marsh, and currently worked on developing a global synthesis report, "OUT OF THE BLUE: RECOGNISING THE VALUE OF SEAGRASSES TO THE ENVIRONMENT AND TO PEOPLE" with GRID-Arendal, a Norwegian foundation (Ref 1). They have highly evaluated past and existing CEARAC activities on mapping seagrass distribution in the NOWPAP region and asked for some input about NOWPAP efforts in the mapping and monitoring chapter of the report.

NOWPAP Medium-Term Strategy (MTS) 2018-2023 (Ref 2) suggests implementation of some specific activities related to impacts of climate change including carbon sequestration in the NOWPAP region, and continuation of seagrass mapping activities by CEARAC.

Using the accumulated knowledge and skills on mapping seagrass beds as well as potential of seagrass beds as carbon storage, CEARAC proposes implementation of case studies on estimating seagrass blue carbon in selected sea areas in each NOWPAP member state in the 2020-2021 biennium.

Table 1 CEARAC Activities on Mapping Seagrass Distribution.

Year	Activity	Output
2014-2015	- Developing a manual for seagrass and seaweed beds distribution mapping with satellite images - Implementing case studies on seagrass mapping in selected sea areas	-Manual for seagrass and seaweed beds distribution mapping with satellite images - Case study report
2016-2017	- Implementing feasibility study towards assessment of seagrass distribution in the NOWPAP region	- Feasibility study report
2018-2019	- Developing a tool for mapping seagrass distribution in the NOWPAP region	- A tool and web-based service for mapping seagrass distribution

2 Objective

Objectives of this activity are to carry out case studies of estimating seagrass blue carbon in selected sea areas in each NOWPAP member state and to develop effective information tools to encourage decision-makers and the public to conserve seagrass beds by providing quantitative proof of the importance of seagrass beds.

3 Tasks

3.1 Selecting/nominating case study areas and responsible experts

While the past case studies implemented in the 2014-2015 biennium are referred (Table 2), suitable case study areas with seagrass beds will be selected as well as nomination of responsible experts. CEARAC FPs will be asked to provide their opinions on selection/nomination of both areas and experts.

Table 2 Selected sea areas and responsible experts in the 2014-2015 case studies.

Country	Selected sea area	Expert
China	・Swan Lake	Dr. Dingtian Yang
Japan	・Toyama Bay (Himi area) ・Nanao Bay (West Bay)	NPEC
Korea	・Deukryang Bay	Dr. Jong-kuku Choi Dr. Keunyong Kim
Russia	・Eastern Section of the Far Eastern Marine Reserve	Dr. Vasily Zharikov

3.2 Estimating Seagrass Blue Carbon in selected sea areas

Nominated experts in each member state will carry out case studies for each selected sea areas to estimate seagrass blue carbon. The following procedure will be taken:

- Classify seafloor substrates using the tool/service that CEARAC develops in the 2018-2019 biennium.
- Based on the Seagrass Watch manual (Mackenzie et al, 2001), conduct seagrass quadrat sampling in each seafloor substrates class in the flouring period (spring – early summer) and decaying period (fall - winter). (In case it is difficult to carry out quadrat sampling within the budget, existing survey results from literatures can be used.).
- Calculate the seagrass coverage in each substrates class
- Weigh the dried seagrass of the Above Ground Biomass (AGB) and Below Ground Biomass (BGB) in each substrate class.
- Calculate the seagrass coverage areas in the flourishing period and the decaying period.
- Estimate the amount of blue carbon captured/stored in seagrass habitat referring to Stankovic et al

(2018) which is used in Habitat Mapping Project of IOC/WESTPAC.

3.3 Organizing an expert meeting back-to-back with an international workshop (2 days)

CEARAC will organize an expert meeting to report case study results and discuss practical future actions for conservation of seagrass beds, back-to-back with an international workshop. At the international workshop, experts to implement CEARAC's case studies, and relevant experts of UNEP will be invited to prepare a feasible action plan for seagrass conservation in the NOWPAP region. The public will also be welcomed to participate in the international workshop.

3.4 Publication of a booklet for seagrass conservation in the NOWPAP region

CEARAC will publish a booklet describing practical actions, including the action plan prepared in the expert meeting and the international workshop in 3.3 above, to be taken for seagrass conservation in the NOWPAP region in English and the four languages of the NOWPAP members and distribute them to relevant stakeholders including government officials such as policy-makers, researchers, private sectors, civil society, students and so on. CEARAC will cooperate with international groups of seagrass conservation to disseminate the booklet through various social media networks.

4 Expected outcome

Visualizing the value of seagrass by quantified evaluation of seagrass blue carbon and the developed booklet can provide scientific base to various stakeholders and help propelling seagrass conservation in the NOWPAP region.

5 Schedule

The timeline of this activity is shown below.

Time		Action	Main body
2019	September	Proposal/adoption of workplan at CEARAC FPM 17	CEARAC FPs
	December	Proposal/Approval of NOWPAP workplan and budget for the 2020-2021 biennium at NOWPAP IGM 24	National FPs
2020	Q1 - Q2	Review of workplan at CEARAC FPM 18	CEARAC and nominated experts
		Selection/nomination of case study areas and experts	CEARAC FPs
	Q2 - Q4	Implementation of case studies (estimation of seagrass blue carbon)	Nominated experts
	Q4	Organization of Expert Meeting and the Second International Workshop	CEARAC and nominate experts
2021	Q1		
	Q2 - Q3	Publication of a booklet	CEARAC and nominated experts
	Q3	Reporting of the activity at CEARAC FPM 19	CEARAC FPs

6 Budget

Task	Time	Output	To be completed	Main body	(US$) Budget
Implementation of case studies of estimating seagrass blue carbon	2020 Q2	Case study reports	2020 Q4	Nominated experts	12,000 (3,000 allocated in each country) (CEARAC)
Organization of the Expert Meeting and the Second International Workshop	2020 Q4	Proceedings of the Workshop	2021 Q1	CEARAC and nominated experts	15,000
Publication of a booklet for seagrass conservation in the NOWPAP region	2021 Q2	A booklet	2021 Q3	CEARAC and consultant	T.B.D
Total					27,000

7 References

Mackenzie. L. J., Campbell, S. J. and Roder, C. A. (2001) Seagrass-Watch: Manual for Mapping & Monitoring Seagrass Resources by Community (citizen) volunteers. (QFS, NFC, Cairns) 100pp

Stankovic M, Tantipisanuh N, Rattanachot E. and Prathep A (2018) Model-based approach for estimating biomass and organic carbon in tropical seagrass ecosystems. Mar Ecol Prog Ser 596:61-70.
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