

## Progress in the implementation of CEARAC Activities for the 2020-2021 biennium

**18<sup>th</sup> CEARAC FPM**  
**24-25 August 2021**  
**online**

## 2020-2021 biennium

➤ basic flow (planned as Jan. 2020-Dec. 2021)



➤ 2020-2021 biennium (June 2020-June 2022)



## CEARAC Activities for 2020-2021

### ◆ Specific Projects

- Assessment of tidal flats/salt marshes distribution
- Organization of e-DNA training course
- Update of HAB database & HAB reference database
- Case studies on seagrass blue carbon
- Improvement of NOWPAP Eutrophication Assessment Tool (NEAT)
- Organization of 5<sup>th</sup> training course on remote sensing data analysis

## CEARAC Activities for 2020-2021

### ◆ Routine work

- Organization of meetings (FPM, expert meeting)
- Cooperation and coordination (participation in events by other RACs and/or NOWPAP partners)
- Maintenance of websites

## Organization of meetings

### ◆ Annual FPMs

2020 → FPM18 postponed

→ Adoption of implementation plans by e-mail (Sep.)

2021 → FPM18 is held virtually

→ Review progress/discuss future work

### ◆ Expert Meeting

- Eutrophication assessment → 2021 Q4

- Seagrass mapping/blue carbon → 2021 Q4

## Cooperation/coordination

### ◆ meetings by other RACs and/or NOWPAP

- FPMs
- Extra-ordinary IGM
- Marine Litter FPM

### ◆ meetings by NOWPAP partners

- PICES
- IOC/WESTPAC

### ◆ cooperation to other RACs

- SOMER3 by POMRAC

### Maintenance of websites

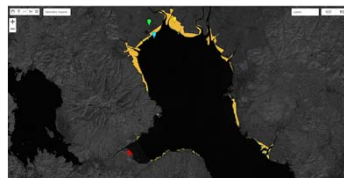
- Regularly updating CEARAC websites



### Specific Projects

#### Assessment of the distribution of tidal flats/salt marshes in the NOWPAP region

- Developing distribution maps by using Global Intertidal Change (GIC)
- Developing a summary report



### Specific Projects

#### Organization of a training course on eDNA analysis

- Organizing a training course with a developed manual

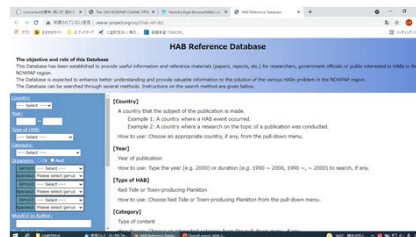


([https://ednasociety.org/wp/wp-content/uploads/2020/09/eDNA\\_manual\\_Eng\\_v2\\_1\\_3b.pdf](https://ednasociety.org/wp/wp-content/uploads/2020/09/eDNA_manual_Eng_v2_1_3b.pdf))

### Specific Projects

#### Update of HAB database and HAB reference database

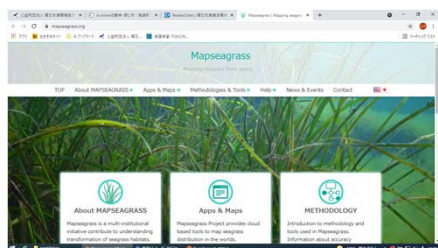
- Updating the DBs by adding new information



### Specific Projects

#### Case studies of estimating seagrass blue carbon in selected sea areas in the NOWPAP region

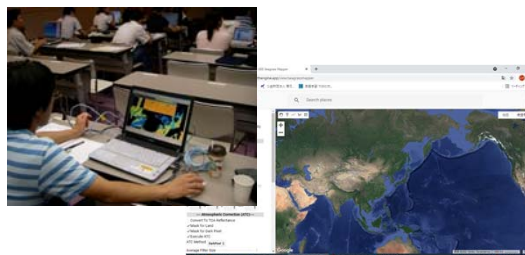
- Conducting seagrass quadrat sampling and estimating the amount of captures/stored blue carbon



### Specific Projects

#### Organization of the 5th NOWPAP Training Course on Remote Sensing Data Analysis

- Training course with tools developed by CEARAC



**Specific Projects**

**Improvement of the NOWPAP Eutrophication Assessment Tool (NEAT) for assessment and monitoring of eutrophication using satellite CHL**

- Developing on-line match-up tool
- Updating sensor independent satellite CHL product



**Development of Regional Action Plan for Marine and Coastal Biodiversity Conservation (RAP BIO)**

2018-2019

- CEARAC prepared a roadmap toward development of RAP BIO

2020-2021

- The first draft was prepared by Int'l consultant in Sep.
- First Consultive Meeting in March 2021
- The draft of RAP BIO was submitted to NOWPAP FPs in April 2021

**Budget (US\$185,000)**

Activity	Budget (USD)	Expenditure (by July 2021)
Tidal flats/salt marshes	20,000	0
eDNA Training course	25,000	0
HAB/HAB reference DB	9,000	
Seagrass blue carbon	27,000	0
NEAT improvement	20,000	4,000
5 <sup>th</sup> training course	20,000	0
Meetings, etc.	59,000	5,000
Website maintenance	100	100
<b>Total</b>	<b>185,000</b>	<b>9,100</b>

**Expenditure & balance (projected)**

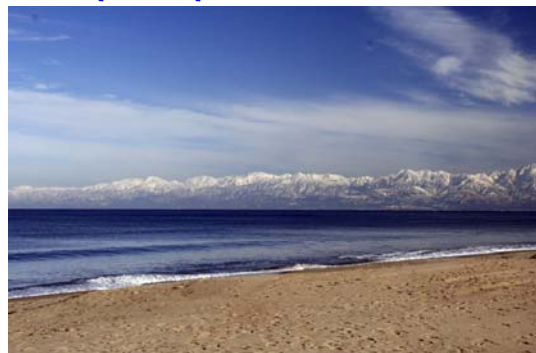
Activity	Budget	Expenditure (by June 2022)	Balance
Tidal flats/salt marshes	20,000	20,000	0
eDNA Training course	25,000	(25,000)*	(25,000)*
HAB/HAB reference DB	9,000	9,000	0
Seagrass blue carbon	27,000	27,000	0
NEAT improvement	20,000	20,000	0
5 <sup>th</sup> training course	20,000	20,000	0
Meetings, etc.	59,000	11,000	48,000
Website maintenance	5,000	5,000	0
<b>Total</b>	<b>185,000</b>	<b>112,000</b>	<b>48,000</b>

**Document FPM 18/4**  
**Report on CEARAC activities for the 2020-2021 biennium**

Adopted or need of discussion

Country	Answer	Comments/questions/suggestions
China	Approved	-
Japan	Approved	-
Korea	Approved	-
Russia	Approved	-

**Thank you very much !**



「写真提供：（公社）とやま観光推進機構」



**Report on assessment of the distribution of tidal flats and salt marshes in the NOWPAP region**  
 18<sup>th</sup> CEARAC FPM  
 24-25 August 2021  
 Online

**Background**

CEARAC Medium-term Strategy for marine biodiversity conservation (Developed in 2019)  
 High priority topics for future activities

- Conservation of biological habitat including tidal flat, salt marsh and seagrass/seaweed beds
- Plankton species related to aquaculture and fisheries
- Environmental DNA

CEARAC Implements project on seagrass mapping from 2014

NOWPAP Ecological Quality Objectives (EcoQOs)  
 No significant effect on biological habitat diversity from anthropogenic pressure

NOWPAP Regional Action Plan for Marine and Coastal Biodiversity Conservation (RAP BIO)

**Background**


- Tidal flats/salt marshes in the NOWPAP region are used as resting/feeding/breeding sites for migratory birds which migrate along the East Asian-Australasian Flyway
- To understand that tidal flats/salt marshes will contribute to conservation of marine biodiversity in the NOWPAP region
- Limitation of available data/information on tidal flats/salt marshes in the NOWPAP region

**Objective**

To map the distribution of tidal flats and salt marshes in the NOWPAP region using a new mapping tool, Global Intertidal Change (GIC), and to understand the status and the historical change of tidal flats/salt marshes

**Global Intertidal Change (GIC)**

- Murray et al (2019): The global distribution and trajectory of tidal flats, Nature
- Satellite images (LANDSAT, 30m resolution) → historical change in past 30 years
- Machine learning (Random forest classification algorism)
- Global mapping tool → Regional mapping tool



(<https://www.intertidal.app/>)

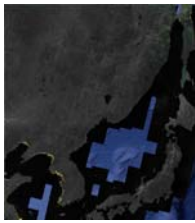
**Task 1: Development of the distribution maps of tidal flats/salt marshes in the NOWPAP region**

1.1 Collection of information on tidal flats/salt marshes in the NOWPAP member states

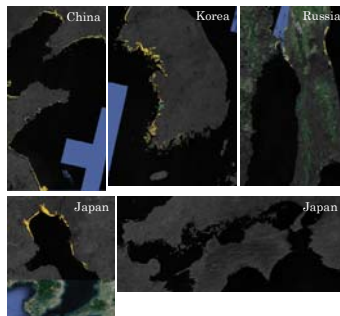
Country	Name of expert	Affiliation	Target areas
China	Dr. Jie SU	National Marine Environment Monitoring Center	Yellow River delta and north Yellow Sea
Japan	CEARAC Secretariat		Seto Inland Sea Ariake Sea
Korea	Dr. Jongseo YIM	Korea Maritime Institute	West and south coast of Korea
Russia	Dr. Kirill BAZAROV	Pacific Geographical Institute	Coastal area of Sakhalin

The collected information was provided by January 2021.  
 The data was shared with Dr. Murray for improving GIC for the NOWPAP region

**1.2 Development of the distribution maps of tidal flats/salt marshes in the NOWPAP region**



Historical changes from 1998 are available



**1.2 Development of the distribution maps of tidal flats/salt marshes in the NOWPAP region**

- GIC was improved to be suited for the NOWPAP region
- There are some mis-detection of tidal flats
- Distribution of tidal flats/salt marshes in the member states was underestimated

To increase accuracy of map, additional correction is necessary



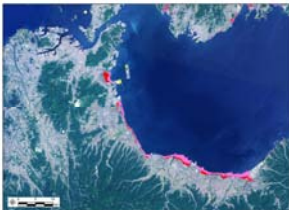
CEARAC Secretariat developed "Guideline for review of the distribution map on tidal flats in the NOWPAP region"

Experts of the member state can correct the map directly

Final maps will be developed by November 2021

**1.3 Error assessment of GIC (comparison between original GIC and real distribution)**

Differences between GIC and real distribution (West part of Seto Inland Sea)



Pink areas: Tidal flats of national provided data  
 Red areas: Overlapped area of national provided data and GIC detected area  
 Yellow areas: Mis-detected by GIC

➡ Location of big sites are detected

Limitation of GIC

1. It is difficult to detect small-scale tidal flats
2. There are some mis-detection in landfill areas and river-side
3. Underestimation of tidal flat areas

**1.3 Error assessment of GIC (comparison between original GIC and real distribution)**

- To understand limitation of GIC, CEARAC Secretariat conducted an error assessment of GIC by comparison with national provided data

Comparison of tidal flat areas between national data and original GIC

Country and area	Area of national provided data	Area (ha)		Overlapped ratio (%)	
		Area of original GIC	Overlapped area		
Japan	Ariake Sea	18,738.9	4,806.1	4,216.0	87.7
China	Bohai and Yellow Sea	320,653.0	652,598.0	285,791.0	43.8
Korea	West and south coast	251,548.1	181,201.3	141,458.1	78.1
Russia	Coastal area of Sakhalin	2,638.4	4,176.0	1.2	0.03

Error assessment results will be reported in the summary report

**Assessment of the improved GIC**



GIC was improved with national provided data from the member states.

Accuracy of the improved GIC is higher than the original GIC.

How much improved?

Limitation of the improved GIC

In the summary report, the assessment results and current status will be included.

**Task 2: Publication of a summary report on distribution of tidal flats/salt marshes in the NOWPAP region**

Chapter 1: Background and objectives

Importance of tidal flats/salt marshes in the NOWPAP region

Chapter 2: Methodology

Introduction of GIC including error assessment

Chapter 3: Development of the distribution maps of tidal flats/salt marshes in the NOWPAP region

Chapter 4: Historical changes of tidal flats/salt marshes distribution and their factors

Chapter 5: Summary

### Expected outputs

- Enhancement of habitat maps in the NOWPAP region
- Contribution to the NOWPAP RAP BIO and EcoQOs
- Contribution to the conservation of endangered species
- MPA networks in the NOWPAP region

### Budget

Tasks	Budget	Main Body
<ul style="list-style-type: none"> <li>· Collecting information on tidal flats/salt marshes distribution in each member state</li> <li>· Reviewing developed draft tidal flats/salt marshes distribution maps for the NOWPAP region</li> </ul>	9,000 USD (3,000 x 3 member states)	3 nominated experts
<ul style="list-style-type: none"> <li>· Conducting error assessment of GIC</li> <li>· Conducting accuracy assessment of maps</li> <li>· Development of a summary report</li> </ul>	3,000 USD	CEARAC Secretariat
<ul style="list-style-type: none"> <li>· Arranging GIC for the NOWPAP region</li> <li>· Developing the distribution maps of tidal flats/salt marshes with historical changes in the NOWPAP region</li> </ul>	8,000 USD	James Cook University (Dr. Nicholas Murray)
<b>Total</b>	<b>20,000 USD</b>	

### Schedule

Year	Tasks	Main body
2020	Q3 - Approval of implementation plan by email communication	CEARAC FPs CEARAC Secretariat
	Q3-Q4 - Collection of information/data on tidal flats/salt marshes distribution	Nominated experts
	Q3-Q4 - Error assessment of GIC (comparison between GIC distribution and real distribution of tidal flats/salt marshes)	CEARAC Secretariat
	Q3-2021Q2 - Arrangement of GIC for the NOWPAP region - Development of the distribution maps of tidal flats/salt marshes with historical changes in the NOWPAP region	James Cook Univ.
2021	August 18 <sup>th</sup> CEARAC FPM	
	Q3 - Review of the developed maps	Nominated experts, James Cook Univ.
	Q3-Q4 - Finalization of the distribution maps - Preparation of the first draft of a summary report	CEARAC Secretariat
2022	Q1 - Review of the summary report	CEARAC FPs
	Q2 - Publication of the summary report (in digital format)	CEARAC Secretariat

### Document FPM 18/5 Report on assessment of the distribution of tidal flats and salt marshes in the NOWPAP region

Adopted or need of discussion

Country	Answer	Comments/questions/suggestions
China	Approved	-
Japan	Approved	-
Korea	Approved	-
Russia	Approved	The small overlapping of GIC and real RS data for the tidal flats at the northwestern Sakhalin Is. should be discussed, though it could be done after summary report





## Report of Organizing a Training Course on eDNA Analysis

18<sup>th</sup> CEARAC FPM  
24-25 August 2021  
Online

### Background

CEARAC Medium-term Strategy for marine biodiversity conservation (Developed in 2019)  
High priority topics for future activities

- Conservation of biological habitat including tidal flat, salt marsh and seagrass/seaweed beds
- Plankton species related to aquaculture and fisheries
- Environmental DNA

eDNA has potential to be a new special monitoring tool of CEARAC activities on marine biodiversity conservation.


### Objective

To develop the common manual for eDNA survey and experiment, and to organize a training course for sharing and introducing the latest technology among the NOWPAP member states.

### Task 1: Development of the common manual for eDNA sampling and experiment

eDNA is a new developed technology and the methodology to use eDNA is not standardized in the world.

There are gaps among the NOWPAP member states to use eDNA techniques.



NOWPAP Environmental DNA Sampling and Experiment Manual was developed with support of the Society of eDNA, Japan

### Task 2: Organizing a training course on eDNA analysis

Original plan of the training course:  
Venue: Kobe University, Japan  
Date: March, 2021 → March, 2022  
Number of participants: 15 (maximum)  
Schedule:

	AM	PM
Day 1	Lecture	Water sampling and filtration
Day 2	DNA extraction	1 <sup>st</sup> PCR test
Day 3	2 <sup>nd</sup> PCR test	Quality check
Day 4	Lecture	Data analysis
Day 5	Report	Closing

Most of parts of this training course are practicing skills.  
Under the current situation of the pandemic of COVID-19 in the world, it is difficult to invite trainees from other countries to Japan.

### Border control of all travelers to Japan (as of 2 August 2021)

1. Application of a new visa at the Embassy or Consulates of Japan
2. Obtainment of a certificate of pre-entry testing result in the country/region of departure within 72 hours before departure
3. Private medical insurance is necessary
4. Submission of "Written Pledge (Residence track and Questionnaire)"
5. Prohibiting use of public transport, and staying hotel/home for 14 days after entering Japan
6. Installation and set-up of the necessary applications
7. Reporting health condition every day for 14 days after entering Japan

Due to the difficulties to organize a face-to-face training course, CEARAC Secretariat would like to cancel the training course in the 2020-2021 biennium, and propose to organize a training course in the 2022-2023 biennium again.

If we cancel to organize a training course, the budget for training course (25,000USD) should be returned to the NOWPAP Trust Fund.

Alternative option:

- Making a video manual
- Organizing a one day online seminar

If all FPs agree alternative option, CEARAC Secretariat will discuss with RCU on possibility to change the terms of SSFA.

## Budget

Original

Tasks	Budget	Main Body
• Cost for organizing a training course	10,000 USD	Local organizer
• Travel support for selected trainee	9,000 USD (1,500 x 6 trainees)	CEARAC Secretariat Selected trainees
• Travel cost for lectures	6,000 USD (2,000 x 3 lectures)	CEARAC Secretariat Lecturers
Total	25,000 USD	

Alternative option

Tasks	Budget	Main Body
• Making a video manual	10,000 USD?	CEARAC Secretariat
Total	10,000 USD?	

## Document FPM 18/6

### Report on organizing a training course on eDNA analysis

Adopted or need of discussion

Country	Answer	Comments/questions/suggestions
China	Approved	-
Japan	Approved	Due to the pandemic of Covid19, the training course has been postponed until 2023. However, given the rapid technological advances in the field of eDNA, it may be necessary to consider holding a webinar for some content rather than postponing all plans until 2023 face-to-face implementation. →Agreed. If all FPs and RCU agree to change the tasks of project for the 2020-2021 biennium, Secretariat would like to make video manual with support of the eDNA Society.
Korea	Approved	-
Russia	Approved	The efficiency of on-line training course on e-DNA analysis is not clear. The postpone for next biennium (WD12) seems more reasonable

## Report on Updating HAB Database and HAB Reference Database

18<sup>th</sup> CEARAC FPM  
24-25 August 2021  
Online

## Background

CEARAC Medium-term Strategy for marine biodiversity conservation (Developed in 2019)

High priority topics for future activities

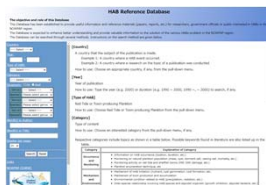
- Conservation of biological habitat including tidal flat, salt marsh and seagrass/seaweed beds
- Plankton species related to aquaculture and fisheries
- Environmental DNA

At the beginning of CEARAC, HAB is one of major topics of activities



## Objective

To update the contents of HAB Database and HAB Reference Database which were developed in the past CEARAC activities.



New causative species?

Change of distribution?

New issues such as green tide, golden tide

## Task 1: Collecting and updating information on the latest occurrence of HABs and scientific papers in the NOWPAP region

CEARAC Secretariat collected following information

[HAB Occurrence Information]

Target year: 2009-2019

Sources: HAEDAT (IOC/ICES/PICES)

Red Tide in the Seto Inland Sea and Red Tide in Kyushu region

[HAB Reference Database]

Target year: 2009-2020

Sources: Nippon Suisan Gakkaishi (in Japanese), Fisheries Science, Bulletin of the Plankton Society of Japan (in Japanese), Plankton and Benthos Research, the Japanese Journal of Phycology (in Japanese), Phycological Research, Journal of Japan Society on Water Environment (in Japanese), ALGAE, Journal of Phycology, Phycologia, Harmful Algae, Marine Ecological Progress Series, and Marine Pollution Bulletin

## Review of the collected information by nominated experts

- Collected information (Annex 1 and 2) will be reviewed by experts of the member states to add more information in each member state
- CEARAC Secretariat would like to ask FPs to nominate experts who review the collected information
- CEARAC Secretariat will contract MoU with the nominated experts
- After review by the experts, information will be updated to HAB Database and HAB Reference Database in HAB Integrated Website

Expected information to be added by experts

- National journals
- Information on new species, including green tide and golden tide
- Categorization of collected scientific paper

## Task 2: Discussion on a new activity and/or new target species

- Outcomes of the NOWPAP Special Project "Identification of Key Indicator Species and Ecosystems of Biodiversity Change in the NOWPAP region".
- Based on the current status of HAB in the NOWPAP region, potential target species will be listed up

## Budget

Tasks	Budget	Main Body
<ul style="list-style-type: none"> <li>Reviewing information collected by CEARAC Secretariat</li> <li>Collecting additional information on current HAB occurrence and related scientific papers by experts</li> </ul>	6,000 USD (1,500 USD x 4 member states)	Nominated experts CEARAC Secretariat
<ul style="list-style-type: none"> <li>Uploading the collected information to the databases (including updating the databases)</li> </ul>	3,000 USD	CEARAC Secretariat
<b>Total</b>	<b>9,000 USD</b>	

## Schedule

Year	Tasks	Main body
2020	Q3 - Approval of implementation plan by email communication	CEARAC FPs CEARAC Secretariat
2021	Q1-Q2 - Collecting information on HAB occurrences and scientific papers	CEARAC Secretariat
	August - 18 <sup>th</sup> CEARAC FPM	CEARAC FPs CEARAC Secretariat
	Q3-Q4 - Review of the collected information - Collecting additional information	Nominated experts
	Q4-2021 Q1 - Updating database	CEARAC Secretariat

## Document FPM 18/7 Report on updating HAB database and HAB reference database

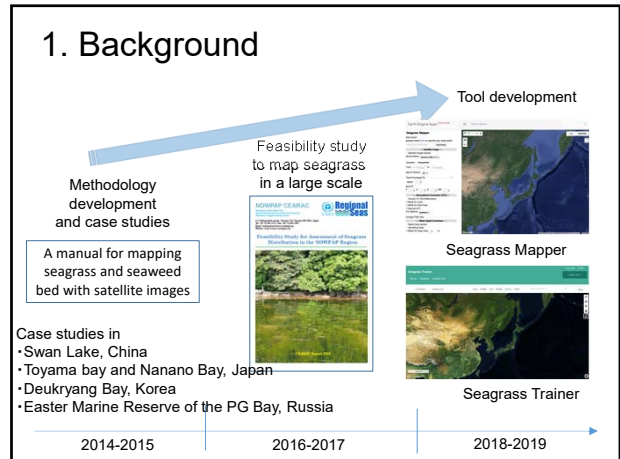
Adopted or need of discussion

Country	Answer	Comments/questions/suggestions
China	Approved	-
Japan	Approved	-
Korea	Approved	-
Russia	Approved	-

# Report on case studies of estimating seagrass blue carbon in selected sea areas in the NOWPAP region

Genki Terauchi  
NOWPAP CEARAC

August 24, 2021



## 1. Background

Establishing an International Seagrass Experts Network

UN Environment      GRID-Arendal

WORKING TITLE

OUT OF THE BLUE: RECOGNISING THE VALUE OF SEAGRASSES TO THE ENVIRONMENT AND TO PEOPLE

A global synthesis report  
UN Environment and GRID-Arendal

**Our Vision.**

We want to see the values of seagrasses incorporated into coastal management and decision-making processes.

We believe that access to knowledge can enhance collaboration and coordination among those on the front lines of protecting and recovering our valuable seagrass meadows. Our Network will continue to grow and expand in ways that create efficiency to help make change.

<http://unseagrass.org/>

## 2. Objective

- To carry out case studies on 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.

CRITICAL STORAGE

OCEAN + COASTAL HABITATS

83% 2% 50%

GLOBAL CARBON: 83% of the global carbon cycle is circulated through the ocean.

COASTAL HABITAT COVERAGE: Coastal habitats cover less than 2% of the total ocean area.

SEDIMENT CARBON: Coastal habitats account for approximately half of the total carbon sequestered in ocean sediments.

How about in NOWPAP?

## 3. Tasks and progress

### 3.1 Selecting / nominating case study areas and responsible experts

Country	Selected sea area	Expert
China	•Swan Lake	Dr. Qinghui XING
Japan	•Omura Bay	Dr. Gregory N NISHIHARA
Korea	•Dongdae Bay	Dr. Seung Hyeon KIM
Russia	•Srednyaya Bay	Dr. Vasily Zharikov

## Locations of case study areas

Srednyaya Bay

Swan Lake

Omura bay

Dongdae Bay

Western NOWPAP Sea

Eastern NOWPAP Sea

Google Earth

### 3. Tasks and progress

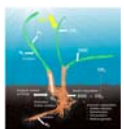
#### 3.2. Estimating seagrass blue carbon in selected sea areas

- Based on the Seagrass Watch manual (Mackenzie et al, 2001), conduct seagrass quadrat sampling in each seafloor substrates class in a luxuriant growth period (later spring –summer) and a scanty growth period ( winter).



Quadrat sampling in Himi

- Weigh the dried seagrass of the Above Ground Biomass (AGB) and Below Ground Biomass (BGB) in each substrate class.



### 3. Tasks and progress

#### 3.2. Estimating seagrass blue carbon in selected sea areas

- Collect more than 40 ground truth points of seagrass and non-seagrass, respectively with geolocation.

- Calculate the seagrass coverage areas in the luxuriant growth period from 2015 to 2020



### 3. Tasks and progress

#### 3.2. Estimating seagrass blue carbon in selected sea areas

- Estimate the amount of blue carbon captured/stored in seagrass ecosystem in the case study area referring to a manual provided by CEARAC\*.

*(\*In case it is difficult to carry out quadrat sampling and analysis of obtained samples within the budget, existing survey results including equations generated on the global data sets (Fourqurean et al. 2012) from literatures can be used.)*

- Prepare and submit a summary report of the case study in line with the annotated table of contents provided by CEARAC

### Table of contents for the case study summary report (1/2)

#### 1. Introduction

Information about case study area and seagrass species will be described.

#### 2. Methodology

2.1 Field information about sea floor substrates

2.2. Satellite image correction and classification

2.3. Methods for estimating blue carbon

### Table of contents for the case study summary report (2/2)

#### 3. Results

3.1. Classification of seafloor and accuracy assessment

3.2. Estimating blue carbon

**4. Recommendation for mapping seagrass in other parts of each NOWPAP member state**

#### Annex A

List of ground truth data

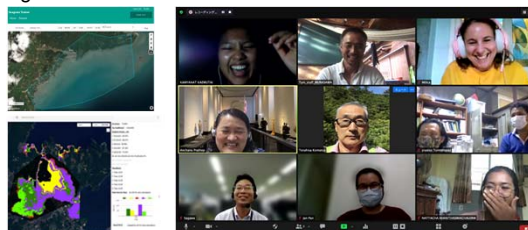
#### Annex B

Raw data concerning organic carbon

### 3. Tasks and progress

#### 3.3. Organizing an online expert meeting

- Case study summary report
- A booklet for seagrass conservation in the NOWPAP region



Materials and photo from a webinar on Seagrass Mapper and Seagrass Trainer. Dr. Milica Stankovich and her students from Songkla University

### 3. Tasks and progress

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

- Understanding Blue Carbon
- Seagrass species in the NOWPAP region
- Seagrass blue carbon in selected sea areas in the NOWPAP member states
- Efforts to conserve seagrass in the NOWPAP member states

**Case 1**

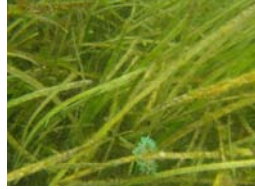
**Seagrass bed restoration in Swan Lake, Rongcheng, Shandong Province**

[ Site: Weihai, Shandong Province ]

Swan Lake locates in the eastern end of the Jiaodong Peninsula and is a typical sand bar lagoon found in the temperate waters of China. Restoration efforts increased the area of seagrass beds in the Moon Lake, Weihai by 40%. In 2017, scientists transplanted 51,000 *Zostera* plants over 20cm in height and sowed 130,000 seeds in Swan Lake. In the future, results of *Zostera* restoration will be assessed and restoration efforts are expected to increase.

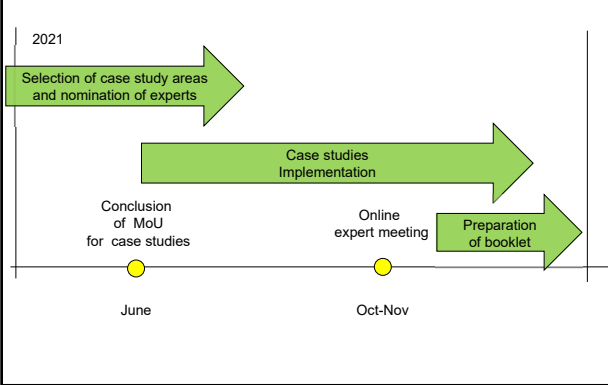
### 4. Expected outcome

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.



Seagrass in Nanano Bay

### 5. Schedule



### 6. Budget

Task	Budget (US\$)
- Implementation of case studies of estimating seagrass blue carbon	24,000 (6,000 for each country)
- Organizing an expert meeting (web)	0
- Publication of booklet for seagrass conservation in the NOWPAP region	3,000
<b>Total</b>	<b>27,000</b>





# Report on Improvement of the NOWPAP Eutrophication Assessment Tool (NEAT) for application in operational assessment and monitoring of eutrophication using satellite chlorophyll-a

Elígio Maúre  
NOWPAP CEARAC

August 24, 2021

## 1. Background

### The Common Procedures

(Procedures for assessment of eutrophication status including evaluation of land-based sources of nutrients for the NOWPAP region)

#### Screening Procedure - NEAT

- NEAT: NOWPAP Eutrophication Assessment Tool
- Detection of **symptoms** of eutrophication with satellite CHL

#### Comprehensive Procedure

- Symptoms of eutrophication detected by the screening procedure

#### The Common Procedures

(as of Aug 2013)

## 1. Background

### NEAT combines SeaWiFS, MERIS and MODIS-Aqua CHL

- Long-term consistent CHL time series (1998-present, **23+ years**)
- **1 km** spatial resolution

## 1. Background

### NEAT: Detection of Eutrophication Potential with Satellite CHL

Present

Teuchie et al. (2014, 2018)

## 1. Background

Some of available ocean colour sensors

- **Bottom sensors:** used to generate NEAT CHL time series
- MODIS-Aqua is well past its planned mission life (6 years)
- **So, we should update the dataset used in the NEAT**

## 2. Objective

- Reevaluate the use of the **NEAT** with satellite chlorophyll-a (CHL) products from newer sensors (GOCI, VIIRS, SGLI, etc.)

### Goal

- Ensure continuous eutrophication assessment and monitoring with satellite CHL

### 3. Tasks (Activities & Deliverables)

- 1. Online match-up tool**  
• Development of a tool for online match-up of in-situ and satellite data
- 2. In-situ data collection**  
Collection of in-situ data for evaluation of satellite CHL
- 3a. Update of satellite CHL**  
Update of satellite CHL to include CHL product from recent sensors
- 3b. Web-based NEAT map**  
Implementation of a web-based NEAT for operational eutrophication monitoring

### 3.1. Online match-up tool (2021 Q1-Q2)

### 3.2. In-situ data collection (Q3-by Sep.?)

- In-situ data collection** – CEARAC Focal Points nominated experts
  - China (TBD)
  - Russia – Mr. Vasily Kachur**
    - Satellite Monitoring Laboratory
  - Korea – Dr. Joo-Hyung Ryu**
    - Korea Ocean Satellite Center
- Data submission** - through the **online match-up tool**
  - In situ data must include years with GOCI, VIIRS, and SGLI sensors (2010–2020)
- Data policy** – not open to the public as it is.
  - Data sharing policy will be discussed at the Expert meeting

### 3.3a. Update of satellite CHL (Q4)

- Evaluation of CHL** (by Oct.?)
  - CEARAC compile results from match-up tool
  - Share the evaluation results for discussion
- 3<sup>rd</sup> CEARAC Expert Meeting on Eutrophication Assessment** (Nov.?)
  - Discuss analysis and evaluation results
  - Obtain recommendations for updating satellite CHL (e.g., YOC algorithm)

### 3.3b. Web-based NEAT map (Q4)

- Interactive NEAT**
  - Google Earth Engine (GEE)-based map
  - Integrated in the Marine Watch Web of NOWPAP
- Alternate GEE-NEAT map for China**
  - Create alternate system for China to access GEE system (Build from the experience of Seagrass Trainer)
  - Access through Marine Watch Web

### 5. Schedule

Time	Action	Main body	
2019	September	17 <sup>th</sup> CEARAC FPM Proposal and approval of the workplan	CERAC and CEARAC FPs
	May	Proposal and approval of NOWPAP workplan and budget at IGM24	National FPs CEARAC and CEARAC FPs
2020	August	17 <sup>th</sup> CEARAC FPM Review of workplan	CEARAC and CEARAC FPs
	Q3-Q4	Implementation of the online match-up tool	CEARAC
2021	Q4	Collection of information for application of the NEAT in operational assessment and monitoring of eutrophication (Satellite CHL and in-situ data)	CEARAC and Nominated Experts
	Q1-Q2	Implementation of the online match-up tool	CEARAC
	Q3	Collection of information for application of the NEAT in operational assessment and monitoring of eutrophication (Satellite CHL and in-situ data) Evaluation of the SGLI and other sensors for operational eutrophication monitoring Compilation of evaluation results	CEARAC CEARAC CEARAC
2021	Q3	Organisation of the 3 <sup>rd</sup> Expert Meeting on eutrophication assessment	CEARAC and Nominated Experts
	Q4	Development of a seamless (sensor independent) satellite CHL for data continuity and operational eutrophication monitoring using the NEAT Implementation of operational eutrophication monitoring web-map based on the NEAT	CEARAC CEARAC

## 6. Budget

### Activities

Online Match-Up Tool	Outsourcing*	\$4,000
<b>Data Collection, Evaluation, and development of a seamless CHL product</b> (evaluation data/results)	NOWPAP member states (China, Korea, Russia)	\$12,000
(Interactive) NEAT monitoring web-map for the NOWPAP region	Outsourcing	\$4,000
	<b>Total</b>	<b>\$20,000</b>

\*Match-Up Tool Code Development (CEARAC)

Document FPM 18/9

Report on improvement of the NOWPAP eutrophication assessment tool (NEAT) for assessment and monitoring of eutrophication using satellite chlorophyll-a

Adopted or need of discussion

Country	Answer	Comments/questions/suggestions
China	Approved	-
Japan	Approved	-
Korea	Approved	-
Russia	Approved	-



# Report on organization of the 5<sup>th</sup> NOWPAP Training Course on Remote Sensing Data Analysis

Genki Terauchi  
NOWPAP CEARAC

August 24, 2021

## 1. Background;

### NOWPAP Medium-term Strategy 2018-2023

6. NOWPAP works to provide its Member States with technical advice and support for capacity building for the region's environment and development priorities. It also promotes sustainable development and co-operation in the region through partnerships and joint activities.

23. NOWPAP will accelerate its activities to ensure mutual learning and capacity building towards closer regional cooperation on integrated coastal zone planning and management as well as marine spatial planning in the region.

28. NOWPAP will deliver its mandate through strategic use of or combination of technical assistance, capacity building, data and information management, mobilization of financial resources, and public awareness and outreach.

## 1. Background; Past NOWPAP training courses on remote sensing data analysis

**4<sup>th</sup> course in 2013**  
PICES  
23 trainees from China, Korea, Canada, Cameroon and Oman

**3<sup>rd</sup> course in 2011**  
PICES  
22 trainees from China, Japan, Korea, Russia, India, Indonesia and the Philippines

**2<sup>nd</sup> course in 2008**  
KORDI  
23 trainees from China, Japan, Korea, Russia, France and Thailand

**1<sup>st</sup> course in 2007**  
IOC/WESTPAC  
23 trainees from China, Japan, Korea, Russia, India, Indonesia, Thailand and Vietnam

77% of participants work in the related field

## 1. Background;

### CEARAC Websites on Ocean Remote Sensing

Provide regionally tuned Satellite Chl-a and SST

Marine Environmental Watch System

Provide maps of potential eutrophic zones (left) and seagrass distribution (right)

Cloud GIS prototype

## 1. Background;

### CEARAC Websites on Ocean Remote Sensing

mapsgrass.org

Online satellite matchup tool

Global Eutrophication Watch (prototype)

## 1. Background

### Getting global attention

NEAT—a satellite-based technique to keep an eye on growing eutrophication threat to oceans

UNEP Webstory on May 5, 2019

Development of a NEAT based eutrophication assessment was selected as 32 GEO – Google funded project in 2020

Assessment of eutrophication in the Northwest Pacific Region with satellite Chl-a from 1998 to 2015 using NEAT

Geo for Good 2020 Highlight: Our community

## 2. Objective

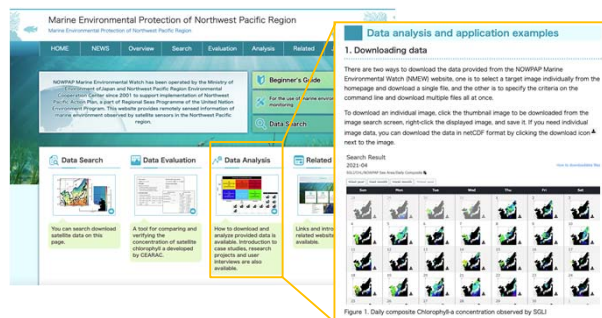
To organize a training course to provide an opportunity to learn the latest techniques for analysis and interpretation of satellite data for assessment of the coastal environment.

As CEARAC has been working on assessment of eutrophication and mapping seagrass using remote sensing and these are closely interrelated, these topics will be the main focus of the training course.

The course will also function to efficiently collect necessary ground truth dataset which is essential for improving the NOWPAP Eutrophication Assessment Tool (NEAT) and web-based service for mapping seagrass distribution.

## 3. Outline of the training course

### 3.1. Development of a webinar website



NOWPAP Marine Environmental Watch website and Data Analysis menu

## 3. Outline of the training course

### 3.1. Development of a webinar website

- Adding links to all teaching materials including presentation slides, tutorials, manuals and videos.



NASA Applied Remote Sensing Program (ARSET)



MarineData4Asia provided by Copernicus Marine Service

Good examples of webinar site related to ocean remote sensing

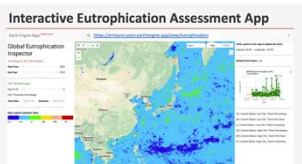
## 3. Outline of the training course

### 3.1. Development of a webinar website

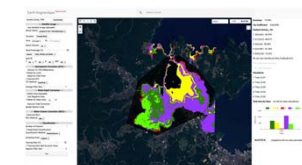
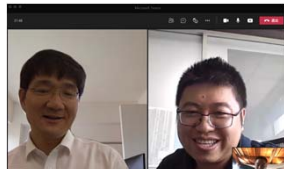
- Structure and contents of webinar site
- About the CEARAC webinar on ocean remote sensing
- People involved (list of NOWPAP national experts)
- Tools (Python code, Seagrass Mapper, Seagrass Trainer..)
- Tutorials for hands-on (presentation slides, manuals and videos)
- News and events for learning

## 3. Outline of the training course

### 3.2. Organization of webinar



Assessment of water quality



Mapping seagrass



## Monitoring and assessment of water quality by ocean color remote sensing (3 days)

Day	Lesson	Lecture and hands on training (each lesson is about 90mins)
1	1	Satellite Biological Oceanography (L)
	2	Processing data-quality flags (H) Validation of satellite data with ground truth data (H)
2	3	Introduction to ocean color sensors (L)
	4	Processing time-series data (daily average, monthly average) (H)
3	5	Application of ocean color sensor (eutrophication, red tide and HAB) (L)
	6	Time-series analysis (extracting trend and/or data in regions of interest) (H)

### Introduction to the NOWPAP Marine Environmental Watch

Search Criteria: Home 日本語

Sensors: MODIS Aqua

Products: SST, CHL, YOC, CODM, TSM

Regions: NOWPAP Sea Area

Period: Monthly, Yearly, Composite, Daily Composite

Date Range: Year: 2021, Month: [dropdown]

Search Result: --/YOC/NOWPAP Sea Area/Monthly, Yearly Composite

24 years ago | last year | next year | 24 years later

Yearly: 2018, 2019, 2020, 2021

Monthly: Jan, Feb, Mar, Apr, May, Jun, Jul, Aug, Sep, Oct, Nov, Dec

### Introduction to the online match-up tool

Selection Criteria: [dropdowns]

Map: [Map of the study area]

Match-up tool: [Form with date, latitude, longitude, and sensor data fields]

Data Table:

Date	Latitude	Longitude	Sensor 1	Sensor 2	...
2008-02-01	32.2844	144.4883	462	3013	...
2008-02-02	32.2844	144.4883	462	3013	...
2008-02-03	32.2844	144.4883	462	3013	...
2008-02-04	32.2844	144.4883	462	3013	...
2008-02-05	32.2844	144.4883	462	3013	...
2008-02-06	32.2844	144.4883	462	3013	...
2008-02-07	32.2844	144.4883	462	3013	...
2008-02-08	32.2844	144.4883	462	3013	...
2008-02-09	32.2844	144.4883	462	3013	...
2008-02-10	32.2844	144.4883	462	3013	...
2008-02-11	32.2844	144.4883	462	3013	...
2008-02-12	32.2844	144.4883	462	3013	...
2008-02-13	32.2844	144.4883	462	3013	...
2008-02-14	32.2844	144.4883	462	3013	...
2008-02-15	32.2844	144.4883	462	3013	...
2008-02-16	32.2844	144.4883	462	3013	...
2008-02-17	32.2844	144.4883	462	3013	...
2008-02-18	32.2844	144.4883	462	3013	...
2008-02-19	32.2844	144.4883	462	3013	...
2008-02-20	32.2844	144.4883	462	3013	...
2008-02-21	32.2844	144.4883	462	3013	...
2008-02-22	32.2844	144.4883	462	3013	...
2008-02-23	32.2844	144.4883	462	3013	...
2008-02-24	32.2844	144.4883	462	3013	...
2008-02-25	32.2844	144.4883	462	3013	...
2008-02-26	32.2844	144.4883	462	3013	...
2008-02-27	32.2844	144.4883	462	3013	...
2008-02-28	32.2844	144.4883	462	3013	...
2008-02-29	32.2844	144.4883	462	3013	...

<https://ocean.nowpap3.go.jp/smat/>

### Global Eutrophication Watch App (Prototype)

Earth Engine Apps

Search: [input field]

Map: [World map with eutrophication overlay]

Filters: [dropdowns]

Data: [Line graph showing eutrophication trends over time]

<https://ermaure.users.earthengine.app/view/global-eutrophication-watch>

### Mapping seagrass by optical sensors (3 days)

Day	Lesson	Lecture and hands on training (each lesson is about 90mins)
1	1	Seagrass beds and coastal ecosystems (L)
	2	Preparation of training data sets from ground truth data (H)
2	3	Theory of detecting seagrass by remote sensing (L)
	4	Classification of satellite images (H)
3	5	Basics of image classifications (L)
	6	Accuracy assessment (H)

### Preparing training data

Features can be in a form of points, lines and polygons in shp, kml, kmz, csv and geojson

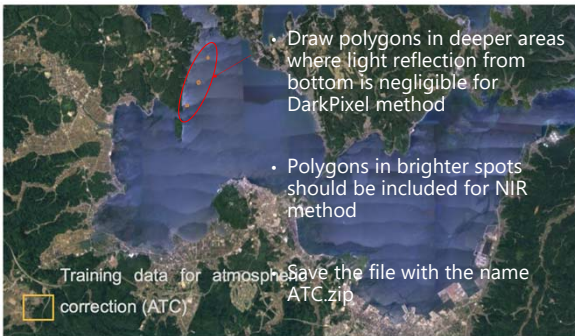
- Points: [Icon of a green and pink pin]
- Lines: [Icon of a green line]
- Polygons: [Icon of a green polygon]

Creating point, line and polygon features on Google Earth Pro

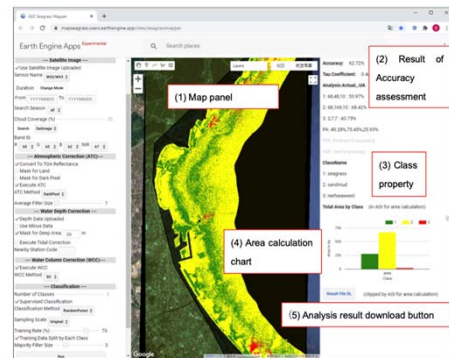
### How to prepare area of interest (AOI) data

- Draw a rectangular-shape polygon for the area to be analyzed by using GIS software (e.g. QGIS) and save it in a Shapefile.
- Then, zip-compress all file components of a Shapefile (at least 4 files: \*.shp, \*.shx, \*.dbf, \*.prj) with a name "AOI.zip". AOI here stands for "Area of Interest". You can also define the area for analysis in Seagrass Trainer.

## How to prepare training data for atmospheric correction

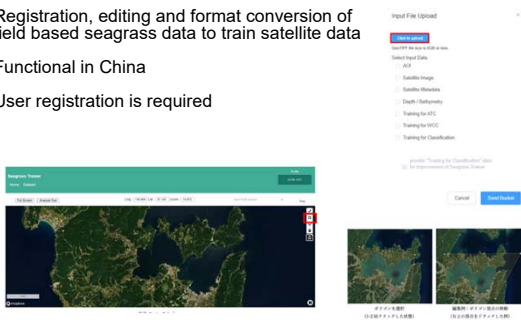


## Getting to know Seagrass Mapper



## Getting to know Seagrass Trainer

- Registration, editing and format conversion of field based seagrass data to train satellite data
- Functional in China
- User registration is required



## 4. Application and selection of trainees

Step 1  
Announcement posted on CEARAC website



Step 2  
Applicants send their application forms to CEARAC

Step 3  
Organizing committee members select candidate trainees

## 5. Cooperation with NOWPAP Partners and other relevant organizations/institutes

International organizations and groups

NOWPAP Framework

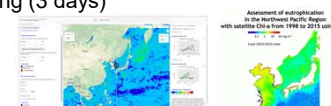
RCU and RACs

Private sector

## 6. Schedule

December 2021

1. Webinar on monitoring and assessment of water quality by ocean color remote sensing (3 days)



2. Webinar on Mapping seagrass by optical sensors (3 days)





## **7. Budget**

**20,000\* US\$ is used to subcontract developing a webinar site.**



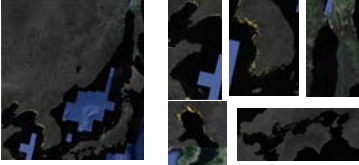
# Proposal for implementation of pilot studies at significant tidal flats in the NOWPAP region

18<sup>th</sup> CEARAC FPM  
24-25 August 2021  
Online

## Background

One of the high priority topics in CEARAC Medium-term Strategy for marine biodiversity conservation developed in 2019 is conservation of biological habitat including tidal flats, salt marshes and seagrass/seaweed beds.

CEARAC implements a project "Assessment of tidal flats/salt marshes in the NOWPAP region" in the 2020-2021 biennium



Map with no information on tidal flats

Ramsar Convention sites (tidal flat) in the member states	
China	<ul style="list-style-type: none"> <li>Shandong Yellow River Delta Wetland</li> <li>Dafeng National Nature Reserve</li> <li>Chongming Dongtan Nature Reserve</li> </ul>
Japan	<ul style="list-style-type: none"> <li>Higashi-voka Tidal Flat</li> <li>Hizen-Kashima Tidal Flat</li> <li>Arao Tidal Flat</li> </ul>
Korea	<ul style="list-style-type: none"> <li>Songdo Tidal Flat</li> <li>Daebudo Tidal Flat</li> <li>Seochoon Tidal Flat</li> <li>Gochang and Buan Tidal Flats</li> <li>Muan Tidal Flat</li> <li>Jeungdo Tidal Flat</li> <li>Suncheon Bay</li> </ul>
Russia	No site of tidal flat in far east

*Underline means MEI of member states*


## Objective

To select significant tidal flats in each NOWPAP member state and to implement pilot studies for collecting information on marine species which use the selected tidal flats, and conservation and management status and anthropogenic impacts around the tidal flats


To enhance the tidal flats/salt marshes map(s) in the NOWPAP region by adding related information on tidal flats in the NOWPAP member states

### Task 1: Selection of significant tidal flats in the NOWPAP member states

Ramsar Convention sites



Endangered Migratory Birds in the NOWPAP Member states



Bilateral Convention/Agreement of Migratory Birds between Japan and other three member states	
Japan-China	Agreement between the Government of Japan and the Government of People's Republic of China for the Protection of Migratory Birds and its Habitats (227 species are conserved in this agreement)
Japan-Korea	Cooperation between the Government of Japan and the Government of Republic of Korea for the Protection of Migratory Birds
Japan-Russia	Convention between the Government of Japan and the Government of Russian Federation for the Protection of Migratory Birds, Endangered Birds and its Habitat Environment (287 species are conserved in this convention)

Each member state selects 2-3 significant tidal flat areas

### Task 2: Implementation of pilot studies

Pilot study for collecting detailed information on the selected tidal flats in each member state

Potential collected information:

- Information on the list of migratory birds which use the selected significant tidal flats
- Information on the list of marine species
- Information on managers of the selected significant tidal flats and their status of management and conservation
- Anthropogenic impacts on the selected significant tidal flats and areas around them
- Other available information on the selected significant tidal flats

### Task 3: GIS mapping of tidal flats in the NOWPAP region

To enhance information on tidal flats in the NOWPAP region

Geographical map



Information map

**Higashi-yoka tidal flat** (Lat: 33.10N, Long: 130.15E)

**Type of protection**  
Marine Protected Area (Wildlife Protection Area)

**Covered area**  
Wildlife Protection Area: 239 ha  
Ramsar Convention site: 218 ha  
Finished by 1930s

**Recent coastal development near the site**

**Marine lives**  
**Migratory birds:** *Limosa lapponica*, *Xenus cornutus*, *Tringa erythropus*, *Numenius phaeopus*, *Tringa brevipes*, *Calidris ferruginea*, *Calidris ruficollis*, *Limosa limosa* (NT), *Pluvialis minor* (EN), .....

**Shellfish:** *Topillica granosa* (EN), *Barnea dilatata* (EN), .....

**Crustacea:** *Uca* (ca.)

**Fish:** *Boleophthalmus boddarti* (EN), .....

**Plant:** *Phragmites australis*, .....

**Regular monitoring and management**  
Shorebirds Census (MOE, Biodiversity Center)  
NGOs (Higashi-yoka Ramsar Club)

### Expected outputs

- GIS on coastal habitats in the NOWPAP region
- Contribution to the NOWPAP RAP BIO and EcoQOs
- Contribution to the conservation of endangered species
- MPA networks in the NOWPAP region



### Budget

Tasks	Budget	Main Body
• Pilot studies at the significant tidal flats in each member state	16,000 USD (4,000 x 4 member states)	Nominated experts
• Enhancing the distribution map(s) using collected information	4,000 USD	CEARAC Secretariat
<b>Total</b>	<b>20,000 USD</b>	

### Schedule

Year	Month	Tasks	Main body
2021	August	• 18 <sup>th</sup> CEARAC FPM Approval of draft workplan	CEARAC FP's CEARAC Secretariat
	Winter	• 24 <sup>th</sup> NOWPAP IGM Approval of Workplan	NOWPAP National FP's
2022	Spring	• 19 <sup>th</sup> CEARAC FPM Approval of implementation plan	CEARAC FP's CEARAC Secretariat
	Summer	• Selection of significant tidal flats and nomination of experts • Contract with the Nominated experts	CEARAC FP's Experts and CEARAC Secretariat
2023	Q3-2023	• Implementation of pilot studies in each member state	Experts CEARAC Secretariat
	Q2	• Expert Meeting (virtual) • Report of the pilot studies	Experts and CEARAC Secretariat
	Q3-Q4	• Enhancing the distribution map(s) based on the results of the pilot studies	CEARAC Secretariat

### Document FPM 18/11 Proposal for implementation of pilot studies at significant tidal flats in the NOWPAP region

Country	Answer	Comments/questions/suggestions
China	Approved	-
Japan	Approved	<p>GIS is an important conservation tool for the East Asian-Australasian region flyway, and although we do not object to deepening it and selecting important tidal flats as the framework of NOWPAP, we will work with other treaties related to the flyway. It is important to confirm and coordinate whether there is any overlap and how we can contribute to the existing international framework.</p> <p>In addition, it is appropriate to 3.1 as "When selecting tidal flats, the member states should refer to the situation of relevant convention, agreement and other international framework on the conservation of migratory waterbirds and their habitats." "For example," "The following description is considered unnecessary."</p> <p>"It is important to note that the scope of bilateral treaties is wide-ranging, not just rare and endangered species.</p> <p>This project is targeted only at those that travel between Japan and China or South Korea, such as the Black-faced Spoonbill and Saunders's Gull. The project also targets Ramsar Wetlands.</p> <p>It is necessary to consider whether such selection of target species and fields is sufficient to achieve the purpose.</p> <p>For example, the Black-faced Spoonbill has overwintered a considerable number at the estuary of the Kuma River in the Ariake Sea.</p> <p>We recognize that the reason why the conservation of the Yellow Sea has been regarded as important internationally since around 2010 is that the number of sandpipers and plovers has been confirmed to decrease sharply.</p>
Korea	Approved	<p>Four Korean tidal flats (geobul), which have been inscribed as UNESCO world natural heritage, are to be considered as prospective sites for pilot studies.</p> <p>→ Each member state protect tidal flats using their own law/institution. Such managed tidal flat areas are selected as target sites for pilot studies.</p>
Russia	Approved/discussion is needed	<p>The current activity on remote sensing analysis of tidal flats (WDF) is clear in terms of the characteristics of important coastal habitats. The expansion/continuation of this activity on the biodiversity issues is not so obvious. Firstly, if we are talking about migratory birds only, it should be specified. Secondly, tidal flats are not only places among coastal habitats important for migratory birds. Other coastal wetlands are also important, and the role of tidal flats should be specified somehow. From the point of view of birds (and Ramsar's managers) there is difference between tidal flats and other coastal wetlands (e.g. in the estuarine zones).</p>

# Proposal for organization of the first eDNA training course

18<sup>th</sup> CEARAC FPM  
24-25 August 2021  
Online

## Background

CEARAC Medium-term Strategy for marine biodiversity conservation (Developed in 2019)  
High priority topics for future activities

- Conservation of biological habitat including tidal flat, salt marsh and seagrass/seaweed beds
- Plankton species related to aquaculture and fisheries
- Environmental DNA


CEARAC planned to organize a training course on eDNA analysis in the 2020-2021 biennium. However, due to the COVID-19 pandemic, it is difficult to organize a face-to-face training course, it was canceled.

## Objective


To share the latest techniques on eDNA analysis among the young scientists of the NOWPAP member states

To find potential joint surveys for CEARAC marine biodiversity projects using eDNA.

Basic skill training



Trial survey



## Task 1: Organizing a training course on eDNA analysis

Plan of the training course:  
Venue: Kobe University, Japan  
Date: March, 2023  
Number of participants: 15 (maximum)  
Schedule:

	AM	PM
Day 1	Filtration	DNA extraction
Day 2	1 <sup>st</sup> PCR test	2 <sup>nd</sup> PCR test
Day 3	Quality check	Data analysis
Day 4	Trial survey	Trial survey
Day 5	Report	Closing

If possible, a trial survey may be conducted (see below). All participants will be required to bring original samples of extracted DNA from sea water in each participants' location.

- Testing availability of Mifish (Japanese database on marine fish DNA)
- Survey on common non-indigenous species in the NOWPAP region

Staring Committee will discuss the contents of training course

## Budget

Tasks	Budget	Main Body
• Cost for organizing a training course	10,000 USD	Local organizer
• Travel support for selected trainee	12,000 USD (1,500 x 8 trainees)	CEARAC Secretariat Selected trainees
• Travel cost for lecturers	3,000 USD (1,000 x 3 lectures)	CEARAC Secretariat Lecturers
<b>Total</b>	<b>25,000 USD</b>	

CEARAC Secretariat will ask other international organizations, such as PICES, and IOC/WESTPAC to be co-sponsor(s) and to provide small fund contribution for trainees from out of the NOWPAP region

## Schedule

Year	Tasks	Main body
2021	August - 18 <sup>th</sup> CEARAC FPM	CEARAC FPs
	Approval of the draft workplan	CEARAC Secretariat
Winter	- 24 <sup>th</sup> NOWPAP IGM	NOWPAP National FPs
	Approval of workplan	
2022	Spring - 19 <sup>th</sup> CEARAC FPM	CEARAC FPs
	Approval of the implementation plan	CEARAC Secretariat
Summer	- Establishment of the starting committee	Nominated expert
	- Starting logistic arrangement	CEARAC Secretariat Local organizer
Fall	- Asking co-sponsor to other international organization	CEARAC Secretariat
	- Open for application	CEARAC Secretariat
Q4-2023 Q1	- Selection of trainees	Steering Committee
	2023 March - Organizing a training course	Local organizer CEARAC Secretariat

Document FPM 18/12  
 Proposal for organization of the first eDNA training course

Adopted or need of discussion

Country	Answer	Comments/questions/suggestions
China	Approved	-
Japan	Approved	Due to the pandemic of Covid19, the training course has been postponed until 2023. However, given the rapid technological advances in the field of eDNA, it may be necessary to consider holding a webinar for some content rather than postponing all plans until 2023 face-to-face implementation. -Agreed. If all FPs and RCU agree to change the tasks of project for the 2020-2021 biennium, Secretariat would like to make video manual with support of the eDNA Society.
Korea	Approved	eDNA methodologies targeting various taxonomic groups are also being developed in Korea, particularly for turtle and sea snakes in Marine Biodiversity Institute of Korea. Field application is also going on. Accordingly we suggest the methodologies developed in each NOWPOP country to be updated together. -Agreed. In each member state, technologies/studies on eDNA is developing rapidly. Sharing such information will contribute build-out of eDNA in our region. When we prepare the training course, Secretariat would like to hear suggestions from experts of member states.
Russia	Approved	-

**Proposal for update of  
 Cochlodinium Website**  
 18<sup>th</sup> CEARAC FPM  
 24-25 August 2021  
 Online



### Background

CEARAC Medium-term Strategy for marine biodiversity conservation (Developed in 2019)  
 High priority topics for future activities


- Conservation of biological habitat including tidal flat, salt marsh and seagrass/seaweed beds
- Plankton species related to aquaculture and fisheries
- Environmental DNA

In the 2020-2021 biennium, databases on HAB occurrence and reference papers were updated.

### Objective

To update Cochlodinium website to add the latest information on *Cochlodinium polykrikoides* in the NOWPAP member states.

To select new target species which cause huge damage to fisheries in the NOWPAP member states and establish a new website on the selected species.



### Task 1: Collecting and updating the latest information on *Cochlodinium polykrikoides* in the NOWPAP region

*Cochlodinium polykrikoides* is one of the concerned red tide species in the NOWPAP member states. Huge fishery damages were reported in Japan and Korea.

To share information on *C. polykrikoides* among the member states and other regions, a website was developed in 2005.

Update of information on *C. polykrikoides* was stopped in 2010 (information on occurrence is 2006), so the latest information after 2006 will be collected by experts of the member states.

### Task 2: Selection of new potential target species and development of a new website

- In recent years, damage by *C. polykrikoides* is in the decreasing trend in Japan and Korea
- On the other hand, other species such as *Karenia mikimotoi* and *Chattonella antiqua* cause serious fishery damage in the member states

Potential species

Causative species of fishery damage in the member states

- *Karenia mikimotoi*
- *Chattonella antiqua*, *C. marina*
- *Heterocapsa circularisquama*
- *Heterosigma akashiwo*

Causative species of shellfish poisoning in the member states

- *Alexandrium tamarense*
- *Dinophysis acuminata*, *D. fortii*

Ciguatera Fish Poisoning

- *Gambierdiscus* spp.

Green tide causative species

- *Ulva prolifera*

Sakamoto et al. (2021): Harmful algal blooms and associated fisheries damage in East Asia: Current status and trends in China, Japan, Korea and Russia. Harmful Algae 102, 101787

### Expected outputs

- Update and enhancement of HAB Integrated Website
- Strengthen collaboration with PICES

## Budget

Tasks	Budget	Main Body
<ul style="list-style-type: none"> <li>Collecting information on <i>Cochlodinium polykrioides</i> in the NOWPAP member states</li> <li>Collecting information on new target species in the NOWPAP member states</li> </ul>	3,000 USD	Experts
<ul style="list-style-type: none"> <li>Updating the Cochlodinium website</li> <li>Development of a new website on the newly selected species</li> </ul>	3,000 USD	CEARAC Secretariat
<ul style="list-style-type: none"> <li>Updating HAB Integrated Website</li> </ul>	3,000 USD	CEARAC Secretariat
<b>Total</b>	<b>9,000 USD</b>	

## Schedule

Year	Tasks	Main body
2021	August - 18 <sup>th</sup> CEARAC FPM Approval of the draft workplan	CEARAC FPs CEARAC Secretariat
	Winter - 24 <sup>th</sup> NOWPAP IGM Approval of Workplan	NOWPAP National FPs
2022	Q3 - Approval of implementation plan by email communication	CEARAC FPs CEARAC Secretariat
2023	Q1-Q2 - Collecting information on HAB occurrences and scientific papers	CEARAC Secretariat
	Q3-Q4 - Review of the collected information Collecting additional information	Nominated experts
	Q4 - Updating database	CEARAC Secretariat

## Document FPM 18/13 Proposal for update of Cochlodinium website

Adopted or need of discussion

Country	Answer	Comments/questions/suggestions
China	Approved	-
Japan	Approved	-
Korea	Approved	Many members of the genus 'Cochlodinium' have been moved to the genus 'Mangokidinium' in the year of 2017, and such recent taxonomic revision should be fully considered in updating Cochlodinium website. --Agreed. Recent taxonomic revision will be reflected to our database/website.
Russia	Approved	-



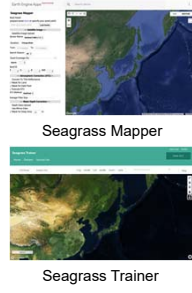
# Proposal for construction of seagrass blue carbon network in the NOWPAP region

Genki Terauchi  
 NOWPAP CEARAC

August 25, 2021

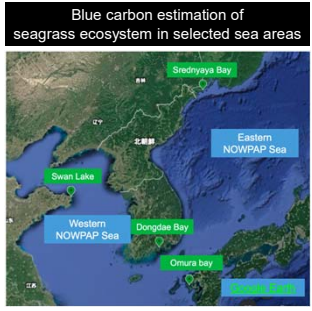
## 1. Background

Tool development



Seagrass Mapper  
 Seagrass Trainer

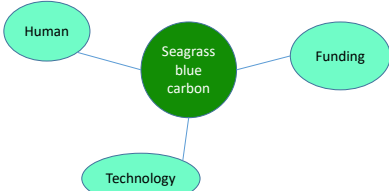
Blue carbon estimation of seagrass ecosystem in selected sea areas



2018-2019 | 2020-2021

## 2. Objective

- To construct a network for further promoting mapping seagrass and evaluating seagrass blue carbon by identifying stakeholders and resources (human, technology and funding opportunity) in the NOWPAP region.



## 3. Tasks and progress

### 3.1. Making a list of organizations/institution and/or personnel to map seagrass in the NOWPAP region

Sharing a list of organizations/institution and/or personnel in Mapeasegrass Project website

Expanding team members of the Mapeasegrass Project

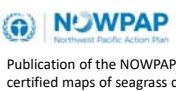
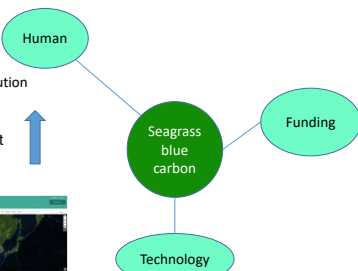
Experts in the NOWPAP member states

- Dr. Dingtian YANG (South China Sea Institute of Oceanology, Chinese Academy of Sciences)
- Dr. Jong-Kuk CHOI and Dr. Keunyoung KIM (Korea Ocean Satellite Center, Korea Institute of Ocean Science and Technology)

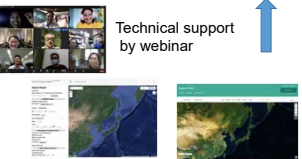


## 3. Tasks and progress

### 3.2. Establishing supporting system for the organization/institutes and/or personnel for mapping Seagrass and estimating seagrass blue carbon

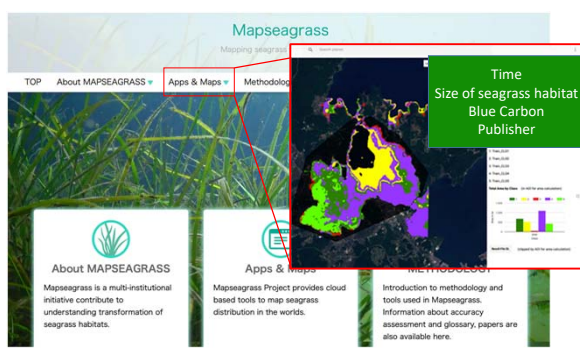



Technical support by webinar



Seagrass Mapper | Seagrass Trainer

## NOWPAP Certified maps of seagrass distribution



Mapeasegrass

Time  
 Size of seagrass habitat  
 Blue Carbon  
 Publisher

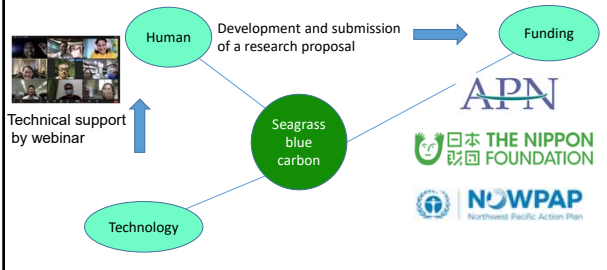
About MAPSEAGRASS  
 Mapeasegrass is a multi-institutional initiative contribute to understanding transformation of seagrass habitats.

Apps & Maps  
 Mapeasegrass Project provides cloud based tools to map seagrass distribution in the worlds.

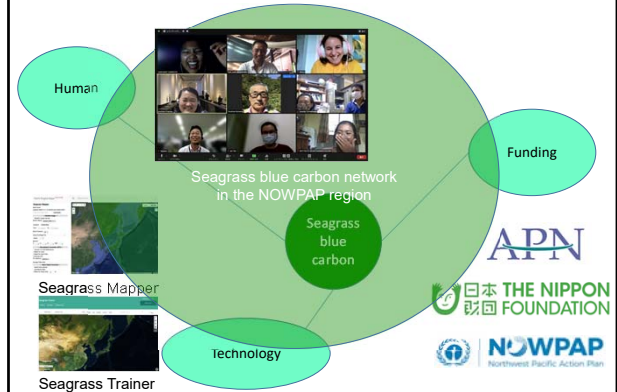
METHODS  
 Introduction to methodology and tools used in Mapeasegrass. Information about accuracy assessment and glossary papers are also available here.

### 3. Tasks and progress

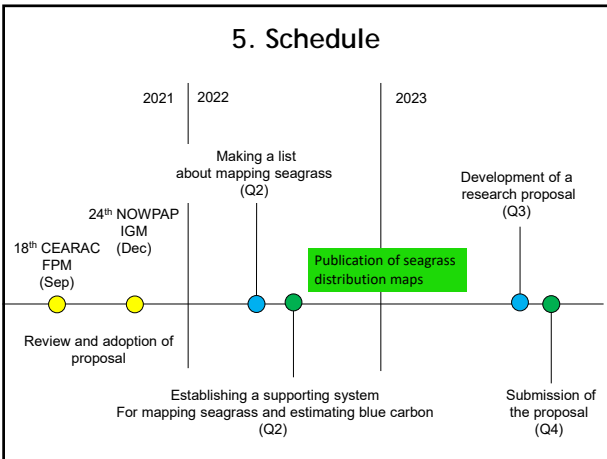
3.3. Development of a research proposal for seagrass mapping and estimation of seagrass blue carbon in the NOWPAP region



### 4. Expected outcome



### 5. Schedule



### 6. Budget

Task	Budget (US\$)
Publication of seagrass distribution maps in each member state	24,000 (6,000 for each country)
Development of a research proposal for seagrass mapping and estimation of seagrass blue carbon in the NOWPAP region	3,000
<b>Total</b>	<b>27,000</b>

# Proposal for development of a cloud-based bio-optical database for satellite water quality monitoring in NOWPAP coastal waters

Elígio Maúre  
NOWPAP CEARAC

August 25, 2021

## 1. Background

Satellite Observations → Satellite-derived CHL → NEAT

Source: <http://modis.gsfc.nasa.gov/>

## 1. Background

**Online match-up tool** (2020-2021 biennium)  
- Contribute to validation of satellite derived CHL

Example of level-2 satellite-to-in-situ CHL match-up validation

Equation:  $\log_{10}(y) = 0.739 \times \log_{10}(x) - 0.008$   
 Statistics:  $N = 172$ ,  $R^2 = 0.63$ ,  $r = 0.73$ ,  $p < 0.001$ ,  $b = 0.98$

Legend:  $x = y$  (red line), linear regression (green line)

Labels: Data match-up tool, Evaluation

## 1. Background

- Benefit from new sensors**
  - Improved spatial coverage of nearshore waters
  - Extend the water quality monitoring to nearshore waters, enclosed bays, etc.

Legend: Land, No data

Color scale: Chlorophyll Concentration [ $\text{mg m}^{-3}$ ] (0.1 to 60)

## 1. Background

- The “water colour” detected by satellites in coastal waters:**
  - Impacted by many inherent optical properties (IOPs)
  - Measurements of absorption coefficients, for instance, provide information about the nature and concentration of dissolved and suspended non-water constituents

- Remote sensing is a powerful tool for water quality assessment**
  - However, integration with in-situ data is very important for data quality assurance

Image source: NASA ARSET Advanced Water Monitoring Webinar Sep 2018

## 2. Objective

- Develop (build) a cloud database of **bio-optical** data for water quality monitoring using satellite information

### Goal

- Extend the water quality monitoring to nearshore regions with data from newer, high-resolution sensors

### 3. Tasks

- 1. Collection of bio-optical data**
  - Used for NOWPAP coastal waters database construction
- 2. Evaluation of satellite derived water quality products**
  - Evaluate the accuracy of satellite derived water quality products in NOWPAP coastal waters
- 3. Relate the NEAT and Secchi disk (SD) maps**
  - NEAT vs. satellite derived SD maps of NOWPAP coastal waters
  - SD maps have long history and are well understood by the public
  - NEAT more accessible to the public (also historical overview of the NEAT)

### 3.1(2). In situ bio-optical data collection

Online match-up tool will be used to build the database

Example of correlations between total chlorophyll and phytoplankton light absorption

Development completed 2020-2021 | Evaluation continued 2022-2023

### 3.1. Bio-optical parameters

Parameter	Unit	Description
CHL	[mg m <sup>-3</sup> ]	Chlorophyll-a concentration
TSM	[g m <sup>-3</sup> ]	Total suspended matter
R <sub>rs</sub>	[nm]	Remote sensing reflectance
a <sub>ph</sub>	[m <sup>-1</sup> ]	Absorption coefficient of phytoplankton
a <sub>NAP</sub>	[m <sup>-1</sup> ]	Absorption coefficient of detrital (non-phytoplankton) particulate matter
a <sub>CDOM</sub>	[m <sup>-1</sup> ]	Absorption coefficient of coloured dissolved matter (or gelbstoff)
b <sub>bp</sub>	[m <sup>-1</sup> ]	Particulate backscattering coefficient
SD	[m]	Secchi disk depth

### 3.3. Development of satellite-based SD map

Secchi disk (SD) – used to estimate transparency  
SD has a long history: first use in 1865 (more than 100 years)

Secchi depth measurement

Secchi depth at Oregon lakes. Trophic boundaries according OECD (1982).

Source: <https://www.sciencedirect.com/topics/agricultural-and-biological-sciences/secchi-disk>

### 3.3. Development of satellite-based SD map

Secchi disk (SD) – used to estimate transparency  
SD has a long history: first use in 1865 (more than 100 years)

Trophic Category	Secchi Depth (m)	Transparency Level
Ultra-oligotrophic	>12	1
Oligotrophic	6-12	2
Mesotrophic	3-6	3
Eutrophic	1.5-3	4
Hyper-eutrophic	<1.5	5

Using a Secchi disk to measuring transparency during algal bloom on Lake Waco (source: [USGS](https://www.usgs.gov))

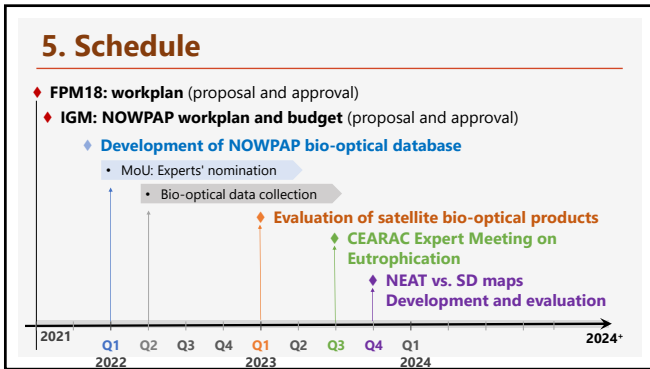
Eutrophication Potential NEAT Assessment

NEAT-based water quality assessment

Source: <https://www.sciencedirect.com/topics/agricultural-and-biological-sciences/secchi-disk>

### 4. Expected Outcomes

- Promote bio-optical algorithms update/improvement**
  - The database will contribute to improving satellite product algorithms (e.g., YOC)
- Guarantee continuity of water quality monitoring**
  - Water quality assessment and monitoring with improved satellite products
- Make the NEAT more accessible to the public**
  - NEAT vs. historical SD maps – easily understood by the public
  - Contribution to the SDGs, 14.1.1a
- Promote the use of newly developed online match-up tool**
  - Contribute to gathering of in-situ data for evaluation of satellite data



### 6. Budget

#### Activities

Online Match-Up Tool	\$16,000 (\$4,000 per member country)
• CEARAC expert meeting (web)	0
• Evaluation of satellite bio-optical products	\$4,000
• Development and evaluation of NEAT vs. SD maps	
<b>Total</b>	<b>\$20,000</b>

Document FPM 18/15  
Proposal for development of a cloud-based bio-optical database for satellite water quality monitoring in NOWPAP coastal waters

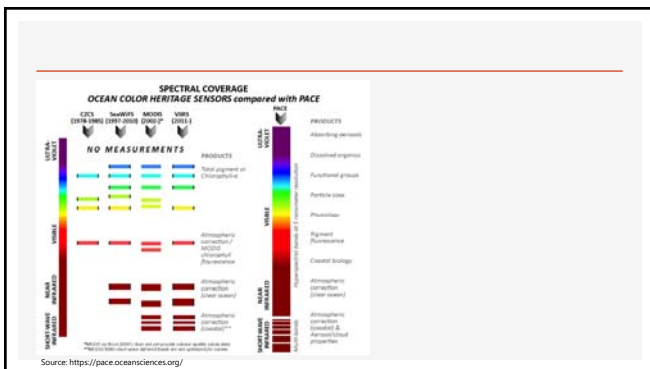
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Adopted or need of discussion

Country	Answer	Comments/questions/suggestions
China	Approved	-
Japan	Approved	-
Korea	Approved	-
Russia	Approved	-

#### Proposed Timeline

Time	Action	Main body
2021	<b>Aug</b> FPM18: workplan (Proposal and approval)	CERAC/CEARAC FPs
	<b>Dec</b> IGM25: NOWPAP workplan and budget • Proposal and approval	National FPs
2022	<b>Q1</b> Preparations for bio-optical database construction • MoU and request for experts nomination	CEARAC
	<b>Q2-Q4</b> In-situ bio-optical data collection • Development of NOWPAP cloud database	Nominated Experts and CEARAC
2023	<b>Q1-Q2</b> Evaluation of satellite bio-optical products	CEARAC
	<b>Q3</b> Organisation CEARAC Expert Meeting	Nominated Experts and CEARAC
	<b>Q4</b> Creation and evaluation of SD maps, and comparison with NEAT maps of water quality monitoring	CEARAC





## Proposal for development of remote sensing programs and organization of the training course

Genki Terauchi  
NOWPAP CEARAC

August 25, 2021

### 1. Background;

#### NOWPAP Medium-term Strategy 2018-2023

6. NOWPAP works to provide its Member States with technical advice and support for **capacity building** for the region's environment and development priorities. It also promotes sustainable development and co-operation in the region through partnerships and joint activities.

23. NOWPAP will accelerate its activities to ensure mutual learning and **capacity building** towards closer regional cooperation on integrated coastal zone planning and management as well as marine spatial planning in the region.

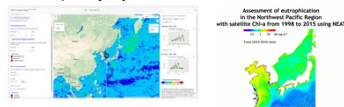
28. NOWPAP will deliver its mandate through strategic use of or combination of technical assistance, **capacity building**, data and information management, mobilization of financial resources, and public awareness and outreach.

### 1. Background;

#### 5<sup>th</sup> NOWPAP training course on remote sensing data analysis

Two webinars are planned in December 2021.

1. Monitoring and assessment of water quality by ocean color remote sensing (3 days)

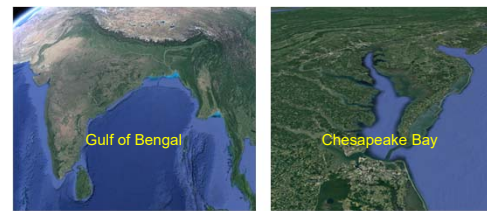


2. Mapping seagrass by optical sensors (3 days)



### 1. Background

#### Request for applying the NEAT based eutrophication assessment in other parts of the world



### 2. Objective

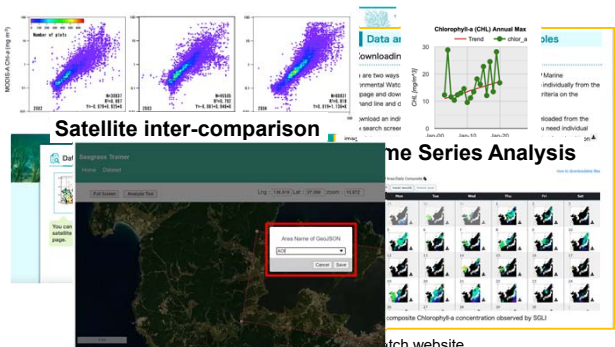
to consolidate the latest knowledge and know-how of satellite remote sensing of the marine environment

to provide an opportunity to learn the state-of-the-art data analysis techniques

to contribute to capacity building of the NOWPAP region and other parts of the world ocean in terms of utilization of satellite remote sensing of the marine environment.

### 3. Outline of the training course

#### 3.1. Enhancement of the webinar website



Field data management in mapping seagrass

### 3. Outline of the training course

#### 3.1. Enhancement of the webinar website

<Enrichment of contents>

5. Interview

"For conservation of marine environment"

- Toyama National College of Technology  
Interview with Prof.Hajime CHIBA
- Nagasaki Prefectural Institute of Fisheries  
Interview with Dr.Nobuo TAKAGI
- Kanazawa University  
Interview with Dr.Koji Nakamura
- Tokyo University of Information Sciences  
Interview with Dr.Katsuro Hara
- Tokyo University, Atmosphere and Ocean Research Institute  
Interview with Dr.Toruoka Komatsu
- Water Quality Section, Toyama Prefectural Environmental Science Research Center  
Interview with Dr.Hisaoaki Fujihira

Manuals for monitoring water quality

Manuals for mapping seagrass

Interviews

### 3. Outline of the training course

#### 3.2. Organization of regular webinar

Interactive Eutrophication Assessment App

Global Eutrophication Inspector

Assessment of water quality

Mapping seagrass

#### Monitoring and assessment of water quality by ocean color remote sensing (3 days)

Day	Lesson	Lecture and hands on training (each lesson is about 90 mins)
1	1	Satellite Biological Oceanography (L)
	2	Processing data-quality flags (H) Validation of satellite data with ground truth data (H)
2	3	Introduction to ocean color sensors (L)
	4	Processing time-series data (daily average, monthly average) (H)
3	5	Application of ocean color sensor (eutrophication, red tide and HAB) (L)
	6	Time-series analysis (extracting trend and/or data in regions of interest) (H)

#### Mapping seagrass by optical sensors (3 days)

Day	Lesson	Lecture and hands on training (each lesson is about 90 mins)
1	1	Seagrass beds and coastal ecosystems (L)
	2	Preparation of training data sets from ground truth data (H)
2	3	Theory of detecting seagrass by remote sensing (L)
	4	Classification of satellite images (H)
3	5	Basics of image classifications (L)
	6	Accuracy assessment (H)

### 3. Outline of the training course

#### 3.3. Organization of an onsite training course

CEARAC will continue seeking possibilities of organizing a conventional onsite training course while monitoring on the situation of COVID-19 pandemic and availability of funding and collaborative organizations.

### 4. Application and selection of trainees

Step 1  
Announcement posted on CEARAC website

Step 2  
Applicants send their application forms to CEARAC

Step 3  
Organizing committee members select candidate trainees



### 5. Cooperation with NOWPAP Partners and other relevant organizations/institutes



International organizations and groups

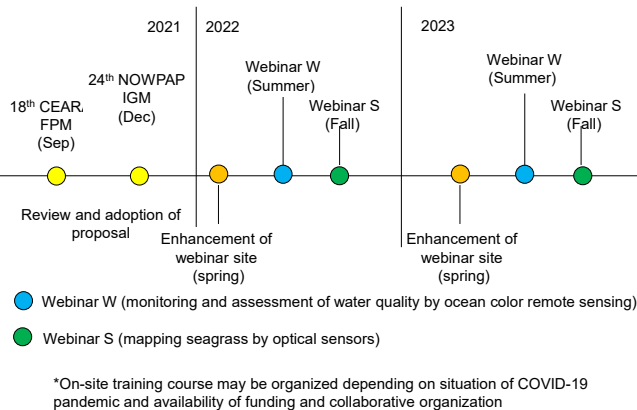
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NOWPAP Framework  RCU and RACs  
Northwest Pacific Action Plan

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Private sector 

### 6. Schedule



### 7. Budget

USD 20,000 will be used for enhancement of the webinar website. Enhancement of functions and enrichment of contents will be conducted annual basis.

\* In case an on-site training course is organized, the total budget can be increased by obtaining external funds from relevant organizations/institutions including NOWPAP Partners.



## Draft Workplan and Budget for CEARAC Activities for the 2022-2023 biennium

18<sup>th</sup> CEARAC FPM  
24-25 August 2021  
online

### Proposal for CEARAC Activities in 2022-2023

- Specific Projects
  - Pilot Studies on significant tidal flats
  - eDNA training Course
  - Update of Cochlodinium website
  - Seagrass blue carbon network in the NOWPAP region
  - Cloud-based bio-optical database for satellite water quality monitoring
  - Development of RS data analysis training programs and organization of training courses

### Proposal for CEARAC Activities in 2022-2023

- Routine activities
  - Meetings, cooperation and coordination
  - Maintenance of websites
- Other
  - Marine litter



### Specific project for 2022-2023

- Implementation of pilot studies on significant tidal flats in the NOWPAP region
  - Member states select significant tidal flats
  - Collecting info. on significant tidal flats for migratory birds and find the status of conservation/management and anthropogenic impacts on them
  - Enhancing the NOWPAP tidal flats maps with collected information

- Organization the first eDNA training course
  - Organizing the eDNA training course for young researchers

Venue: Kobe University, Japan

Timing: Spring 2023

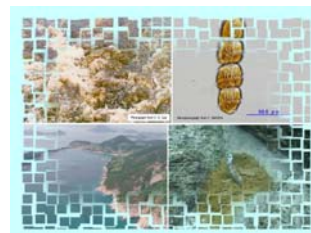
Contents: 5-day skill practices

Trainees: Young scientists from member states

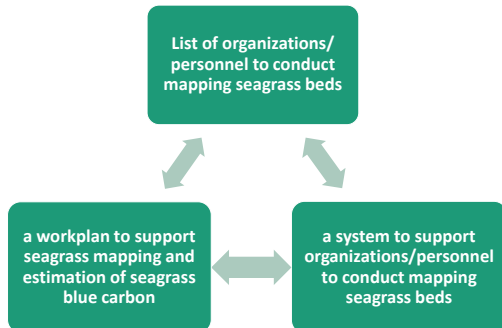
Trainers: Japanese experts

- Update of the Cochlodinium website

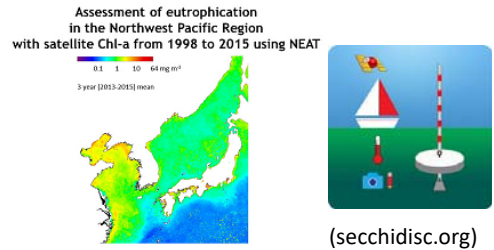
- Enhancing contents of the website
- including new emerging causative species



➤ Construction of a seagrass blue carbon network in the NOWPAP region



➤ Development of a cloud-based bio-optical database for satellite water quality monitoring in NOWPAP coastal waters



➤ Development of the remote sensing data analysis training programs and organization of training courses

- Developing an online training program and organizing training courses regularly



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Activity on marine litter

➤ Collecting information on actions and best practices on plastic litter in the NOWPAP region



Routine work

- Regular meeting
  - FPMs
    - FPM 19 (2022) → Progress Review
    - FPM 20 (2023) → Progress Review & discussion for 2024-2025 activities
  - Expert MT (1/biennium, if needed)
- Cooperation/coordination with other RACs and NOWPAP Partners
- Maintenance of websites

Maintenance of Websites

• Updating web contents



### Budget Option I (US\$185,000)

Activity	Budget
Pilot studies at significant tidal flats	20,000
eDNA training course	25,000
Update of Cochloclodium website	9,000
Seagrass blue carbon network	27,000
Cloud-based bio-optical database for satellite water quality monitoring	20,000
RS data analysis training programs + training courses	20,000
Meetings, cooperation/coordination	54,000
Website maintenance	10,000
<b>Total (same as 2020-2021)</b>	<b>185,000</b>
Marine litter (collecting info. on plastic litter)	9,250

### Budget Option II (US\$197,000)

Activity	Budget
Pilot studies at significant tidal flats	20,000
eDNA training course	25,000
Update of Cochloclodium website	9,000
Seagrass blue carbon network	27,000
Cloud-based bio-optical database for satellite water quality monitoring	20,000
RS data analysis training programs + training courses	20,000
Meetings, cooperation/coordination	54,000
Website maintenance	22,000
<b>Total (+12,000)</b>	<b>197,000</b>
Marine litter (collecting info. on plastic litter)	9,250

### Budget Option III (US\$173,000)

Activity	Budget
Pilot studies at significant tidal flats	20,000
eDNA training course	25,000
Update of Cochloclodium website	9,000
Seagrass blue carbon network	27,000
Cloud-based bio-optical database for satellite water quality monitoring	20,000
RS data analysis training programs + training courses	20,000
Meetings, cooperation/coordination	42,000
Website maintenance	10,000
<b>Total (-12,000)</b>	<b>173,000</b>
Marine litter (collecting info. on plastic litter)	9,250

### Document FPM 18/17 Draft workplan and budget of CEARAC activities for the 2022-2023 biennium

Adopted or need of discussion

Country	Answer	Comments/questions/suggestions
China	Approved	-
Japan	Approved	Information on marine plastic litter in the ASEAN + 3 region is collected at REGIONAL KNOWLEDGE CENTRE FOR MARINE PLASTIC DEBRIS(RKC-MPD), and the best practices for plastic litter by the private sector in Japan, Korea, and China are also collected at RKC-MPD. Since some of the information collected this plan will be duplicated, please share the information with RKC-MPD and make CEARAC aware of the activities of RKC-MPD. <a href="https://kcmpl.mpa.gov.jp/">https://kcmpl.mpa.gov.jp/</a> → Workplan on marine litter will be discussed at the RAP MALI FPM. CEARAC Secretariat will coordinate with RKC-MPD before the meeting, and change the proposal to avoid duplication, if necessary.
Korea	Approved	-
Russia	Approved	-

Thank you very much !



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## Proposal for collecting information on actions and best practices on plastic litter in the NOWPAP region

18<sup>th</sup> CEARAC FPM  
24-25 AUGUST 2021

### Background

- ▶ In the 2020-2021 biennium, NOWPAP plans to revise the NOWPAP Regional Action Plan on Marine Litter (RAP MALI) which was developed in 2006.
- ▶ CEARAC developed a report on National Actions on Marine Microplastics in the NOWPAP region
- ▶ Prevention of marine plastic litter is the most serious issue



### Objective

- ▶ To collect information on actions and best practices on plastic litter by governments and private sectors for prevention of marine plastic litter in each NOWPAP member state

### Tasks

- ▶ Collecting information on actions and best practices on plastic litter for prevention of marine plastic litter by governments and private sectors
- ▶ Publication of a summary report on actions and best practices for prevention of marine plastic litter in the NOWPAP region

### Expected outputs

- ▶ Contribution to the updated NOWPAP RAP MALI
- ▶ Contribution to the OSAKA Blue Ocean Vision and SDGs

### Budget

Tasks	Budget (USD)
- Collecting information in each member state	6,000 USD (2,000 USD for China, Korea and Russia)
- Publication of a summary report including English check	3,250 USD
<b>Total</b>	<b>9,250 USD</b>

### Schedule

Year	Tasks	Main Body	
2021	September	RAP MALI FPM Approval of the draft workplan	RAP MALI FPs RCU and RACs
	Winter	24 <sup>th</sup> NOWPAP IGM Approval of workplan	NOWPAP National FPs
2022	Q2-Q4	Collecting information by the nominated experts	Experts and CEARAC Secretariat
2023		Publication of a summary report	CEARAC Secretariat

Country	Answer	Comments/questions/suggestions
China	Approved	-
Japan	Approved	Information on marine plastic litter in the ASEAN + 3 region is collected at REGIONAL KNOWLEDGE CENTRE FOR MARINE PLASTIC DEBRIS (RKC-MPD), and the best practices for plastic litter by the private sector in Japan, Korea, and China are also collected at RKC-MPD. Since some of the information collected this plan will be duplicated, please share the information with RKC-MPD and make CEARAC aware of the activities of RKC-MPD. <a href="https://rkcmpd-asia.org/">https://rkcmpd-asia.org/</a> → Workplan on marine litter will be discussed at the RAP MALI FPM. CEARAC Secretariat will coordinate with RKC-MPD before the meeting, and change the proposal to avoid duplication, if necessary.
Korea	Approved	-
Russia	Approved	-