Progress in the implementation of CEARAC Activities for the 2018-2019 biennium

NOWPAP CEARAC FPM17
9-10 September 2019

CEARAC Activities for 2018-2019

- **Organization of meetings (FPM and Expert MT)**
- **Maintenance of Websites**
- **3 Specific Projects**
  - **Development of CEARAC MTS on marine BD conservation**
  - **Development of a roadmap for RAP BIO**
  - **Development of a tool for mapping seagrass distribution**
- **Cooperation and Coordination**
- **Marine Litter (RAP MALI)**

FPM and Expert Meeting

- **16th FPM** (May 2018)
  - Reviewing results of 2016-2017 activities and revised workplan of 2018-2019 activities
- **17th FPM** (September 2019)
  - Reviewing progress of on-going activities
  - Presenting proposals for 2020-2021 activities
- **2nd Expert Meeting on Eutrophication Assessment** (22 March 2019)
  - Introducing a new assessment tool (NEAT)

2nd CEARAC Expert Meeting on Eutrophication Assessment in the NOWPAP Region (22 March 2019, Vladivostok, Russia)

Maintenance of Websites

- **Updating web contents**
- **Moving to cloud server (migrating Marine Environment Watch System to a cloud based service)**

Follow up for 2016-2017 biennium

- **Feasibility Study for Assessment of Seagrass Distribution in the NOWPAP region**

http://cearac.nowpap.org/app/website/wp-content/uploads/CEARAC_SGM_FS_2018.pdf

- **Assessment of Major Pressures on Marine Biodiversity in the NOWPAP region**

http://www.cearac-project.org/cearac-project/integrated-report/Assessment_of_major_pressures.pdf

Specific Projects in 2018-2019

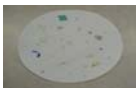
- Development of a CEARAC Medium-term Strategy on Marine Biodiversity Conservation (CEARAC MTS)
- Development of a roadmap for Regional Action Plan for Marine and Coastal Biodiversity Conservation (RAP BIO)
- Development of a tool for mapping seagrass distribution in the NOWPAP region

Cooperation/Coordination with other RACs and regional/int'l organizations

- Participating NOWPAP events
  - RAC FPMs (explaining roadmap for RAP BIO)
  - other NOWPAP events (ICC, IGM, POMRAC WS)
- Participating other relevant events
  - PICES Annual Meeting (2018, 2019)
  - 3rd Science Conference by YSLME (2019)
  - Expert Group MT on SDG 14.1.1 (2018)
  - 1st Operational Satellite Oceanography Symposium (2019)

Marine Litter activities (RAP MALI)

- Harmonizing/summarizing monitoring data by the member states and submitting to DINRAC
- Collecting information on governmental countermeasures against microplastics in the member states
- Translating texts in the Northwest Regional Node to Japanese



Budget (US$194,250)

Activity	Budget (USD)	Expenditure (Aug. 2019)
Meetings	54,000	30,815
Web Maintenance	27,000	8,046
CEARAC MTS on marine BD	30,000	0
Roadmap for RAP BIO	30,000	0
Tool for Seagrass Mapping	40,000	0
Cooperation/Coordination	4,000	767
Total	185,000	39,628
Marine Litter (RAP MALI)	9,250	0

Thank you very much !

「写真提供：（公社）とやま観光推進機構」

Biodiversity Activity I: Development of a CEARAC Medium-term Strategy on marine biodiversity conservation

17th CEARAC FPM
9-10 September 2019
Toyama, Japan

Background

Past CEARAC Marine Biodiversity Activities

2010-2011
- Development of a coastal environmental assessment tool for marine biodiversity conservation (in-kind by NPEC)

2012-2013
- Publishing "Monitoring and management of MPAs in the NOWPAP region"

2014-2015
- Pilot assessment of the impacts of major threats on marine biodiversity
- Case studies on seagrass mapping in the selected sea areas in the NOWPAP region

2016-2017
- Assessment of major pressures on marine biodiversity in the NOWPAP region
- Feasibility study towards assessment of seagrass distribution in the NOWPAP region

NOWPAP

NOWPAP Medium-term Strategy 2012-2017
- Theme 4: Biodiversity conservation (including NIS)

Development of a NOWPAP Action Plan for Biodiversity Conservation

NOWPAP Medium-term Strategy 2018-2023
- Publishing "Monitoring and management of MPAs in the NOWPAP region"

Regional Action Plan has not been developed yet

➡ Biodiversity Activity I

No clear vision for marine biodiversity conservation in the NOWPAP region

Future direction is necessary for CEARAC ASAP

Objective

- To develop the CEARAC Medium-term Strategy on marine biodiversity conservation

CEARAC Medium-term Strategy on marine biodiversity shows following elements
- Basic policy on activities of CEARAC for marine biodiversity conservation
- Role of CEARAC for marine biodiversity conservation in NOWPAP framework
- Future direction and priorities in CEARAC's marine biodiversity activities
- Cooperation with other RACs and International Organizations

Task 1: Development of a list of potential topics for future CEARAC activities

The selected potential topics for future activities of CEARAC
- Assessment of marine biodiversity
- Harmful invasive species
- Specific migratory species
- Conservation of biological habitats, including tidal flat, salt-marsh and seagrass/seaweed beds
- Plankton species related to aquaculture and fisheries
- Environmental DNA

Task 2: Feasibility assessments of potential topics

Member states	Nominated experts
China	Dr. Huang BEI, Zhejiang Provincial Zhoushan Marine Ecological Environmental Monitoring Station
Japan	CEARAC Secretariat
Korea	Dr. Yong Rock AN, National Marine Biodiversity Institute of Korea
Russia	Dr. Tatiana ORLOVA, A.V. Zhirmunskii Institute of Marine Biology, FAR RAS

- Needs of member states
  Relation with National law, strategy and plan
- Data availability
- Potential activities
- Feasibility

Results of feasibility assessment

Potential topics	China	Japan	Korea	Russia
Assessment of marine biodiversity	Feasible (Lack of sufficient data)	Feasible	Unknown	Feasible
Harmful invasive species	Unfeasible (Very little data)	Feasible	Unknown	Feasible
Specific migratory species	Unfeasible (No available data)	Feasible	Unknown	Feasible (Partly)
Conservation of biological habitats	Feasible (Lack of available data)	Feasible	Unknown	Feasible
Plankton species	Feasible (Lack of sufficient data)	Feasible	Unknown	Feasible
E-DNA	Feasible	Feasible	Unknown	Feasible

Task 3: Organization of a marine biodiversity workshop and a meeting for development of CEARAC Medium-term Strategy on marine biodiversity

In original workplan, CEARAC plans to organize a workshop to prioritize future activities for CEARAC MTS.

CEARAC could not organize a meeting, but MTS should be adopted by the end of 2019.

CEARAC would like to propose to revise its workplan slightly

- ✓ Preparation of the first draft of CEARAC MTS
- ✓ Review and approval of the draft CEARAC MTS in principle
- ✓ Organization of a workshop to discuss a detailed workplan for 2020-2021

Priority of potential topics

Potential topics	Priority	Reasons
Assessment of marine biodiversity	Middle	Luck of sufficient data Need of member states
Harmful invasive species	Low	Unfeasible in member states
Specific migratory species	Low	Unfeasible in member states
Conservation of biological habitats	High	CEARAC has experience Need of member states
Plankton species	High	CEARAC has experience on HAB New project "Identification of key indicator species and ecosystems of biodiversity change in the NOWPAP region"
E-DNA	High	New useful tool High potential to improve the lack of data

CEARAC MTS and future workplan for the 2020-2021 biennium

The first draft of CEARAC MTS (UNEP/NOWPAP/CEARAC/FPM 17/5 Annex)

Table of contents

Comments from experts on the first draft of CEARAC MTS

- Agreeing to use e-DNA techniques for marine biodiversity conservation activities. China started to use e-DNA in many fields of marine biodiversity (Chinese expert)

Budget (ORIGINAL)

Activities	Budget (US$)	Main Body
Implementing feasibility assessment	12,000 (3,000 * 4 member states)	Nominated experts
Organizing Marine Biodiversity Workshop and Meeting on development of CEARAC Medium-term Strategy on Marine Biodiversity	15,000	CEARAC FPs Governmental officials Experts CEARAC Secretariat
Developing a CEARAC Medium-term Strategy on marine biodiversity	3,000	CEARAC Secretariat
Total	30,000	

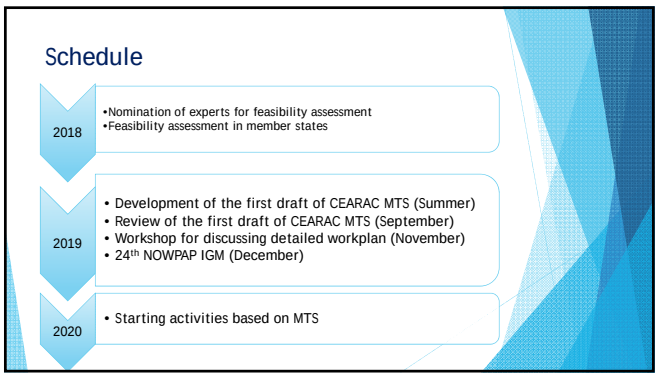
Budget (REVISED)

Activities	Budget (US$)	Main Body
Implementing feasibility study	9,000 (3,000 * 3 member states expect for Japan)	Nominated experts
Workshop to discuss the detailed workplan for the 2020-2021 biennium	18,000	Experts on habitat/e-DNA/plankton CEARAC Secretariat
Developing a draft CEARAC Medium-term Strategy on marine biodiversity	3,000	CEARAC Secretariat
Total	30,000	

Expected outcomes

- Future vision of CEARAC marine biodiversity activities
- Future workplans (after 2020) of CEARAC marine biodiversity activities
- Contribution to the NOWPAP Regional Action Plan on Marine and Coastal Biodiversity Conservation (RAP BIO) (Biodiversity Activity II)

- Expectation to CEARAC Secretariat: Smooth operation of future activities
  - ✓ Priority of marine biodiversity activities based on its feasibility and national needs
  - ✓ Strong support on collection of sufficient data/information from member states and experts


Schedule
2018
•Nomination of experts for feasibility assessment
•Feasibility assessment in member states
2019
• Development of the first draft of CEARAC MTS (Summer)
• Review of the first draft of CEARAC MTS (September)
• Workshop for discussing detailed workplan (November)
• 24th NOWPAP IGM (December)
2020
• Starting activities based on MTS

Biodiversity Activity II: Development of a roadmap for Regional Action Plan for Marine and Coastal Biodiversity Conservation in the NOWPAP region

17th CEARAC FPM
9-10 September 2019
Toyama, Japan

Background

- NOWPAP Medium-term Strategy 2012-2017
  Theme 4: Marine biodiversity
  Development of Regional Action Plan for marine and coastal biodiversity
  - Future direction of the NOWPAP marine biodiversity conservation
  - Guidelines for member states and RACs' activities

  Extended to the NOWPAP Medium-term Strategy 2018-2023

- CEARAC marine biodiversity activity 2018-2019
  Development of the CEARAC Medium-term Strategy on marine biodiversity Conservation

Background (RAP MALI)

2004 → 2005 → 2006-2007

- 2004: UNEP proposed IGM to start ML project in NOWPAP
- 2004-2005: Preparation of proposal of Marine Litter Activity (MALITA) by RCU/RACs/Experts
  - First WS on ML by NPEC
- 2005: RCU proposed in IGM
- 2006-2007: Nomination of ML FPs from member states
  - Implementation of MALITA by RCU/RACs/ML FPs
  - Preparation of draft Regional Action Plan on Marine Litter (RAP MALI)
    - Second WS by MERRAC
    - Third WS by CEARAC

RAP MALI (2008)

Objective

- To develop a roadmap for developing a Regional Action Plan for Marine and Coastal Biodiversity Conservation in the NOWPAP region (RAP BIO) with NOWPAP member states, RCU and all RACs.

At the 16th CEARAC FPM, CEARAC FPs requested CEARAC Secretariat to communicate with other three RACs and modify the workplan based on comments from other RACs

Task 1: Cooperation and coordination with other RACs

Comments from other RACs and FPs

- Need to review past NOWPAP biodiversity activities
- Organizing expert meeting/workshop to discuss future direction
- Hiring a consultant for this project
- Link with current activities of RACs

Workplan was revised and approved

Task 2: Selection of International consultant and nomination of national experts

International Consultant	Dr. David COATES
National Expert of China	Dr. Jingfeng FAN, National Marine Environmental Monitoring Center
National Expert of Japan	CEARAC Secretariat
National Expert of Korea	Dr. Yong Rock AN, National Marine Biodiversity Institute of Korea
National Expert of Russia	Dr. Tatiana ORLOVA, A.V. Zhirmunskii Institute of Marine Biology, FAR RAS

Waiting finalization of nominated experts

International consultant prepares a discussion paper on roadmap with support from national experts and RACs

Discussion paper: Outlook for the Development of the Roadmap for NOWAP RAP BIO

1. Background
2. Introduction
   - 2.1 Scope of "marine and coastal biodiversity conservation" and the RAP BIO
   - 2.2 Relationship between RAP-BIO and overall NOWPAP strategy and workplan
   - 2.3 Previous work of NOWPAP on marine and coastal biodiversity
   - 2.4 Conclusions relevant to NOWPAP RAP BIO
3. Relevant existing National and Regional Seas marine and coastal biodiversity strategies and action plans
   - 3.1 In NOWPAP member states
   - 3.2 Regional Seas strategies and action plans
   - 3.3 Other relevant action plans
   - 3.4 Conclusions relevant to the NOWPAP RAP BIO

Outlook for the Development of the Roadmap for NOWAP RAP BIO

4. Other Major Policy Frameworks, Projects and Programmes addressing marine and coastal biodiversity in the four NOWPAP member states and at NOWPAP regional level
   - 4.1 Coordinating Body on the Seas of East Asia (COBSEA)
   - 4.2 The UN Economic and Social Commission for Asia Pacific (UN ESCAP)
   - 4.3 The North-East Asian Subregional Programme for Environmental Cooperation (NEASPEC)
   - 4.4 The IOC Sub-Commission for the Western Pacific (WESTPAC)
   - 4.5 The North Pacific Marine Science Organization (PICES)
   - 4.6 The Association of Southeast Asian Nations (ASEAN)
   - 4.7 Asia-Pacific Economic Cooperation (APEC)
   - 4.8 Conventions and Agreements on Migratory Species
   - 4.9 Conclusion regarding relevance to the NOWPAP RAP BIO
5. Draft principles for, and the outline of the NOWPAP RAP BIO
   - 5.1 Principles
   - 5.2 Vision, Mission and Goals
   - 5.3 Targets and indicators
   - 5.4 Draft outline of NOWPAP RAP BIO
   - 5.5 Roadmap for NOWPAP RAP BIO

Task 3: Organization of NOWPAP Marine and Coastal Biodiversity Conservation Workshop

- In order to exchange/share information/opinions on working areas of marine and coastal biodiversity in the NOWPAP region as well as roles of each RAC, NOWPAP Marine and Coastal Biodiversity Conservation Workshop will be held

Expected participants:

International consultant, national experts, governmental officers of member states, and representatives of RACs and RCU

Timing:

Q3 2019?

Venue

In Japan?

Outcome of project: Proposal of NOWPAP Marine Biodiversity Activity

Roadmap for developing RAP BIO

Role of each member state and RAC

Collaboration among RACs and with NOWPAP partners

Schedule

2018

- 16th CEARAC FPM / The first RCU/RAC meeting
  - Approval of workplan
  - Request CEARAC Secretariat to coordinate with other RACs
- Other RACs FPM
  - Review of past NOWPAP activities
  - Organizing expert meeting/workshop
  - Hiring an international consultant
- Revise workplan
- Open recruitment of international consultant
- Nomination of national experts

2019

- Contract with international consultant and national experts
- Preparing discussion paper by international consultant and national experts
- NOWPAP Marine and Coastal Biodiversity Conservation Workshop → Proposal to 24th IGM

Budget

Activity	Budget (US$)	Main Body
Development of ToR for roadmap Request nomination of national experts/consultant	In-kind	NOWPAP RCU CEARAC Secretariat
Conclude contracts with national experts	10,000 (2,500 x 4 member states)	National experts CEARAC Secretariat
Preparing discussion paper		International consultant
Organizing of NOWPAP Marine and Coastal Biodiversity Conservation Workshop	20,000	International consultant, national experts, governmental officers, RCU, RACs
Total	30,000	

Report of development of a tool for mapping seagrass distribution in the NOWPAP region

Genki Terauchi
NOWPAP CEARAC

September 9, 2019
Toyama, Japan

1. Background

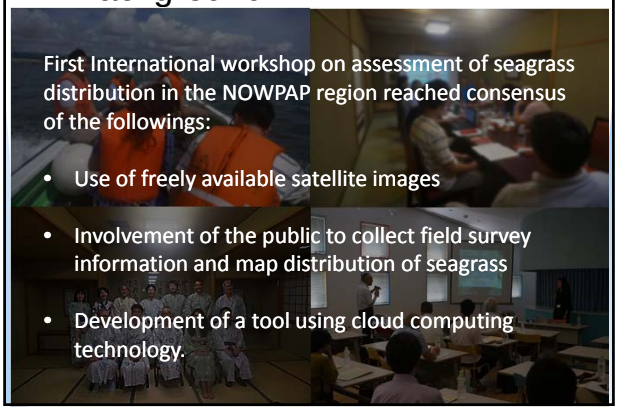
Conservation of biodiversity

Mitigation of climate change

"Sustainable Development Goals (SDGs)" of Rio+20 (2012)
By 2020, conserve at least 10 percent's of coastal and marine areas, consistent with national and international law and based on best available scientific information.

Aichi Biodiversity Target (Target 11)
By 2020, at least 17 per cent of terrestrial and inland water, and 10 per cent of coastal and marine areas, especially areas of particular importance for biodiversity and ecosystem services, are conserved.

1. Background



First International workshop on assessment of seagrass distribution in the NOWPAP region reached consensus of the followings:

- Use of freely available satellite images
- Involvement of the public to collect field survey information and map distribution of seagrass
- Development of a tool using cloud computing technology.

2. Objective

To develop a tool for mapping and sharing information on distribution of seagrass in the NOWPAP region by using satellite images.

The developed assessment tool will be shared among the NOWPAP member states to help mapping distribution of seagrass in each member state.

Depending on availability of external funding, CEARAC will develop a website that incorporates the developed tool in it, so that users can detect distribution of seagrass in their regions of interest by uploading their filed data.

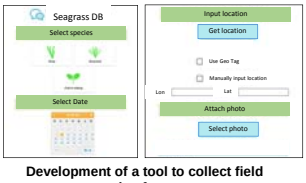
3. Tasks

- 3.1 Update of information on seagrass distribution
- 3.2 Development of a tool and webservice for mapping seagrass distribution with satellite image using cloud computing technology

3.1 Update of information on seagrass distribution

2016-2017 biennium

Maps of seagrass distribution in the NOWPAP members.
(http://map.nowpwp3.gp.jp/maps/view)

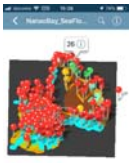


Development of a tool to collect field records of seagrass

Lunching a campaign to get involved the citizens in data collection

3.1 Update of information on seagrass distribution

A mobile map app that allows to down maps for offline use in mobile platforms



Evaluation in field seagrass monitoring in Nanao Bay

Developing a manual to use Avenza Maps to efficiently prepare training data set

3.2 Development of a tool and webservice for mapping seagrass distribution with satellite image using cloud computing technology

3.2 Development of a tool and webservice for mapping seagrass distribution with satellite image using cloud computing technology

挿絵挿入

Demonstrationへの切り替え

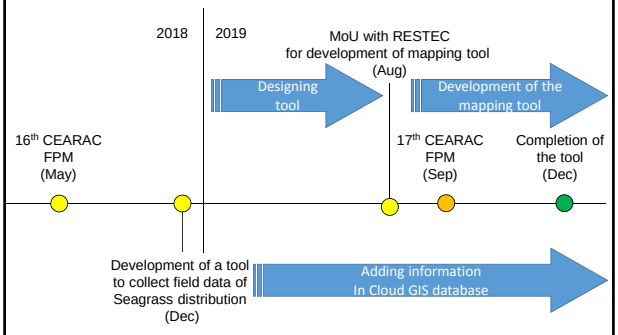
4. Expected outcome

Help wide range of stakeholders including officials, general public, and fishermen to understand information of seagrass distribution

Help calculate seagrass area is to estimate CO_2 sink in the ocean (Blue carbon) and can provide useful input to researchers and relevant officials.

In addition, this activity can be collaborated with Ocean Remote Sensing Program by IOC/WESTPAC and possible to be applied in East-Asian countries.

5. Schedule



6. Budget

Task	Time	Deliverables	To be completed	Main body	Budget (US$)
Update of field data of seagrass distribution	2018 Q2	-Updated information of seagrass distribution	2019 Q3	CEARAC	0
Development of a tool and webservice for mapping seagrass distribution	2019 Q2	A GEE based tool and webservice for mapping seagrass distribution	2019 Q4	Remote Sensing Technology Center of Japan	40,000 (25,000 + 15,000)
Total					40,000

A tool to updated field data of seagrass distribution was developed by NPEC with its own budget (FY2018). Therefore, 15,000 US dollars originally allocated for this task was not spent then decided to add on the task of the development of a tool and webservice for mapping seagrass distribution. This change of budget allocation was proposed by CEARAC Secretariat and accepted by CEARAC FPs in correspondence in June 2019.

Activities for marine biodiversity conservation in the 2020-2021 biennium

17th CEARAC FPM

9-10 September 2019

Toyama, Japan

Background

CEARAC Medium-term Strategy

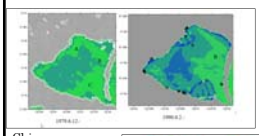
High priority topics for future activities

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

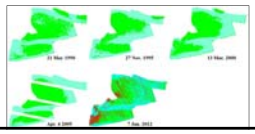
CEARAC Secretariat proposes potential three activities related to three high priority topics

1. Assessment of distribution of tidal flats and salt marshes in the NOWPAP region

- Seagrass/seaweed beds mapping

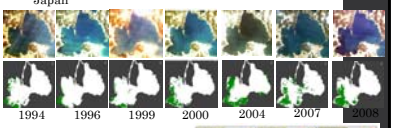


China



Korea

Japan



Russia

Tidal flats and salt marshes in the NOWPAP member states

Tidal flat

Tidal flats in YS, Dr. Bong-Oh Kwon, Korea

Tidal flats in Ariake Bay, MOE

Salt marsh

Global distribution of salt marshes, UNEP WCMC

Endangered species in coastal habitats in the NOWPAP region

Example
- Japanese horseshoe crab (*Tachypleus tridentatus*)
- Bluespotted Mud Hopper (*Boleophthalmus pectinirostris*)
- Many migratory birds

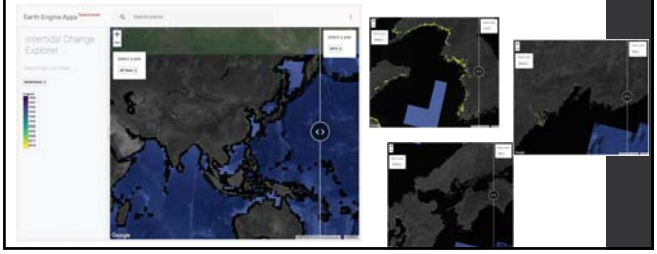
Conservation of coastal habitats (tidal flat, salt marsh) will contribute to protection of marine endangered species living in these habitats

(WWF)

Global intertidal mapping tool

- Murray et al (2019): The global distribution and trajectory of tidal flats, Nature

Intertidal area mapping tool with satellite images using GEE (https://www.intertidal.app/)



1. Assessment of distribution of tidal flats and salt marshes in the NOWPAP region

- Objectives

To understand the distribution and historical changes of tidal flats and salt marshes in the NOWPAP region, and to assess the anthropogenic pressures on these habitats.

- Tasks

✓ Mapping tidal flats and salt marshes in the NOWPAP region

Distribution map of tidal flats and salt marshes is developed using Global Intertidal Change and national data

✓ Assessment of historical change of tidal flats and salt marshes, and its causes

Using outputs of DINRAC's project "Sea reclamation state and management in the NOWPAP region", anthropogenic pressures on coastal habitats will be assessed.

Schedule and budget

2020

Mapping of tidal flats and shalt marshes

CEARAC Secretariat — 5,000 USD

2021

Review of tidal flats and salt marshes map

Experts of member states — 3,000 USD X 3 countries

Assessment of the change of tidal flats and salt marshes and its causes

Experts of member states — 2,000 USD X 3 countries

Total: 20,000 USD

Collaboration with other RACs and international organizations

- DINRAC

Collection of data and information on species filed in the Red Lists of NOWPAP member state

Sea reclamation state and management in the NOWPAP region

- POMRAC

Ecological Quality Objectives (Conservation of coastal habitat)

- IOC/WESTPAC

Coastal habitat mapping

- NEASPEC

MPA network

- YSLME

Biodiversity conservation, protection of tidal flats

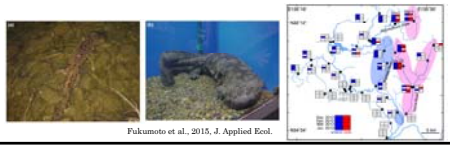
2. Organizing a training course on e-DNA analysis

- Background

Through the feasibility assessments, limitation of available data on biodiversity is clarified.

E-DNA technique has potential to produce data/information on biodiversity including NIS.

E-DNA is a new technology developed several years ago. The analytical methodology is not standardized yet, therefore, a common methodology is needed for comparison among member states.



Fukumoto et al., 2015, J. Applied Ecol.

2. Organizing a training course on e-DNA analysis

- Objective

To help capacity building by increase knowledge on the methodology of e-DNA through training course

- Tasks

➢ Development of an analytical manual for e-DNA

The eDNA Society developed a manual

→NOWPAP Common manual

➢ Organizing a training course on e-DNA analysis

The first training course will be held at in Japan with support from the eDNA society

Lecture and skill practice

Schedule and budget

2020

Development of analytical manual for e-DNA

Experts of e-DNA — 5,000 USD

Application of external budget (from APN?, PICES?)

CEARAC Secretariat — Depend on the scale of TC

2021

Organizing a training course

CEARAC Secretariat and LO — 20,000 USD

Total: 25,000 USD

Collaboration with other RACs and international organizations

- POGO (Partnership for Observation of the Global Ocean)

  Standardization of analytical method of e-DNA analysis

- PICES (North Pacific Marine Science Organization)

  BIO: The application of molecular approaches in marine ecology and fisheries science

  AP-NIS: Monitoring Non-indigenous Species in PICES Member Countries

- SCOR

  Standardization of analytical method of e-DNA analysis

3. Updating HAB database and HAB Reference database

- Past CEARAC experiences

  CEARAC developed HAB database and HAB reference database

- NOWPAP MTS 2018-2023

  NOWPAP MTS expects CEARAC to increase understanding about distribution and impacts of HABs in the NOWPAP region as one of focused areas on marine biodiversity conservation

- New project proposed by Russia

  "Identification of key indicator species and ecosystem of biodiversity change in the NOWPAP region"

3. Updating HAB database and HAB Reference database

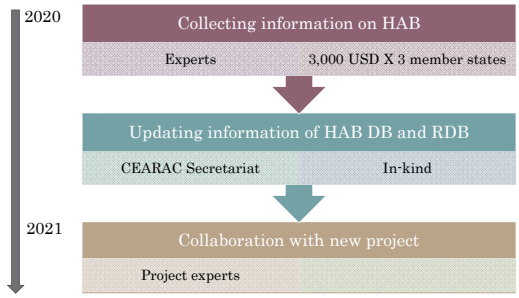
- Objective

  To update HAB Database and HAB Reference Database to share information among the member states

- Tasks

  ➢ Updating of HAB Database and HAB Reference Database

Schedule and budget



Collaboration with other RACs and international organizations

- New project on indicator species

  Identification of key indicator species and ecosystem of biodiversity change in the NOWPAP region

- PICES (North Pacific Marine Science Organization)

  S-HAB

- IOC/WESTPAC

  Project on Harmful Algal Blooms

Which project should be implemented in the 2020-2021 biennium?

- Budget and human resources are limited. It is preferred to select one or two project(s) for the 2020-2021 biennium.
- Secretariat would like to propose to implement two projects, 1) Assessment of distribution of tidal flats and salt marshes in the NOWPAP region, and 2) Organizing a training course on e-DNA for the 2020-2021 biennium.
- Project on plankton related to aquaculture and fisheries will be implemented in the 2022-2023 biennium based on the outputs from a new special project on key indicator species on biodiversity and ecosystem

Activities	Budget
Assessment of distribution of tidal flats and salt marshes in the NOWPAP region	20,000 USD
Organizing a training course on e-DNA	25,000 USD
Updating HAB DB and RDB	9,000 USD

Workshop for discussing detailed workplan for the 2020-2021 biennium

CEARAC plans to organize a workshop in order to discuss a detailed workplan of the selected activities for the 2020-2021 biennium

Timing: November 2019

Venue: major city in Japan where is convenient for participants (Narita/Tokyo or Osaka?)

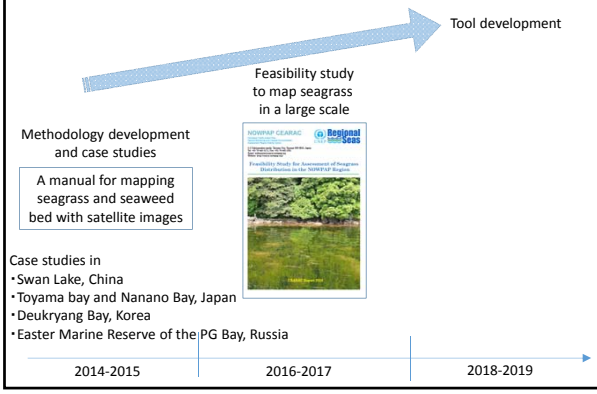
Expected participants: Experts on selected activities from member states

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

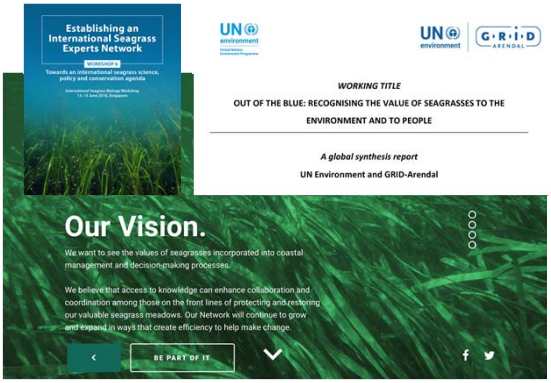
Genki Terauchi
NOWPAP CEARAC

September 9, 2019
Toyama, Japan

1. Background



1. Background



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.

→ How about in NOWPAP?

3. Tasks and progress

3.1 Selecting / nominating case study areas and responsible experts

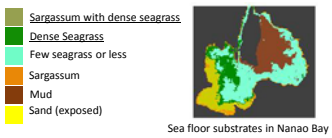
Example: selected sea areas and responsible experts in the 2014-2015 case studies

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. Tasks and progress

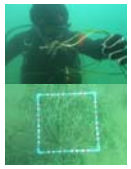
3.2. Estimating seagrass blue carbon in selected sea areas

- Classify seafloor substrates using the tool/service that CEARAC develops in the 2018-2019 biennium.



Sea floor substrates in Nanao Bay

- 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).

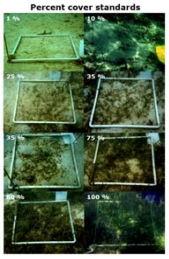


Quadrat sampling in Himi

3. Tasks and progress

3.2. Estimating seagrass blue carbon in selected sea areas

- 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.



Percent cover standard proposed by Mackenzie et al, 2001

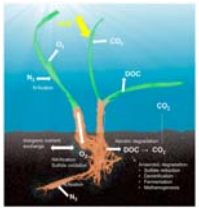
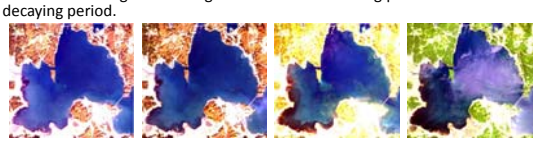


Figure 1, Kelly et al., 2017

3. Tasks and progress

3.2. Estimating seagrass blue carbon in selected sea areas

- Calculate the seagrass coverage areas in the flourishing period and the decaying period.



Nov 5, 2014 | Nov 21, 2014 | April 30, 2015 | June 1, 2015

R.G.B true color images of Landsat 8 OLI

- Estimate the amount of blue carbon captured/stored in seagrass habitat based on Stankovic et al (2018) which is used in Habitat Mapping Project of IOC/WESTPAC.

Example of spreadsheet to estimate blue carbon provided by Dr. Stankovic

Seagrass information					
Plot code	Species present	Substrate type	Coverage in plot (%)	AGB (g DW m-2)	BGB (g DW m-2)
Station 32	Ho, Th, Ea	sand, mud	45	65.8	83.2
Station 52	Th, Ea	sand, rubble	70		

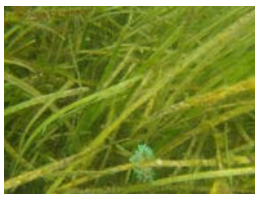
3. Tasks and progress

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

Photos from the 1st expert meeting and international workshop on assessment of seagrass distribution in the NOWPAP region held at Himi, Toyama Japan, August 1-2, 2017

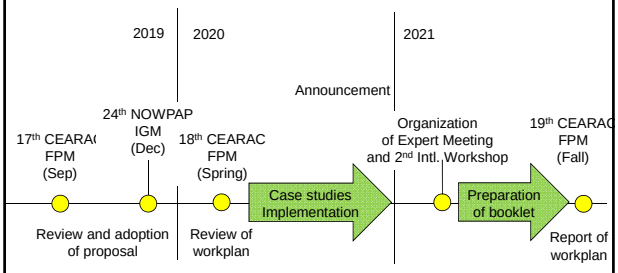
4. Expected outcome

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	***12,000 (3,000 for each country)***
- Organizing an expert meeting back to back with an international workshop	***15,000***
- Preparing of booklet for seagrass conservation in the NOWPAP region	**T. B. D.**
Total	**27,000**

Northwest Pacific Region
NPEC Environmental Cooperation Center

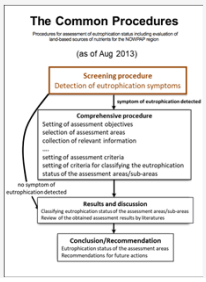
Improvement of the NOWPAP Eutrophication Assessment Tool (NEAT) for application in operational assessment and monitoring of eutrophication using satellite chlorophyll-a

2019.09.09

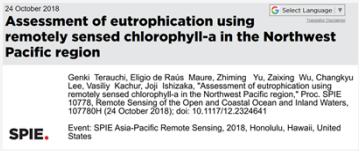
MAÚRE, Elígio de Raús
Department of Study & Research, **NPEC**

Common Procedures for Eutrophication Assessment

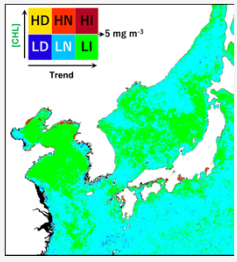
- **The Common Procedures (CP)**
  - Eutrophication assessment with evaluation of land-based sources of nutrients in the NOWPAP region
- **Steps of the CP**
  - **Screening Procedure**
    - use of remote sensing data (chlorophyll *a* - CHL)
  - Comprehensive Procedure
    - If screening procedure detects symptoms of eutrophication



The Screening Procedure in the NOWPAP Sea Area



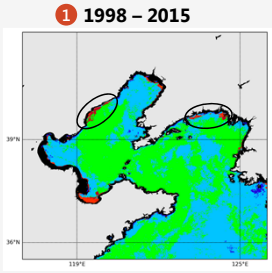
- Results of the screening procedure in the NOWPAP region (Terauchi et al. 2018)
  - **L** & **H** – CHL concentration level [low (< 5mg m^{-3}) & high (≥ 5 mg m^{-3})]
  - **D**, **N**, **I** – CHL trend (decreasing, no-trend increasing)



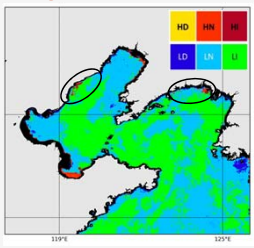
NOWPAP Region

The Screening Procedure in the NOWPAP Sea Area

1 **1998 – 2015**

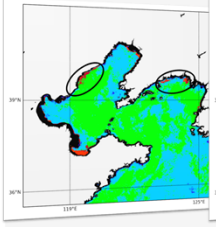


2 **1998 – 2016**

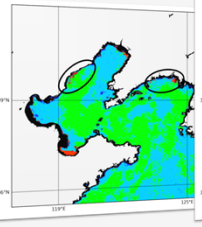


The Screening Procedure in the NOWPAP Sea Area

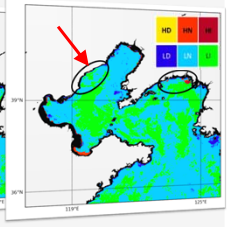
1 **1998 – 2015**



2 **1998 – 2016**

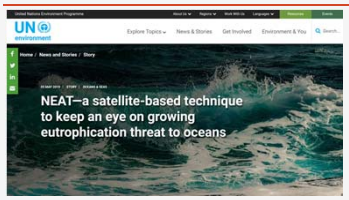


3 **1998 – 2018**

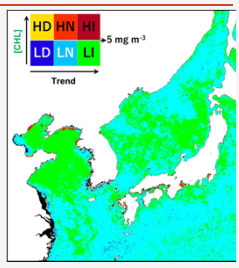


➢ Continued monitoring is important to detect ocean's surface changes

The Screening Procedure as NEAT

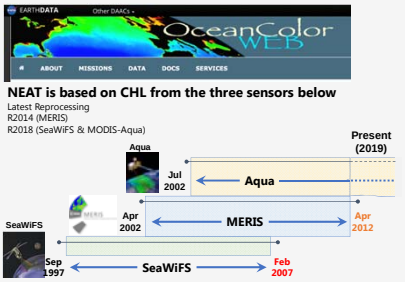


- **NEAT was recognised at the 2nd CEARAC Expert Meeting** on Eutrophication Assessment in March 2019, Vladivostok, Russia
- **Meeting experts also emphasised the importance of continued improvement of the NEAT**



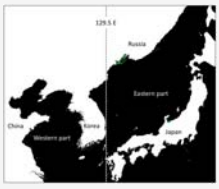
NOWPAP Region

NEAT-based Eutrophication Assessment



NEAT is based on CHL from the three sensors below

Latest Reprocessing
R2014 (MERIS)
R2018 (SeaWiFS & MODIS-Aqua)



- Western part
  - CHL based on YOC (Siswanto et al. 2011) & STD algorithms (NASA)
- Eastern part
  - Only STD algorithm

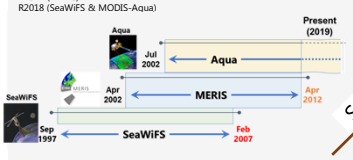
YOC CHL is available on Marine Environmental Watch

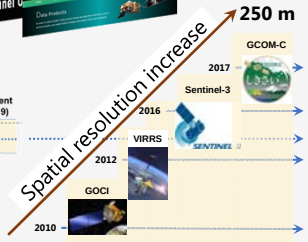
(https://ocean.nowpap3.go.jp/image_search/?latest)

NEAT-based Eutrophication Assessment

Extend the NEAT to use new available sensors

Latest Reprocessing
R2014 (MERIS)
R2018 (SeaWiFS & MODIS-Aqua)





Objectives

- Improve the currently used procedures for creating continuous satellite CHL to cover new satellite sensors
  - This guarantees data continuity with better spatial resolution and higher accuracy
- Revaluate the use of the NEAT with satellite CHL from newer sensor for continuous eutrophication assessment and monitoring

Proposed Tasks

1. Develop a tool for online match-up between *in-situ* and satellite data
2. Evaluate/cross-validate satellite CHL from new sensors
3. Update the CHL product to include recent sensors for use in NEAT operational monitoring

Expected Outcomes

- **Guarantee the continuity CHL data** for eutrophication assessment and monitoring in the NOWPAP region
- **Make the NEAT operational** for eutrophication assessment and monitoring (contribute to the SDGs, 14.1.1 and 6.3)
- The online match-up system
  - Open to the public
  - **Help gather ground truthing data for calibration/validation, algorithm updates/improvements**, etc.

Proposed Timeline

Activity \ Time	2019		2020				2021			
	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Improvement of the NEAT and Procedures										
17th CEARAC FPM (Review and approval – **workplan**)										
24th NOWPAP IGM (Approval – **workplan** and **budget**)										
18th CEARAC FPM (Rev. Implementation Plan)										
→ Online Match-Up Tool										
→ In situ data collection										
Evaluation of new sensor CHL products										
→ Analysis and compilation of evaluation results										
Development of seamless satellite CHL product										
Application of new CHL in a web-based NEAT map										

3rd Expert Meeting on Eutrophication Assessment

Proposed Budget

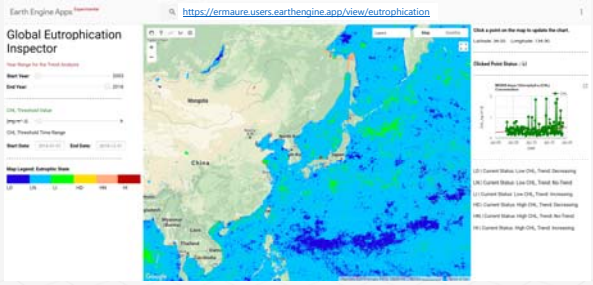
Activities

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

[a]Match-Up Tool Code Development (CEARAC)
[b]CEARAC budget == $0

Interactive Eutrophication Assessment App

https://ermaure.users.earthengine.app/view/eutrophication



Thank you for your attention!

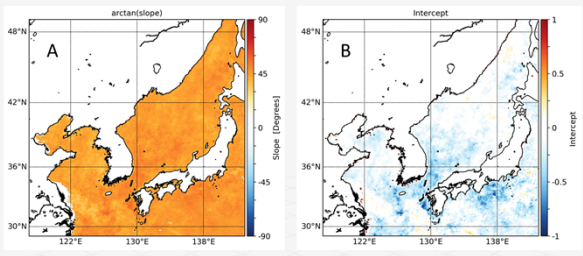
- ご清聴ありがとうございました!
- 관심을 가져 주셔서 감사합니다!
- 谢谢您的关注!
- С п а с и б о з а в н и м а н и е !

YOC Algorithm

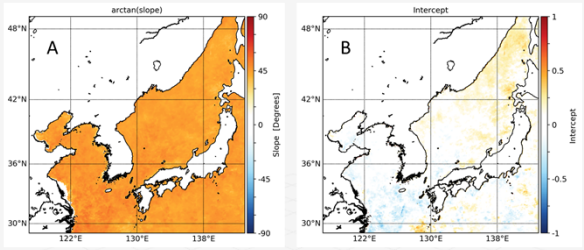
- $\mathrm{YOC}_{\mathrm{CHL}_{(\mathrm{mg/m^3})}} = 10^{(b_0 + b_1 R_{os} + b_2 R_{os}^2)}$
- $R_{\mathrm{os}} = \log_{10}\left\{\left(\frac{\mathrm{Rrs}(443)_{\mathrm{os}}}{\mathrm{Rrs}(555)_{\mathrm{os}}}\right)\left(\frac{\mathrm{Rrs}(412)_{\mathrm{os}}}{\mathrm{Rrs}(490)_{\mathrm{os}}}\right)^{C_0}\right\}$
- b_0, b_1 & c_0 - coefficients

(Siswanto et al. 2011)

YOC Algorithm (SeaWiFS (X) **Rrs412/Rrs490** and MERIS (Y) **Rrs413/Rrs490**)



YOC Algorithm (SeaWiFS (X) **Rrs412/Rrs490** and Aqua (Y) **Rrs412/Rrs488**)



Proposed Timeline

Sep 2019
17th CEARAC FPM
(Review and approval – **workplan**)

Dec 2019
24th NOWPAP IGM
Approval – **workplan** and **budget**

2020 (Q_1-Q_2)
→ Online Match-Up Tool
→ 18th CEARAC FPM
(Implementation plan rev.)
→ In situ data collection

2020 (Q_3-Q_4)
→ Evaluation of new sensor CHL products
→ Compilation of evaluation results

2021 (Q_1 – Q_3)
Development of seamless satellite CHL product

2021 (Q_4)
Application of new CHL in a web-based NEAT map

Proposal for the 5th NOWPAP Training Course on Remote Sensing Data Analysis

Genki Terauchi
NOWPAP CEARAC

September 9, 2019
Toyama, Japan

1. Background;

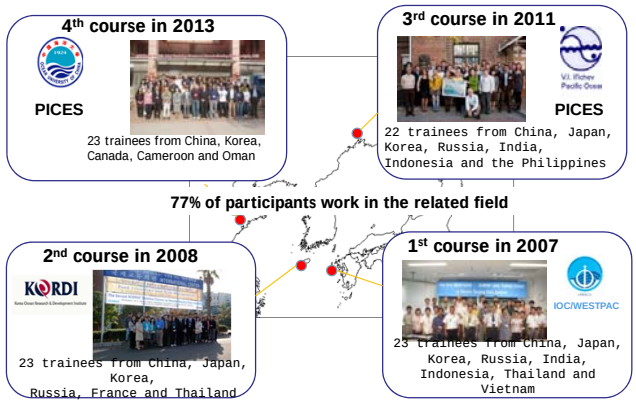
NOWPAP Medium-term Strategy 2018-2023

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.

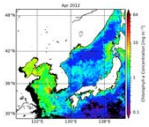
1. Background; Past NOWPAP Training Courses on remote sensing data analysis

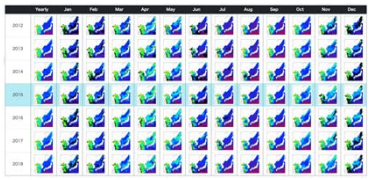


1. Background;

CEARAC Websites on Ocean Remote Sensing

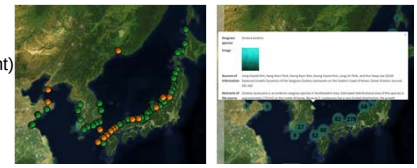
Provide regionally tuned Satellite Chl-*a* and SST





Marine Environmental Watch System

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



Cloud GIS prototype

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.

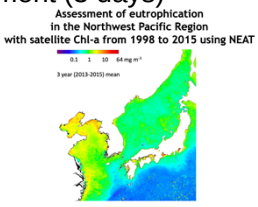
The course will also function to efficiently collect necessary ground truth dataset which is essential for improving the NOWPAP Eutrophication Assessment Tool (NEAT) and web-based service for mapping seagrass distribution.

3. Outline of the training course

Venue	University of institute in a NOWPAP member state
Time	Fall in 2020
Expected participants	Young researchers, students and national/local government official (approx. 25 people)
Tuition	Free; however, participants are required to pay accommodation and transportation fee by themselves. Limited financial support is available
Period	7 days

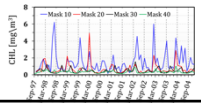
3. Outline of the training course

Eutrophication Assessment (3 days)



■ Lectures
- Satellite biological Oceanography
- Introduction to ocean color sensors
- Applications of ocean color sensor (eutrophication, red tide and HAB)

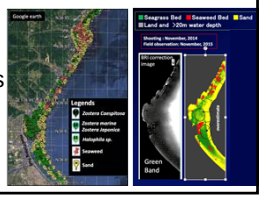
■ Hands on
- Developing time-series data (daily average, monthly average), dealing with quality flags
- Validation of satellite data with ground truth data
- Time-series analysis (extracting trend and/or data in regions of interest)



3. Outline of the training course

Mapping Seagrass (3 days)

■ Lectures
- Seagrass beds and coastal ecosystems
- Theory of detection seagrass beds by remote sensing
- Basics of image classifications



■ Hands on
- Preparation of ground truth data as training data sets
- Classification of satellite images
- Accuracy validation

3. Outline of the training course

Group work and presentation (1 day)

- Participants will be divided into several groups that share common interests.
- Each group will work together to analyze satellite data
- Each group will make presentation

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

PICES, WESTPAC, CCG International Ocean Colour Coordinating Group, YSLME, GEO GROUP ON EARTH OBSERVATIONS

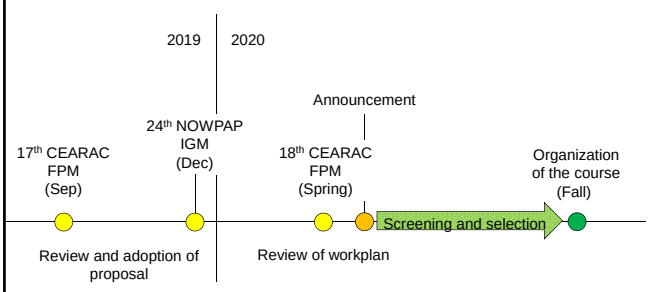
NOWPAP Framework

NOWPAP Northwest Pacific Action Plan — RCU and RACs

Private sector

Google Earth Engine, Avenza Maps

6. Schedule



7. Budget

20,000* US$ is allocated from NOWPAP Trust Fund.

***The total budget will be increased by mobilizing extra fund from NOWPAP partners and others**

Draft Workplan and Budget for CEARAC Activities for the 2020-2021 biennium

NOWPAP CEARAC FPM17
9-10 September 2019

Planned CEARAC Activities for 2020-2021

➢ **Specific Projects**

- **Potential activities on marine biodiversity**
  - **Assessment of distribution of tidal flats & salt marshes in the NOWPAP region**
  - **Training course on E-DNA**
  - **Update of HAB database and HAB reference database**
- **Case studies on estimating seagrass blue carbon in selected sea areas**
- **Improvement of NOWPAP eutrophication assessment tool (NEAT)**
- **5th NOWPAP training course on remote sensing data analysis**

Planned CEARAC Activities for 2020-2021

➢ **Routine Work**

- **Organization of meetings (FPM & Expert MT)**
- **Website Maintenance**
- **Cooperation/Coordination**
- **Marine Litter Activities**

Organization of Meetings

- **18th FPM** (spring 2020)
  - Reviewing workplan for 2020-2021 based on IGM24 decision (Dec. 2019)
- **19th FPM** (fall 2021)
  - Reviewing progress of 2020-2021 activities
  - Presenting proposals for 2022-2023 activities
- **3rd Expert Meeting on Eutrophication Assessment** (2021)
  - Reporting the status of eutrophication and progress of NEAT improvement

Maintenance of Websites

- **Updating web contents**

Cooperation/Coordination with other RACs and regional/int'l organizations

➢ **NOWPAP activities by other RACS and/or RCU**

For example

- RAP BIO
- EcoQOs by POMRAC
- NOWPAP Special Project on identifying key indicator species and ecosystems of BD change by RAS
- Marine litter

Cooperation/Coordination with other RACs and regional/int'l organizations

➢ **NOWPAP Partner Organizations and others**

For example

- PICES (MEQ, S-HAB, AP-CREAMS, AP-NIS, WG-42)
- YSLME (Biodiversity conservation, eutrophication)
- IOC/WESTPAC (Habitat Mapping Project)
- NEASPEC (MPA)
- IOCCG (ocean color remote sensing)

Marine Litter activities (RAP MALI)

• Discussion on revising RAP MALI

Regional Action Plan on Marine Litter (RAP MALI) was developed and approved in 2008.

During the past decade, member states enhanced countermeasures against ML.

New issue, marine microplastic is focused globally.

Updating of RAP MALI is planned.
Role of each RAC will be reviewed and revised.

Budget (US$185,000)

Activity	Budget (USD)
(marine BD) Assessment of tidal flat/salt marsh	20,000*
(marine BD) E-DNA training course	25,000*
(marine BD) Update of HAB (reference) databases	9,000*
Case studies on estimating seagrass blue carbon	27,000
Improvement of eutrophication assess. Tool (NEAT)	20,000
5th training course on RS data analysis	20,000
Organization of meetings	54,000
Maintenance of Website	5,000
Cooperation/coordination with RACs/Partners	5,000
Total	185,000

*Biodiversity projects will be selected from three potential activities based on CEARAC MTS

Thank you very much !

「写真提供：（公社）とやま観光推進機構」

Report on marine litter activities

17th NOWPAP CEARAC FPM

9-10 September 2019

Background

NOWPAP-TEMM joint workshop on Marine Litter Management NOWPAP Regional Action Plan on Marine Litter Focal Points Meeting

The marine litter activities by NOWPAP including CEARAC have been approved in the meeting. In 2018, the meeting was hosted by NOWPAP RCU, supported by the Ministry of Ocean and Fisheries of Korea and held in Busan, Korea, on 3-6 June.

2019 meetings will be held in Dalian, China in September.

Participants of the NOWPAP-TEMM Joint Workshop on Marine Litter Management-NOWPAP RAP-MALI FPM in 2018

Activities in the 2018-2019 biennium

Collecting information on national actions on marine microplastics (1/2)

CEARAC has collected information of activities of microplastic issues among the NOWPAP member states. The collected information is:

- monitoring on marine litter
- actions by the central government (legislations, plan, and activity summaries in accordance with relevant legislations)
- actions by local governments and private bodies

CEARAC Secretariat will ask ML FPs to review a draft summary report and modify/add information, if needed.

Budget: USD 6,000 for MoU with ML FPs or nominated experts (USD 2,000/each state, except for Japan)
Deadline: December 2019
Output: Summary report of information on microplastics in each member state

Activities in the 2018-2019 biennium

Collecting information on national actions on marine microplastics (2/2)

- monitoring on marine litter
  (*e.g.*, an extract for monitoring on the coast by NOWPAP member states)

1. Monitoring, Survey

	No.	Monitoring /survey	Category for location	Outline for location	Period	Organizer of survey	Main body	Monitoring item	Link
China	1	Microplastics sampling and analysis in the sediments	beach (sandy or muddy)	50 sites along the coast in the Yellow Sea and the East China Sea	since 2007	UNKNOWN	National Marine Environmental Monitoring Center, East China Normal University	density	UNKNOWN
Japan	1	Mrine litter monitoring on the coast	coasts	28 sites	2010-2014	Ministry of the Environment	Ministry of the Environment	amount, items (type), composition, and languages on the label	2.Act.Govt.: Legislation [3], Plan [2]
Korea	2	Marine debris monitoring on the coasts (National Marine Litter Monitoring Program)	coasts	20 coasts in 2008; 40 coasts in 2015; 40 coasts in 2018	2008, 2015, 2018	Korea Marine Environment Management Cooporation	UNKNOWN	item, density	UNKNOWN
Russia	1	Monitoring for marine litter caused by the fishing industry	coasts	55 stations	2007-2017	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN

Activities in the 2018-2019 biennium

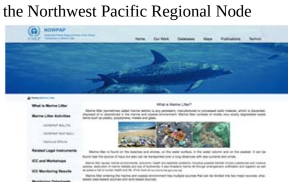
Translation contents of the Northwest Pacific Regional Node into Japanese

CEARAC translates the contents of the Northwest Pacific Regional Node (operated by DINRAC) into Japanese.

Translated text will be submitted to DINRAC to help refinement of the Northwest Pacific Regional Node which will have pages in the language of each member state in future.

Budget: USD 3,250
Deadline: December 2019
Output: Japanese text of the contents of the Northwest Pacific Regional Node

Website of Northwest Pacific Regional Node



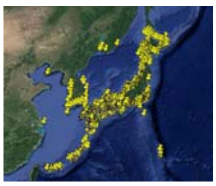
Activities in the 2018-2019 biennium

Compiling and harmonizing marine litter monitoring data on beaches and submitting the collected data to DINRAC

Same as the past biennia, CEARAC has continued compiling and harmonizing marine litter monitoring data collected by each member state, which is submitted to DINRAC.

Budget: In-kind
Deadline: 2018-2019
Output: latest NOWPAP marine litter monitoring data

NOWPAP National Monitoring of Marine Litter (2012)
In 2012, monitoring survey was conducted in 55 sites. Total number of collected marine litter items is 119,771, and total weight is 11,336kg.



Activities in the 2020-2021 biennium

Considering activities based on the review of RAP MALI

RAP MALI will be updated/revised based on the current situation in the NOWPAP region.

Through the discussion on updating the RAP MALI, CEARAC will implement relevant activities based on the needs/requests from the NOWPAP member states.

Revision of RAP MALI will be discussed at the NOWPAP RAP MALI Focal Points Meeting held in Dalian on 26th September 2019.