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)

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
- 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

2nd CEARAC Expert Meeting on Eutrophication Assessment in the NOWPAP Region
(22 March 2019, Vladivostok, Russia)
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
- 3rd Science Conference by YSLME (2019)
- 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)

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

Thank you very much!
Biodiversity Activity I: Development of a CEARAC Medium-term Strategy on marine biodiversity conservation

**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 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

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**

<table>
<thead>
<tr>
<th>Potential topics</th>
<th>China</th>
<th>Japan</th>
<th>Korea</th>
<th>Russia</th>
<th>Feasibility</th>
</tr>
</thead>
<tbody>
<tr>
<td>Assessment of marine biodiversity</td>
<td>Feasible</td>
<td>Unknown</td>
<td>Feasible</td>
<td>Feasible</td>
<td>Feasible</td>
</tr>
<tr>
<td>Harmful invasive species</td>
<td>Feasible (Lack of sufficient data)</td>
<td>Feasible</td>
<td>Unknown</td>
<td>Feasible (Partly)</td>
<td></td>
</tr>
<tr>
<td>Specific migratory species</td>
<td>Unfeasible (lack available data)</td>
<td>Feasible</td>
<td>Unknown</td>
<td>Feasible (Partly)</td>
<td></td>
</tr>
<tr>
<td>Conservation of biological habitats</td>
<td>Feasible (Lack of available data)</td>
<td>Feasible</td>
<td>Unknown</td>
<td>Feasible</td>
<td></td>
</tr>
<tr>
<td>Plankton species</td>
<td>Feasible (Lack of sufficient data)</td>
<td>Feasible</td>
<td>Unknown</td>
<td>Feasible</td>
<td></td>
</tr>
<tr>
<td>Environmental DNA</td>
<td>Feasible</td>
<td>Unknown</td>
<td>Feasible</td>
<td>Feasible</td>
<td>Feasible</td>
</tr>
</tbody>
</table>

**Results of feasibility assessment**

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

<table>
<thead>
<tr>
<th>Potential Topics</th>
<th>Priority</th>
<th>Reasons</th>
</tr>
</thead>
<tbody>
<tr>
<td>Assessment of marine biodiversity</td>
<td>Middle</td>
<td>Lack of sufficient data</td>
</tr>
<tr>
<td>Harmful invasive species</td>
<td>Low</td>
<td>Unfeasible in member states</td>
</tr>
<tr>
<td>Specific migratory species</td>
<td>Low</td>
<td>Unfeasible in member states</td>
</tr>
<tr>
<td>Conservation of biological habitats</td>
<td>High</td>
<td>CEARAC has experience</td>
</tr>
<tr>
<td>Plantation species</td>
<td>High</td>
<td>CEARAC has experience on NBA</td>
</tr>
<tr>
<td>E-DNA</td>
<td>High</td>
<td>New potential to improve the lack of data</td>
</tr>
</tbody>
</table>

**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:
1. Background
2. Feasibility assessment for development of CEARAC MTS
3. CEARAC Medium-term Strategy for Marine Biodiversity Conservation in the NOWPAP region
4. Basic policy of CEARAC MTS
5. High priority activities for future CEARAC marine biodiversity activities
6. CEARAC Medium-term Strategy for Marine Biodiversity Conservation in the NOWPAP region
7. Collaboration with other RACs and international organizations
8. Expected role of CEARAC
9. Reference

**Budget (ORIGINAL)**

<table>
<thead>
<tr>
<th>Activity</th>
<th>Budget (US$)</th>
<th>Main Body</th>
</tr>
</thead>
<tbody>
<tr>
<td>Implementing feasibility assessment</td>
<td>12,000</td>
<td>3,000* (4 member states)</td>
</tr>
<tr>
<td>Organizing Marine Biodiversity Workshop and Meeting on development of CEARAC Medium-term Strategy on Marine Biodiversity</td>
<td>15,000</td>
<td>CEARAC FPs Governmental officials, Experts, CEARAC Secretariat</td>
</tr>
<tr>
<td>Developing a CEARAC Medium-term Strategy on marine biodiversity</td>
<td>3,000</td>
<td>CEARAC Secretariat</td>
</tr>
<tr>
<td>Total</td>
<td>30,000</td>
<td>CEARAC Secretariat</td>
</tr>
</tbody>
</table>

**Budget (REVISED)**

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

**Expected outcomes**

- Future visions of CEARAC marine biodiversity activities
- Future workplans (after 2020) of CEARAC marine biodiversity activities
- Contributions 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

- 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)
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 IGA (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)

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

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

- 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 prepared 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

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 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
- Approval of workplan
- Request CSW/NEP: Secretariat to coordinate with other RACs
- Review of past NOWPAP activities
- Organising expert meeting/workshop
- Hiring an international consultant

2019
- Review of workplan
- Open recruitment of international consultant
- Nomination of national experts
- Review of participation
- Preparing discussion paper by international consultant and national experts

Proposal to 24th IGM

Budget

<table>
<thead>
<tr>
<th>Activity</th>
<th>Budget (US$)</th>
<th>Main Body</th>
</tr>
</thead>
<tbody>
<tr>
<td>Development of ToR for roadmap</td>
<td></td>
<td>NOWPAP RCU/CEARAC Secretariat</td>
</tr>
<tr>
<td>Proposal for conclusion of national experts/consultant</td>
<td></td>
<td>National experts/CEARAC Secretariat</td>
</tr>
<tr>
<td>Conclude contracts with national experts</td>
<td>30,000</td>
<td>National experts/CEARAC Secretariat</td>
</tr>
<tr>
<td>Preparing discussion paper by international consultant</td>
<td></td>
<td>International consultant</td>
</tr>
<tr>
<td>Organising of NOWPAP Marine and Coastal Biodiversity Conservation Workshop</td>
<td>20,000</td>
<td>International consultant, national experts, governmental officers, RCU, RACs</td>
</tr>
<tr>
<td>Total</td>
<td>30,000</td>
<td></td>
</tr>
</tbody>
</table>
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

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

Maps of seagrass distribution in the NOWPAP members.

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

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 CO₂ 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

5. Schedule

6. Budget

<table>
<thead>
<tr>
<th>Task</th>
<th>Time</th>
<th>Deliverables</th>
<th>To be completed</th>
<th>Main body</th>
<th>Budget (US$)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Update of field data of seagrass distribution</td>
<td>2018 Q2</td>
<td>Updated information of seagrass distribution</td>
<td>2019 Q3</td>
<td>CEARAC</td>
<td>0</td>
</tr>
<tr>
<td>Development of a tool and webservice for mapping seagrass distribution</td>
<td>2019 Q2</td>
<td>A GEE based tool and webservice for mapping seagrass distribution</td>
<td>2019 Q4</td>
<td>Remote Sensing Technology Center of Japan</td>
<td>40,000 (25,000 + 15,000)</td>
</tr>
<tr>
<td>Development of a tool to collect field data of Seagrass distribution (Dec)</td>
<td>2018 16th CEARAC  FPM (May)</td>
<td>17th CEARAC FPM (Sep)</td>
<td>Development of the mapping tool</td>
<td></td>
<td></td>
</tr>
<tr>
<td>17th CEARAC FPM (Sep)</td>
<td></td>
<td>Development of the mapping tool</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Adding information in Cloud GIS database</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>40,000</td>
</tr>
</tbody>
</table>

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

Endangered species in coastal habitats in the NOWPAP region

- 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

Global intertidal mapping tool


Appendix V
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**

<table>
<thead>
<tr>
<th>2020</th>
<th>2021</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Mapping of tidal flats and salt marshes</strong></td>
<td><strong>Review of tidal flats and salt marshes map</strong></td>
</tr>
<tr>
<td>CEARAC Secretariat</td>
<td>Experts of member states</td>
</tr>
<tr>
<td>5,000 USD</td>
<td>3,000 USD X 3 countries</td>
</tr>
<tr>
<td><strong>Assessment of the change of tidal flats and salt marshes and its causes</strong></td>
<td><strong>Experts of member states</strong></td>
</tr>
<tr>
<td>Experts of member states</td>
<td>2,000 USD X 3 countries</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>20,000 USD</strong></td>
</tr>
</tbody>
</table>

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.

- **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 in Japan with support from the eDNA society

**Schedule and budget**

<table>
<thead>
<tr>
<th>2020</th>
<th>2021</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Development of analytical manual for e-DNA</strong></td>
<td><strong>Organizing a training course</strong></td>
</tr>
<tr>
<td>Experts of e-DNA</td>
<td>CEARAC Secretariat and LO</td>
</tr>
<tr>
<td>5,000 USD</td>
<td>20,000 USD</td>
</tr>
<tr>
<td><strong>Application of external budget (from APN?, PICES?)</strong></td>
<td><strong>Total</strong></td>
</tr>
<tr>
<td>CEARAC Secretariat</td>
<td>Depend on the scale of TC</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>21,000 USD</strong></td>
</tr>
</tbody>
</table>
Collaboration with other RACs and international organizations

- POGO (Partnership for Observation of the Global Ocean)
- PICES (North Pacific Marine Science Organization)
- BIO: The application of molecular approaches in marine ecology and fisheries science
- AP-NESS: 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

<table>
<thead>
<tr>
<th>Activity</th>
<th>Budget</th>
</tr>
</thead>
<tbody>
<tr>
<td>Assessment of distribution of tidal flats and salt marshes in the NOWPAP region</td>
<td>20,000 USD</td>
</tr>
<tr>
<td>Organizing a training course on e-DNA in the 2020-2021 biennium</td>
<td>25,000 USD</td>
</tr>
<tr>
<td>Updating HAB DB and RDB</td>
<td>9,000 USD</td>
</tr>
</tbody>
</table>

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

- Budget and human resources are limited. It is preferred to select one or two projects for the 2020-2021 biennium.
- Secretariat would like to propose to implement two projects: 1) Assessment of distribution of tidal flat 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.
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

Methodology development and case studies
Feasibility study to map seagrass in a large scale

A manual for mapping seagrass and seaweed bed with satellite images

Case studies in
- Swan Lake, China
- Toyama Bay and Nanao Bay, Japan
- Deukryang Bay, Korea
- Easter Marine Reserve of the PG Bay, Russia


1. Background

http://unseagrass.org/

• 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.

2. Objective

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

<table>
<thead>
<tr>
<th>Country</th>
<th>Selected sea area</th>
<th>Expert</th>
</tr>
</thead>
<tbody>
<tr>
<td>China</td>
<td>Swan Lake</td>
<td>Dr. Dingtian Yang</td>
</tr>
<tr>
<td>Japan</td>
<td>Toyama Bay (Himi area)</td>
<td>NPEC</td>
</tr>
<tr>
<td></td>
<td>Nanao Bay (West Bay)</td>
<td></td>
</tr>
<tr>
<td>Korea</td>
<td>Deukryang Bay</td>
<td>Dr. Jong-ku-ki Choi</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Dr. Keunyong Kim</td>
</tr>
<tr>
<td>Russia</td>
<td>Eastern Section of the Far Eastern Marine Reserve</td>
<td>Dr. Vasily Zharikov</td>
</tr>
</tbody>
</table>

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.

- Based on the Seagrass Watch manual (Mackenzie et al, 2001), conduct seagrass quadrat sampling in each seafloor substrates class in the flourishing period (spring – early summer) and decaying period (fall - winter).
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.

- 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

4. Expected outcome

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

5. Schedule

5.1. Timeline

- 17th CEARAC (Sep)
- 24th NOWPAP IGM (Dec)
- 19th CEARAC (Fall)
- 18th CEARAC (Spring)
- Organization of Expert Meeting and 2nd Intl. Workshop
- Preparation of booklet
- Report of workplan

Preparation of booklet for seagrass conservation in the NOWPAP region

6. Budget

<table>
<thead>
<tr>
<th>Task</th>
<th>Budget (US$)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Implementation of case studies of estimating seagrass blue carbon</td>
<td>12,000 (3,000 for each country)</td>
</tr>
<tr>
<td>Organizing an expert meeting back to back with an international workshop</td>
<td>15,000</td>
</tr>
<tr>
<td>Preparing of booklet for seagrass conservation in the NOWPAP region</td>
<td>T. B. D.</td>
</tr>
<tr>
<td>Total</td>
<td>27,000</td>
</tr>
</tbody>
</table>
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)
  1. L, N, M – CHL concentration level (low (< 5 mg m⁻³) & high (≥ 5 mg m⁻³))
  2. D, N, I – CHL trend (decreasing, no-trend increasing)

- 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
NEAT-based Eutrophication Assessment

**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
- Reevaluate 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

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

Proposed Budget

<table>
<thead>
<tr>
<th>Activities</th>
<th>Outsourcing*</th>
<th>$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Online Match-Up Tool</td>
<td>Outsourcing*</td>
<td>$4,000</td>
</tr>
<tr>
<td>Data Collection, Evaluation, and development of a seamless CHL product (evaluation data/results submitted in spreadsheet form)</td>
<td>NOWPAP member states (China, Japan*, Korea, Russia)</td>
<td>$12,000</td>
</tr>
<tr>
<td>(Interactive) NEAT monitoring web-map for the NOWPAP region</td>
<td>Outsourcing</td>
<td>$4,000</td>
</tr>
<tr>
<td>Total</td>
<td>$20,000</td>
<td></td>
</tr>
</tbody>
</table>

*CEARAC budget == $0

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!
- Спасибо за внимание!

YOC Algorithm

- $YOC_{\text{CHL}}(\text{mg/m}^2) = 10(b_0 + b_1 R_{rs412} + b_2 R_{rs490})$
- $R_{rs412} = \log \frac{R_{rs(443nm)}}{R_{rs(355nm)}} (\frac{R_{rs(412nm)}}{R_{rs(490nm)}})^{c_0}$
- $b_0, b_1, c_0$ - coefficients

[Siswanto et al. 2011]
**Proposed Timeline**

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

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

- **2020 (Q1-Q2)**
  - Online Match-Up Tool
  - 18th CEARAC FPM (Implementation plan rev.)
  - In situ data collection

- **2020 (Q3-Q4)**
  - Evaluation of new sensor CHL products
  - Compilation of evaluation results

- **2021 (Q1-Q3)**
  - Development of seamless satellite CHL product

- **2021 (Q4)**
  - 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; Past NOWPAP Training Courses on remote sensing data analysis

- 1st course in 2007
  22 trainees from China, Japan, Korea, Russia, India, Indonesia, and the Philippines
  77% of participants work in the related field

- 2nd course in 2008
  23 trainees from China, Korea, Russia, France, and Thailand

- 3rd course in 2011
  23 trainees from China, Korea, Japan, Russia, India, Indonesia, Thailand, and Vietnam

- 4th course in 2013
  35 trainees from China, Korea, Canada, Cameroon, and Oman

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 data 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

<table>
<thead>
<tr>
<th>Venue</th>
<th>University of Institute in a NOWPAP member state</th>
</tr>
</thead>
<tbody>
<tr>
<td>Time</td>
<td>Fall in 2020</td>
</tr>
<tr>
<td>Expected Participants</td>
<td>Young researchers, students, and participants national/local government officials (approx. 25 people)</td>
</tr>
<tr>
<td>Tuition</td>
<td>Free; however, participants are required to pay accommodation and transportation fee by themselves. Limited financial support is available</td>
</tr>
<tr>
<td>Period</td>
<td>7 days</td>
</tr>
</tbody>
</table>
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)

**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
- GEOTRACES
- GROUP ON EARTH OBSERVATIONS

NOWPAP Framework
- RCU and RACs

Private sector
- Google Earth Engine
- Avanza Maps

6. Schedule

- **2019**
  - 17th CEARAC FPM (Sep)
  - Announcement
  - Review and adoption of proposal

- **2020**
  - 24th NOWPAP IGM (Dec)
  - 18th CEARAC FPM (Spring)
  - Organization of the course (Fall)
  - Review of workplan
  - Screening and selection
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

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
  - 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)

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

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

Thank you very much!
Report on marine litter activities

17th NOWPAP CEARAC FPM
9-10 September 2019

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)

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

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.