



NOWPAP activities and cooperation with PICES

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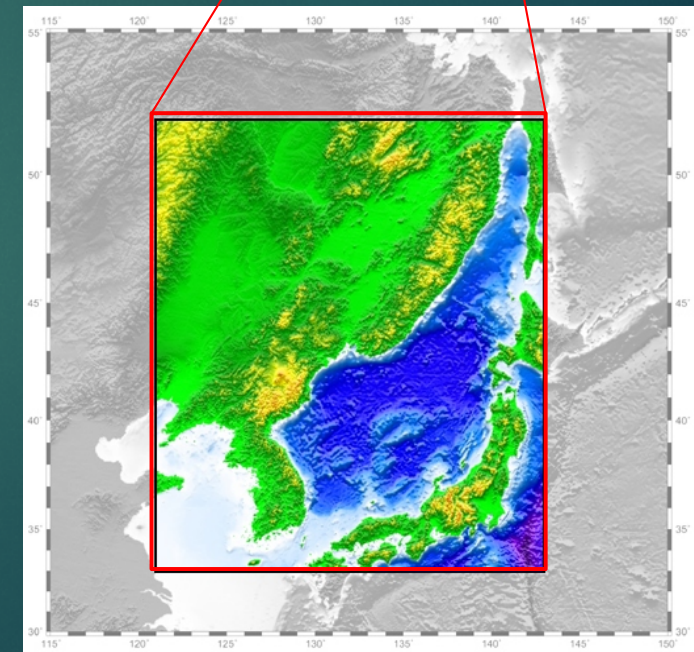
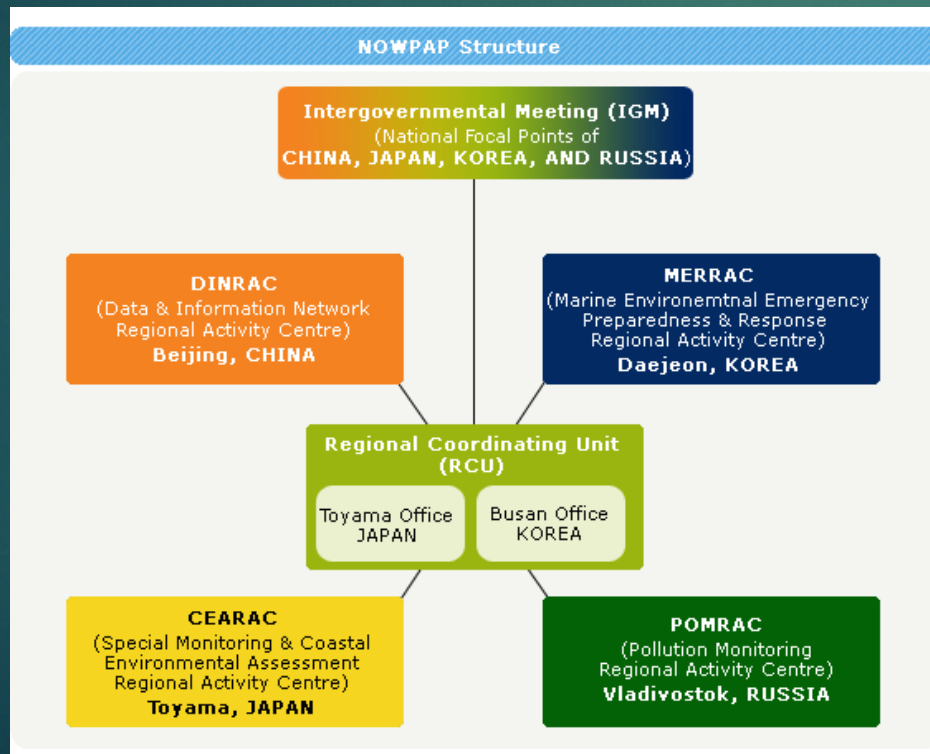
NORTHWEST PACIFIC ACTION PLAN (NOWPAP)

2019 PICES ANNUAL MEETING

W4: CIRCULATION, BIOGEOCHEMISTRY, ECOSYSTEM, AND
FISHERIES OF THE WESTERN NORTH PACIFIC MARGINAL SEAS:
PAST AND FUTURE OF CREAMS

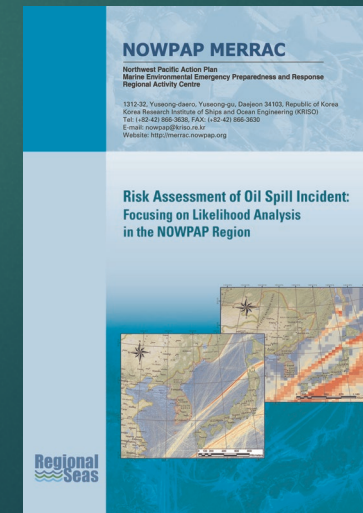
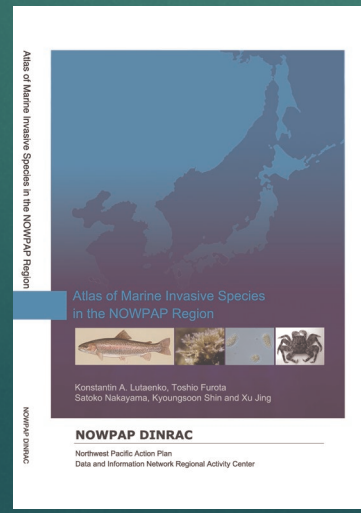
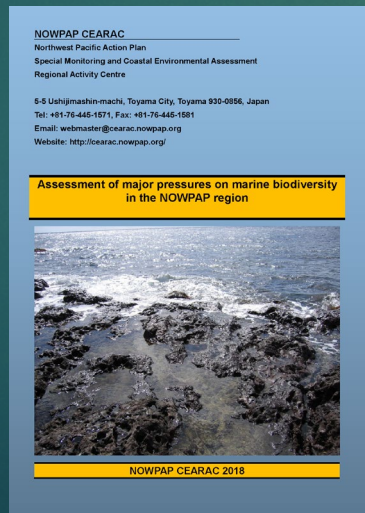
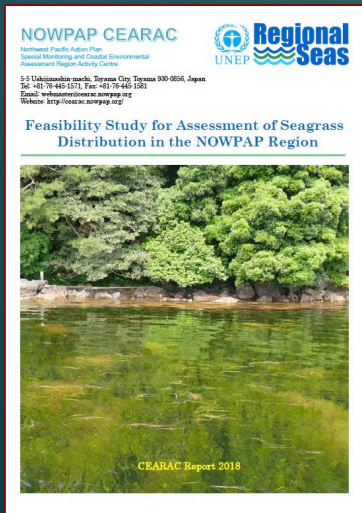
What is NOWPAP?

- ▶ Regional Seas Programme of UNEP
Northwest Pacific Action Plan
- ▶ Member states
China, Japan, Korea and Russia



NOWPAP's Vision: NOWPAP Medium-term strategy

- ▶ 1st MTS (2012-2017)
 - Integrated coastal and river basin management
 - Regular assessments of the state of marine environment
 - Pollution prevention and reduction
 - Biodiversity conservation (including alien invasive species)
 - Climate change impacts



NOWPAP's Vision: NOWPAP Medium-term strategy

- ▶ 2nd MTS (2018-2023)
 - Support ecosystem-based integrated coastal and river basin management
 - Assess status of the marine and coastal environment
 - Prevent and reduce land- and sea-based pollution
 - Conserve marine and coastal biodiversity



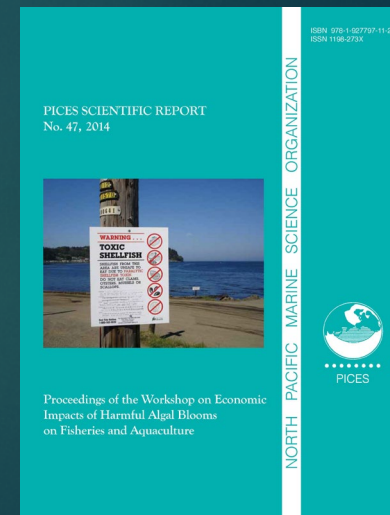
Partner groups

- ▶ S-HAB: Ecology of Harmful Algal Blooms in the North Pacific
- ▶ WG31: Emerging Topics in Marine Pollution
- ▶ WG35: Third North Pacific Ecosystem Status Report
- ▶ WG42: Indicators of Marine Plastic Pollution
- ▶ AP-CREAMS
- ▶ AP-NIS
- ▶ MEQ

History of PICES-NOWPAP Collaboration

- ▶ 2008 Joint Training Course: The second NOWPAP Training Course on RS Data Analysis
- ▶ 2009 Joint Session: Marine spatial planning in support of integrated management – tools, methods, and approaches
- ▶ 2011 Joint Workshop: Remote sensing techniques for HAB detection and monitoring
- ▶ 2011 Joint Training Course: The third NOWPAP Training Course on RS Data Analysis
- ▶ 2013 Joint Training Course; The fourth NOWPAP Training Course on RS Data Analysis
- ▶ 2014 Joint Session: Marine debris in the ocean: sources, transport, fate and effects of macro- and micro- plastics
- ▶ 2014 Joint Publication: Proceedings of the Workshop on Economic Impacts of Harmful Algal Blooms on Fisheries and Aquaculture
- ▶ 2015 Joint Session: Indicators of emerging pollution issue in the North Pacific Ocean
- ▶ 2015 Joint Workshop: Contrasting conditions for success of fish-killing flagellates in the western and eastern Pacific
- ▶ 2015 Joint Workshop: Identifying major threats to marine biodiversity and ecosystems in the North Pacific
- ▶ 2015 Joint Workshop: Marine Environment Emergencies: Detection, monitoring, response, and impacts
- ▶ 2017 Joint Workshop: Long-term changes in HAB occurrences in PICES nations; the Eastern vs. Western Pacific
- ▶ 2019 Joint Session: Environmental indicators of plastic pollution in the North Pacific
- ▶ 2019 Joint Workshop: GlobalHAB: Evaluating, reducing and mitigating the cost of HABs

2014-2015: Joint PICES-NOWPAP Study Group on Scientific Cooperation in the North Pacific Ocean



PICES-NOWPAP priority topics for joint collaboration

Category	Priority in last 5 years (2015-)
Harmful Algal Bloom	High
Marine Pollution	High
Non indigenous species	Middle
Ecosystem Status Report	Middle
Biodiversity	Middle
Eutrophication	Low
Hypoxia	Low

Current NOWPAP activities

- ▶ DINRAC (Data & Information Network RAC)
 - Marine Environmental Database
 - Endangered Species in the NOWPAP region
 - Sea Reclamation, Sea ports
- ▶ MERRAC (Marine Environmental Emergency Preparedness & Response RAC)
 - Response to oil and HNS spill incidents
- ▶ POMRAC (Pollution Monitoring RAC)
 - Integrated Coastal and River Basin Management
 - Ecological Quality Objectives

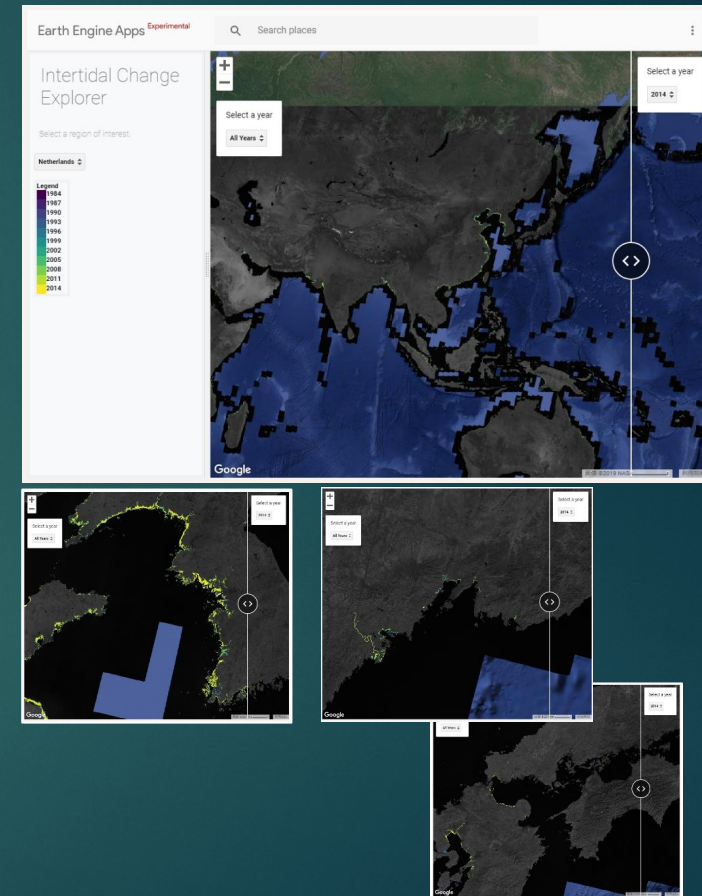
CEARAC activities 1: CEARAC MTS for Marine Biodiversity Conservation

Future high priority topics of CEARAC

- ▶ Conservation of coastal habitat including tidal flats/salt marshes
- ▶ Plankton species related to fisheries and aquaculture
- ▶ Environmental DNA

New projects for the 2020-2021 biennium

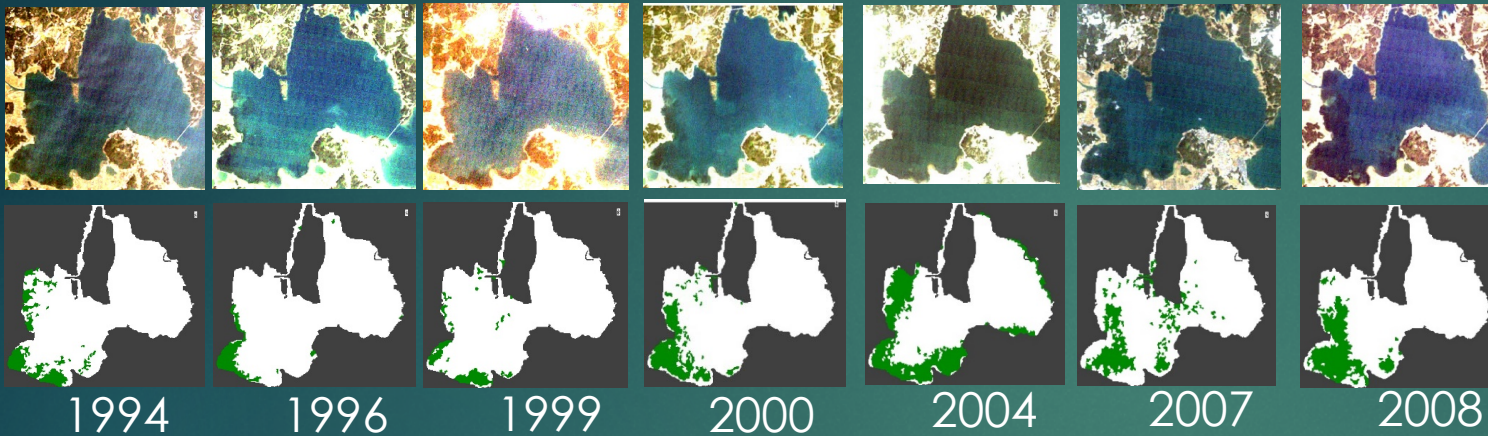
- ◆ Assessment of distribution of tidal flats and salt marshes in the NOWPAP region
- ◆ Organizing a training course on e-DNA analysis
- ◆ Updating HAB Database and HAB Reference Database



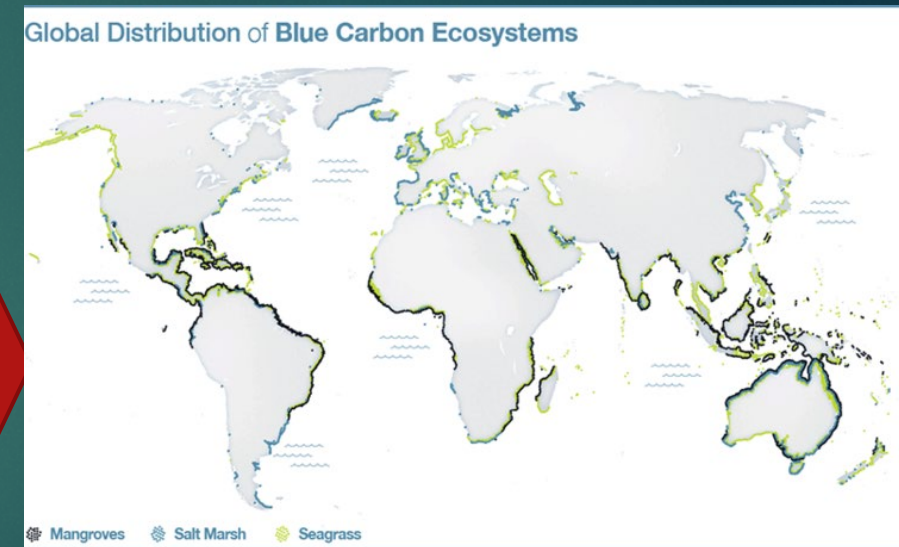
Murray et al (2019): The global distribution and trajectory of tidal flats, Nature
Intertidal area mapping tool with satellite images using GEE (<https://www.intertidal.app/>)

CEARAC activities 2: Seagrass mapping

CEARAC developed a manual for mapping seagrass and seaweed beds with satellite images (2015)

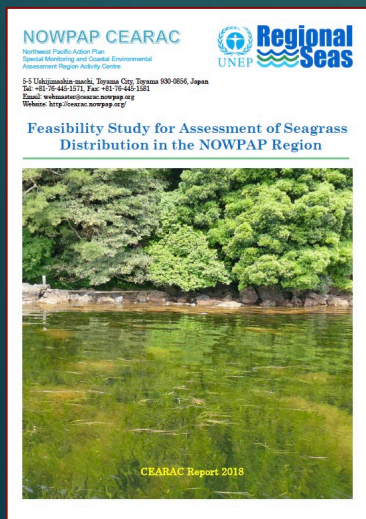


2020-2021 biennium



Convention International

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



CEARAC's activities 3: Eutrophication assessment

- Common procedures for eutrophication assessment with evaluation of land-based sources of nutrient in the NOWPAP region
- NOWPAP Eutrophication Assessment Tool (NEAT)

2020-2021 biennium

Satellite
SeaWiFS (1997-2007)
MERIS (2002-2012)
Aqua (2002-)



GOCI (2010-)
VIRRS (2012-)
Sentinel-3 (2016-)
GCOM-C (2017-)

The Common Procedures

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

(as of Aug 2013)

Screening procedure

Detection of eutrophication symptoms

symptom of eutrophication detected

Comprehensive procedure

Setting of assessment objectives
selection of assessment areas
collection of relevant information
....
setting of assessment criteria
setting of criteria for classifying the eutrophication status of the assessment areas/sub-areas

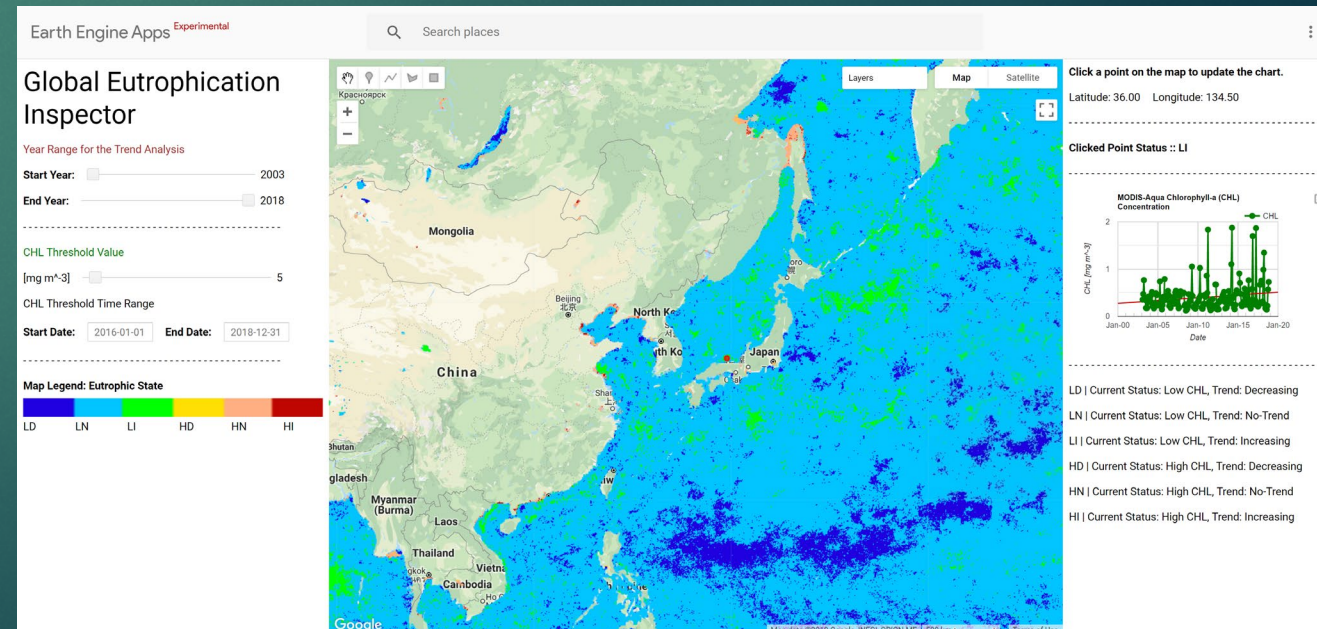
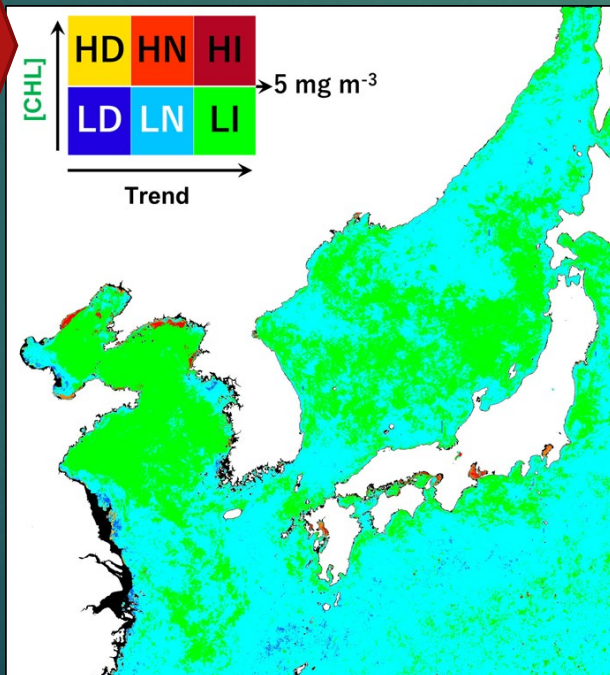
no symptom of eutrophication detected

Results and discussion

Classifying eutrophication status of the assessment areas/sub-areas
Review of the obtained assessment results by literatures

Conclusion/Recommendation

Eutrophication status of the assessment areas
Recommendations for future actions



Future collaboration between PICES (AP-CREAMS) and NOWPAP/CEARAC

Category	Priority in NOWPAP	Priority in PICES
Harmful Algal Bloom	High (CEARAC)	? (S-HAB)
Marine Pollution	High (NOWPAP)	?
Marine litter	High (NOWPAP)	? (WG42)
Eutrophication (hypoxia)	High (CEARAC)	?
Biodiversity	High (NOWPAP)	?
Coastal habitat	High (CEARAC)	?
Non indigenous species	Middle (?)	? AP-NIS
Ecosystem Status Report	High (NOWPAP)	? WG35
New issue? Climate change?	Middle (?)	?
New issue? Capacity building	High (CEARAC)	?

Proposal on future collaboration

- ▶ 5th NOWPAP Training Course on Remote Sensing Data Analysis in 2020
- Eutrophication Assessment (3 days)
- Mapping seagrass (3 days)
- Group work and presentation (1 day)

2nd course in 2008 in Korea



PICES is a supporter

3rd course in 2011 in Russia



PICES is a co-organizer
1 lecturer + 3 trainees
(10,000\$)

4th course in 2013 in China



PICES is a co-organizer
1 lecturer + 2 trainees
(3,000\$)