

Pilot assessment on the impacts of major threats to marine biodiversity in selected sea areas in the NOWPAP region

1. Background

At present, marine biodiversity faces various anthropogenic threats including land-based pollution, eutrophication, destructive fishing, loss of physical habitats, invasion of non-indigenous species and global climate change (UNEP, 2010). Since such threats are commonly found in various areas in the NOWPAP region (NOWPAP, 2010), “Medium-term Strategy 2012-2017” was developed in 2012 to address them, in which “regular assessments of the state of the marine environment” and “biodiversity conservation” are stated as major themes with others in the NOWPAP region. In particular, regarding marine biodiversity conservation, “Regional Action Plan on marine biodiversity conservation” is planned to be developed by 2017.

CEARAC is responsible for coordination of regional activities for assessment of the state of the marine and coastal environment. In view of this, CEARAC has developed “Procedures for assessment of eutrophication status including evaluation of land-based sources of nutrients for the NOWPAP region (the NOWPAP Common Procedure)” and applied it in some selected case study areas in the region. In addition, CEARAC tried to develop a new marine environmental assessment method for marine biodiversity conservation in 2009 based on Toyama Bay Pilot Study. However, there exist gaps on data availability among the member states; therefore, it is required to set common assessment indicators based on the data availability in the member states.

As the first step, CEARAC focused our attention on marine protected areas (MPAs) in the NOWPAP region, which are established in respective member states under their national regulations, and implemented an activity for preparing a regional report on monitoring and management status of MPAs in the in the 2012-2013 biennium. Moreover, in order to explore possible future NOWPAP/CEARAC activities on marine biodiversity, CEARAC held a joint workshop with North-East Asian Subregional Programme for Environmental Cooperation (NEASPEC) in March 2013 and an expert meeting in August 2013. At these occasions, participants provided their views on potential CEARAC activities:

- 1) Developing a new assessment tool for marine biodiversity conservation in the NOWPAP region, based on data availability in the member states;
- 2) Selecting assessment indicators based on characteristics of the NOWPAP region;
- 3) Preparing a workplan for the 2014-2015 biennium which meets 1 and 2 above; and
- 4) Strengthening collaboration with relevant organizations

Taking into consideration of these recommendations, CEARAC proposed a new activity “Pilot assessment on the impacts of major threats to marine biodiversity in selected sea areas in the NOWPAP region” at the 11th CEARAC FPM (September 2013), and it was agreed to propose to the 18th NOWPAP IGM (December 2013). This activity was approved by correspondence by the member states in April 2014.

2. Objective

The objective of this project is to assess and understand the impacts of major threats (eutrophication, non-indigenous species and habitat alteration) on marine biodiversity in the NOWPAP region. The result of this project will be summarized as a regional report and used in order to identify possible components, data requirements and methodologies for future development of a new assessment tool for marine biodiversity conservation.

3. Tasks

(1) Selection of target sea areas for pilot assessment

Based on data availability on eutrophication, non-indigenous species and habitat alteration, each member state selects sea areas from the areas which are significant for marine biodiversity conservation to conduct a pilot assessment. For selection, each member state is encouraged to select wider sea areas as much as possible, not a bay, in order to contribute to the assessment to be implemented in the entire NOWPAP region in the future.

>Potential areas: Around Qingdao Peninsula in China, Northern coast of Kyushu in Japan, Southern coast of Korea and the Peter the Great Bay in Russia

Note: The member states are encouraged to select one sea area where data on eutrophication, non-indigenous species and habitat alteration have been obtained. However, if data/information on all threats is not available in one sea area, several sea areas can be selected for a pilot assessment.

(2) Collection of available data and development of data inventory

Contracted experts collect relevant data and information for pilot assessments as much as possible. The collected data/information can be the ones monitored by central/local governments as well as the ones research institutes have obtained. The collected data are summarized in a data inventory as shown in Table 1.

Note: If there are no data available on some items which is recognized as necessary indicators to understand the status of threat, the column of the items should be remained in the inventory with mentioning 'non-data available'.

For data collection, existing data/information in reports such as "Integrated Report on Eutrophication Assessment in Selected Sea Areas in the NOWPAP Region: Evaluation of the NOWPAP Common Procedure" and "Monitoring and management of Marine Protected Areas in the NOWPAP region" prepared by CEARAC, and "Annual summary of major marine environmental data available in the NOWPAP region" and "The Atlas of Marine Invasive Species in the NOWPAP Region" developed by DINRAC and "State of the Marine Environment in the NOWPAP Region: Second edition" to be published by POMRAC should be referred.

(3) Implementation of pilot assessment

1) Selection of assessment indicators

Based on available data, each expert decides assessment indicators. The selected indicators should include parameters which directly indicate trends/status of eutrophication, non-indigenous species and habitat alteration as well as the ones related to the three threats indirectly. In addition, indicators on marine biodiversity and/or marine ecosystem services will be selected in order to understand impacts of three threats. Example indicators are shown in Table 2.

Note: Indicators which are not related to impacts on the three threats but potentially important for developing a new assessment tool are encouraged to be included in the inventory.

2) Implementation of pilot assessment

Pilot assessments are conducted by the experts in order to understand the current status of each threat and their impacts on marine biodiversity (Figure 1). The assessment is expected to help:

a. Understand the current status of three threats;

(Using assessment indicators, the expert judge whether each threat is problematic or not in the target sea area(s). If any threat is problematic, details of the problem should be explained.)

b. Identify causes of threat(s)

(Cause(s) of problem(s) on each threat should be investigated using available data and information.)

c. Forecast each threat; and

(If the current status of any threat is non-problematic, its change in the future should be forecasted using trend assessment of available data.)

d. Understand impacts of threats on marine biodiversity and/or marine ecosystem services

(Influence of each threat to marine biodiversity and/or marine ecosystem services should be clarified using available data and information.)

Note: This pilot assessment will be used as basic information in developing a new assessment tool in the future. Therefore, the experts are encouraged to collect available data and information including relevant information on threats and causes as much as possible.

*For reference, draft procedures for pilot assessment are attached as Annex.

3) Preparation of national report

Results of the pilot assessments are summarized as a national report in each member state. It is expected that, in addition to the assessment results, information on potential countermeasure for resolving problems of threat is included in the report. The national report will be submitted to CEARAC with a data inventory of collected available data.

(4) Organization of workshop

CEARAC will organize a workshop in order to review the pilot assessment conducted in the member states. In addition to review the four national reports, a new NOWPAP assessment tool will be discussed in the workshop, based on the results of the pilot assessments and data availability in the member state.

(5) Preparation of regional report on major threats to marine biodiversity in the NOWPAP region

A regional report on major threats to marine biodiversity in the NOWPAP region will be published based on the national reports of the member states. In this report, the current status of three major threats will be explained and recommendations on a new assessment tool for the NOWPAP region will be introduced.

➤ Draft contents of regional report

1. Introduction
2. Status of eutrophication in the NOWPAP region
3. Status of non-indigenous species in the NOWPAP region
4. Status of habitat alteration in the NOWPAP region
5. Influence of major threats to marine biodiversity in the NOWPAP region
6. New assessment tool for marine biodiversity conservation for the NOWPAP region

4. Schedule

Time		Actions	Main Body
2014	April	The first Extraordinary IGM Approval of Program of Works and budget for the 2014-2015 biennium	NOWPAP National FPs
	2-3 July	12 th CEARAC FPM - Review and approval of workplan - Nomination of experts - Selection of target sea areas	CEARAC FPs and Secretariat
	July	Contracting MoU with experts	Experts and Secretariat
	Aug- Feb 2015	Implementation of pilot assessments	Experts
2015	March	Submission of national reports on pilot assessments from member states	Experts
	April	Workshop - Review of pilot assessment results - Discussion on a new assessment tool	Experts and Secretariat
	Q2-Q3	Preparation of a regional report	Secretariat
	Q3	Expert meeting - Review of a draft regional report - Discussions on next steps	Experts and Secretariat
	Q3	13 th CEARAC FPM - Review of the regional report - Approval of workplan for the 2016-2017 biennium	CEARAC FPs and Secretariat

5. Budget

Task	Budget (US\$)	
Organization of workshop	10,000	
Preparation of a regional report on the impacts of major threats on marine biodiversity in the NOWPAP region	2,000	
Implementation of pilot assessment	China	3,000
	Japan	3,000
	Korea	3,000
	Russia	3,000
Total	24,000	

Table 2 Potential assessment indicators

Threats	Indicators for impact assessment			Common indicators for marine biodiversity assessment
	Direct indicators	Indirect indicators	Indicators on influence	
Eutrophication (Chemical threat)	<ul style="list-style-type: none"> - T-N, T-P - River input 	<ul style="list-style-type: none"> - Aquaculture with feed - Use of fertilizer - Land use - Population 	<ul style="list-style-type: none"> - Water quality (transparency, DO etc.) - Bottom environment (DO, hydrogen sulfide etc.) - Red tide occurrence - Dissolved Oxygen (hypoxia) 	<ul style="list-style-type: none"> - Ecosystem service - Socio-economic value <ul style="list-style-type: none"> >fish catches >Seaweed/Seagrass area >Use of sea surface - Marine biodiversity <ul style="list-style-type: none"> >composition of marine lives
Habitat alteration (Physical threat)	<ul style="list-style-type: none"> - Coastal structure - Natural/artificial coast line - Landfilled area - Dredging - Warm water discharge 	<ul style="list-style-type: none"> - Number of dam (sediment supply through rivers) 	<ul style="list-style-type: none"> - Water quality (water temperature, salinity, DO etc.) - Bottom environment (grain size, DO etc.) 	
Non indigenous species (Biological threat)	<ul style="list-style-type: none"> - Number of NIS reported - Number of NIS established 	<ul style="list-style-type: none"> - Aquaculture of NIS - Foreign ships (ballast water) 	<ul style="list-style-type: none"> - Distribution of IS - Endangered species 	

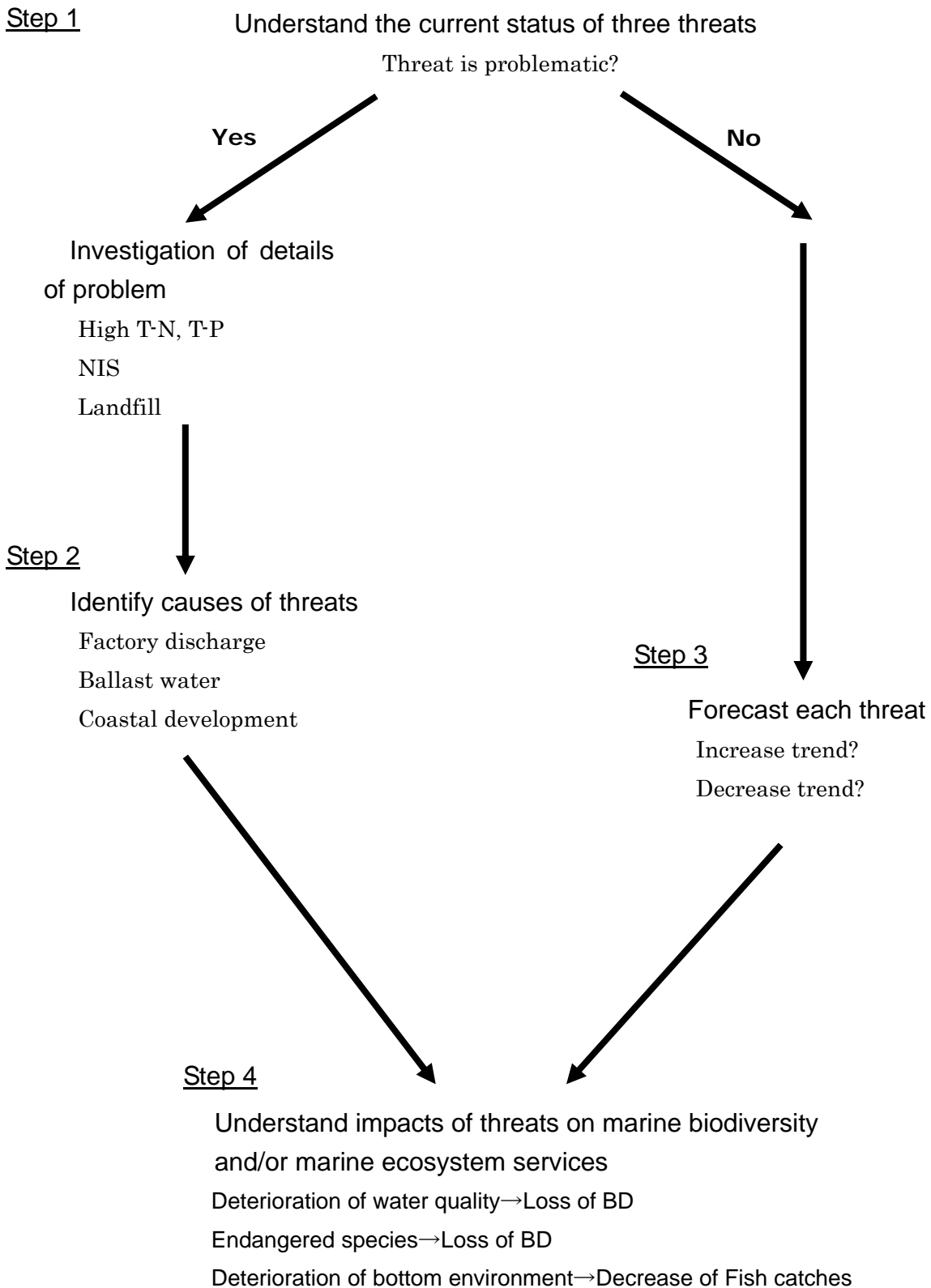
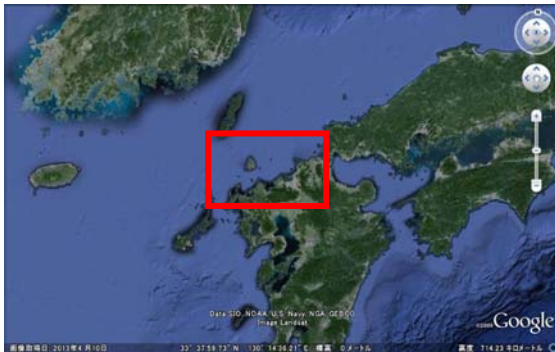


Fig. 1 Procedures for pilot assessment

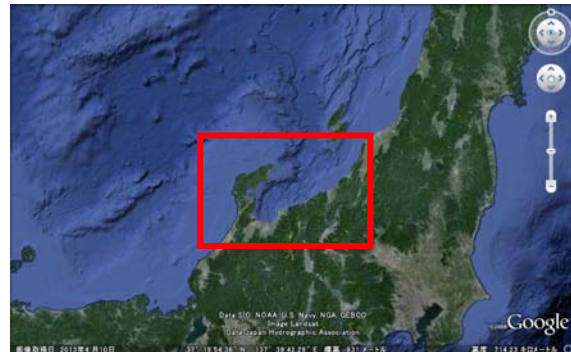
**Draft Procedures for pilot assessment
(in case of Japan)**

1. Selection of target sea area(s) for pilot assessment

Northern sea area of Kyushu and the sea area around Hokuriku region are selected as target areas based on data availability on eutrophication, non-indigenous species (NIS), habitat alteration and marine biodiversity.



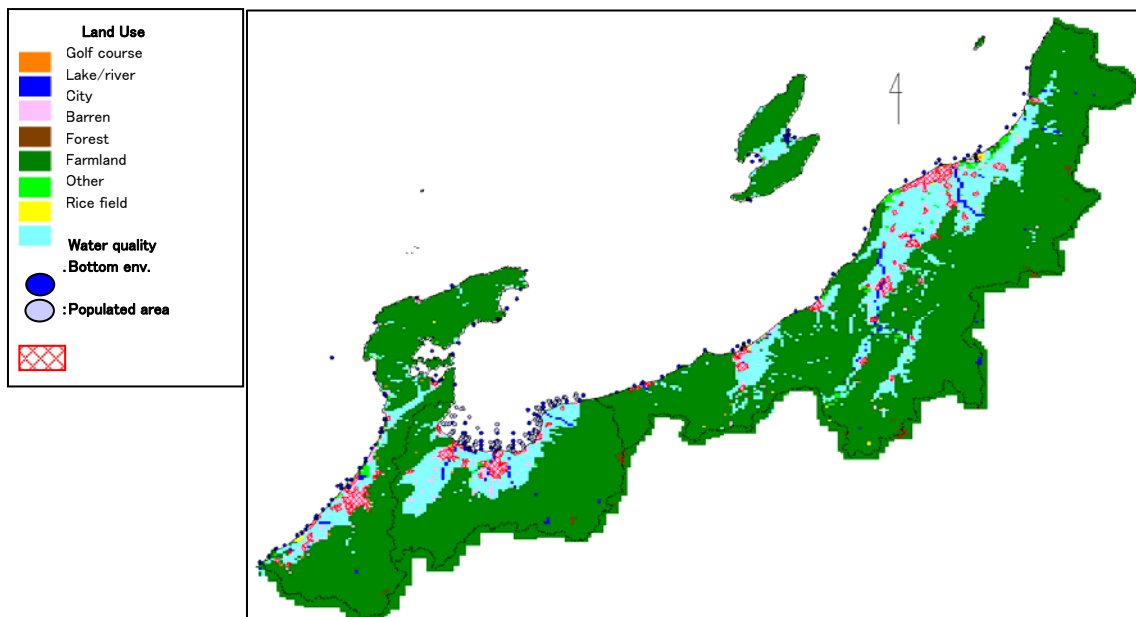
Northern sea area of Kyushu



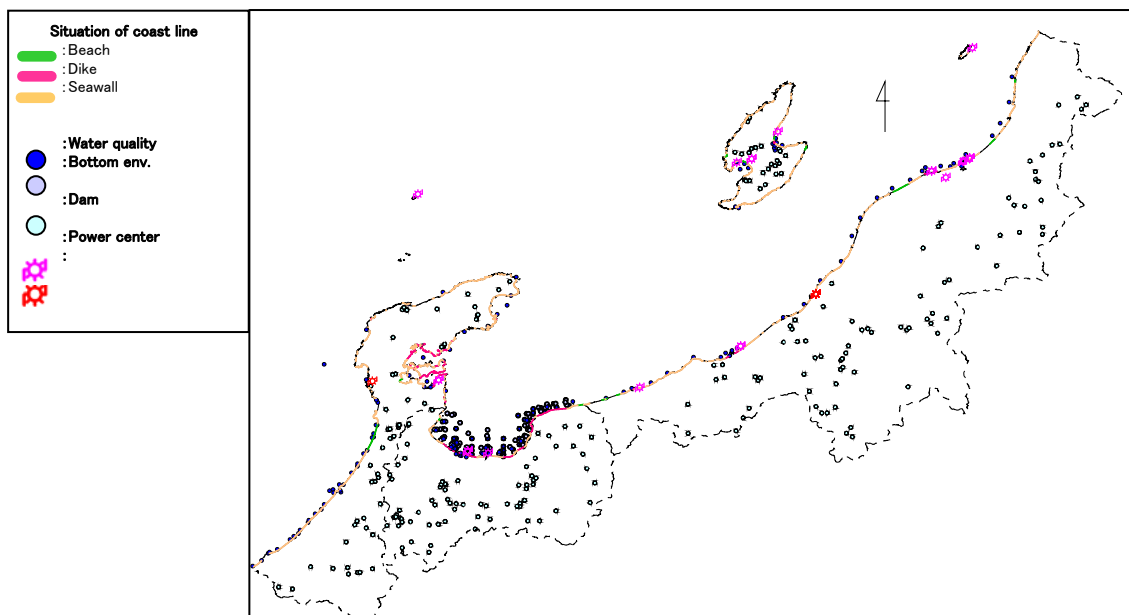
Sea area around Hokuriku region

2. Collection of available data and selection of assessment indicators

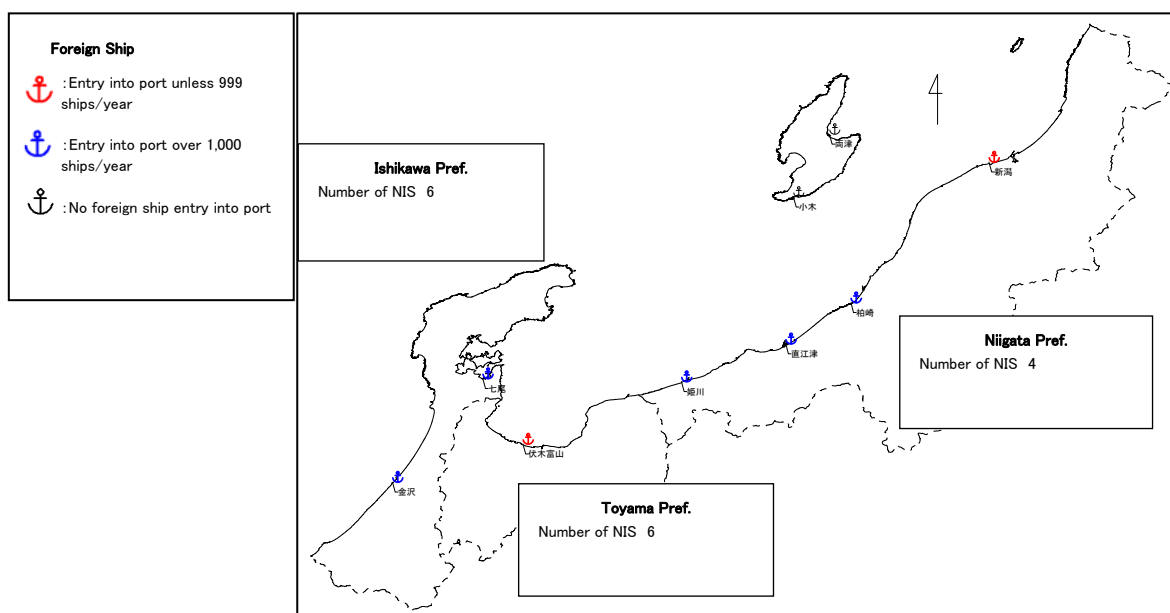
Available data in Japan are collected from various kinds of database managed by central and local governments. All collected data are summarized into a data inventory in Table 1. Following maps indicate available data on eutrophication, non-indigenous species and habitat alteration in the target sea area around Hokuriku region. Based on the available data in each target sea area, assessment indicators are decided.



Available data on eutrophication in sea area around Hokuriku region



Available data on habitat alteration in sea area around Hokuriku region



Available data on non-indigenous species in sea area around Hokuriku region

3. Implementation of pilot assessment

Step 1: Understanding the current status of three threats

Based on the standards set by national laws and other relevant regulations, the current status of each selected indicator is assessed. If reference values are not set by central/local governments, existing scientific papers and reports should be referred.

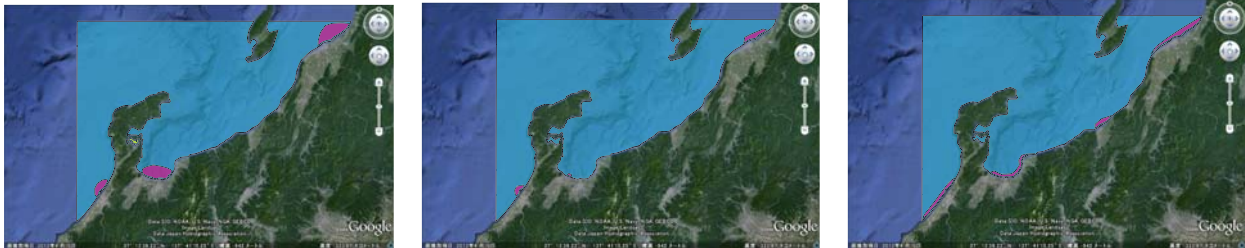


Image of pilot assessment of three threats
(from left: eutrophication, NIS, and habitat alteration)

Step 2: Identifying causes of threats to marine biodiversity

Causes of threats are investigated using available data/information, scientific paper and reports. Data on aquaculture, fertilizer, factory discharge, land use, population density (related to eutrophication), aquaculture of foreign species, foreign ships and ballast water (related to NIS), and coastal development and construction of dam and others are analyzed and identify possible causes of threats.

Step 3: Forecasting threats in target sea area(s)

If any threat is judged as ‘non-problematic’ in the current status assessment, past and future trend of it is analyzed in order to understand future risks of the threat. Please note that this trend assessment is implemented only in case long-term data are available in target sea areas.

Step 4: Assessing impacts of threats on marine biodiversity and/or marine ecosystem services

If collected data is available in consecutive years, yearly changes are also analyzed to understand impacts on marine biodiversity.