

# Integration of marine spatial data in Japan: "Japan's Marine Cadastre"

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# Outline

- Framework of Japanese Ocean Policy
- Integration of Marine-related Data and Information
- Marine Cadastre in Japan
- Future Issues
- Summary



# Framework of Japanese Ocean Policy

# Basic Act on Ocean Policy

## ○International legal framework related to oceans:

UNCLOS, Agenda 21, Convention on Biological Diversity, etc.

## ○Various challenges at sea around Japan :

marine pollution, depletion of fisheries resources, coastal erosion, serious maritime accidents

## ○Increasing role of the oceans for all mankind :

security of foods, ocean resources and energy, cargo transport, global environment



Need to **establish executive structure** and  
to **promote comprehensive and integrated approach**  
to the ocean issues

## Basic Act on Ocean Policy

Enactment : 20 April, 2007

Enforcement : 20 July, 2007



# Structure to execute the Act

## Government

### Headquarters for Ocean Policy

Director-General: **Prime Minister**

Vice-Director-General: **Chief Cabinet Secretary**  
**Minister for Ocean Policy**

Members: **All Ministers**



**Councilor's meeting**  
Key figures  
with deep insight



Cabinet Secretariat

**Secretariat (SHOP)**

**Ministries**

Implementing the measures

**1<sup>st</sup> Basic Plan on Ocean Policy** (approved by the Cabinet in March 2008)

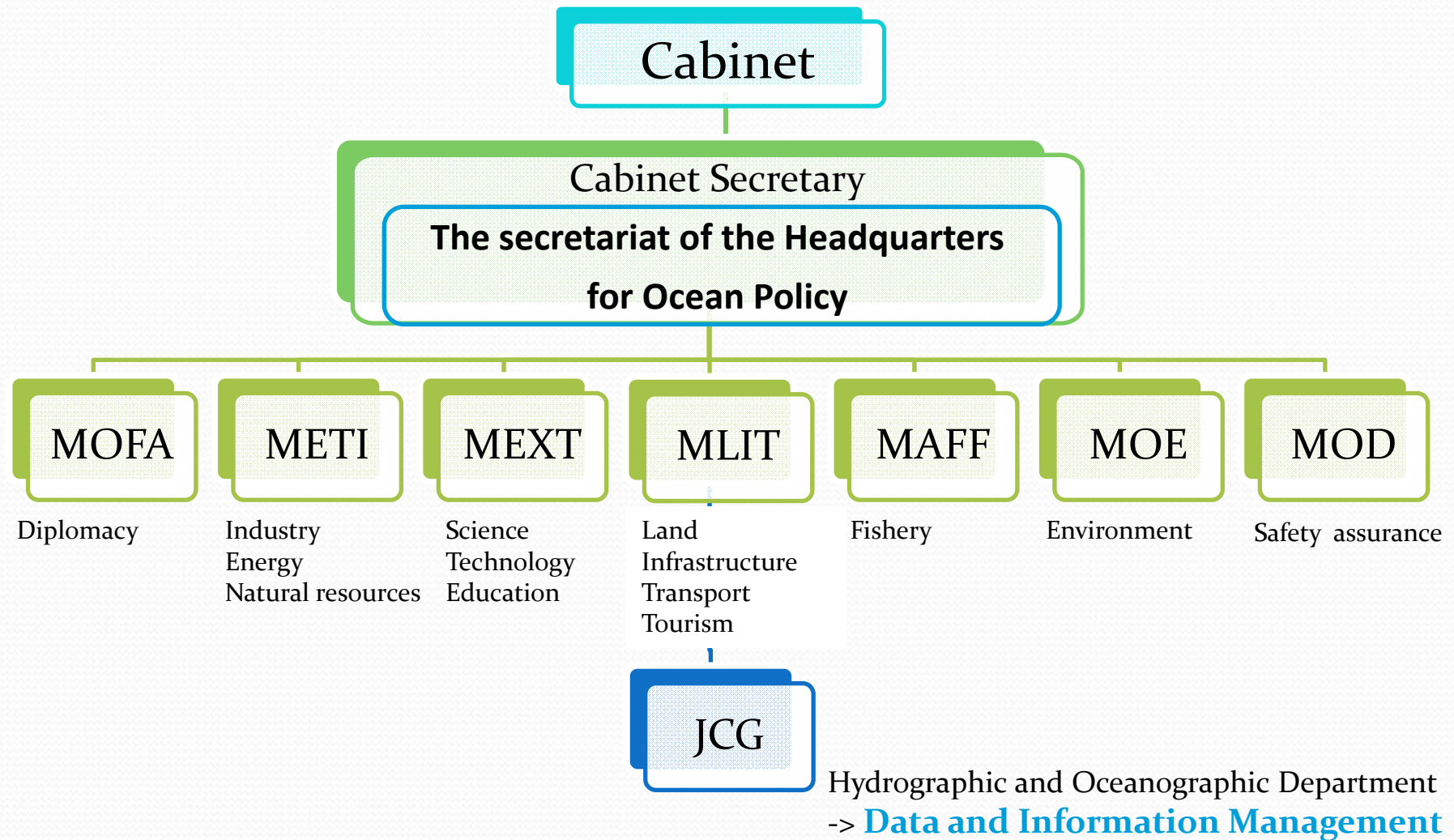
Period of the Plan Five years (from FY2008 to FY2012)

**2<sup>nd</sup> (present) Basic Plan on Ocean Policy** (approved by the Cabinet in April 2013)

Period of the Plan Five years (from FY2013 to FY2017)

- 4 visions as an oceanic state
- 12 basic measures that the central government shall implement

# Ministries related to ocean policy





# Integration of Marine-related Data and Information

# 1<sup>st</sup> Basic Plan on Ocean Policy (2008-2012)

## 2.6.(3) Integration of marine-related information

- Marine-related information is publicized **separately by respective agencies** depending on their own purposes.
- **It is troublesome to search** necessary information on specific marine zones or of specific types.
- **Establish a system** to comprehensively manage and provide the pieces of information now scattered in respective agencies.
- In the process, utilize the efforts made so far by agencies such as the **Japan Oceanographic Data Center\***

\* JODC: Established in 1965 in the Hydrographic Department, JCG



# How to integrate the marine-related information

- 1<sup>st</sup> Step (2008~)
  - To establish the meta-data search system in Japan  
“**Marine Information Clearing House**” (launched in 2010)
- 2<sup>nd</sup> Step (2010~)
  - To establish the WEB-GIS system for the Marine spacial information, which is managed by JCG  
“**Marine Cadastre**” (launched in 2012)

# Stepwise integration of marine-related data and information

**Integration of  
meta-data**

**Clearing-House**

Moderate cooperation  
among related  
organizations

**Integration of  
information into GIS**

**Marine Cadastre**

High-level cooperation  
among related  
organizations



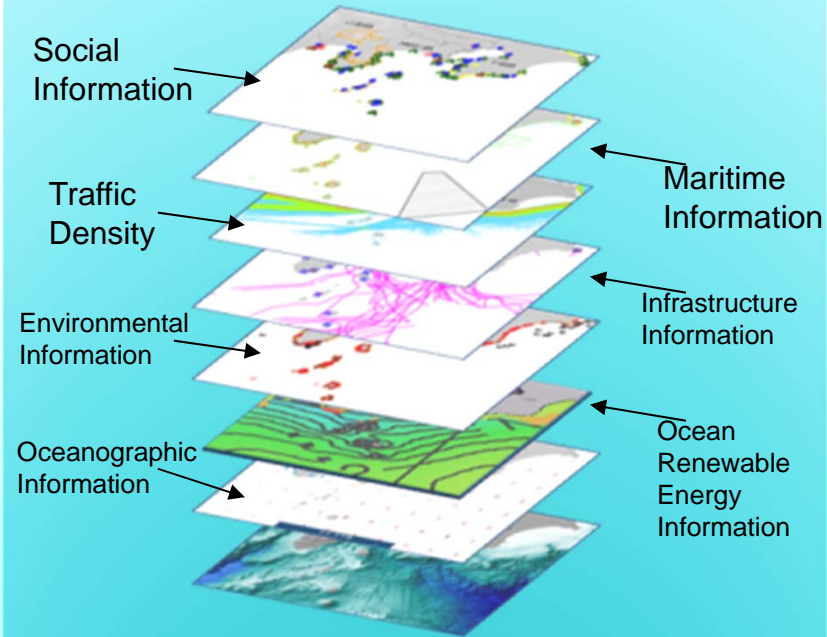


# Marine Cadastre in Japan

# Marine Cadastre in Japan

established and managed by JCG

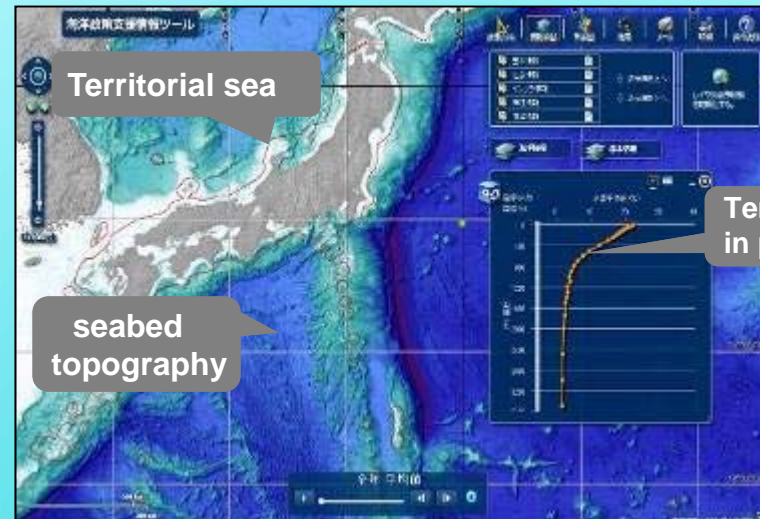
## Marine-related information



Users choose information and overlap them onto a map.

<http://www.kaiyoudaichou.go.jp/>

## Snapshot of Marine Cadastre



# Information items in Marine Cadastre

**More than 100 items are available**

- **Social activity information**
  - Traffic volume, historic sites, natural treasures, fishery rights area, traffic route, fishery port area, U.S military exercises area, national park area,...
- **Infrastructure information**
  - Thermal power station, seabed pipes, cables, lights, Coast Guard offices,...
- **Marine environmental information**
  - Sunken vessels, obstructions, birds habitats, turtles spawn area, beach, coastal shoreline sensitivity...
- **Oceanographic information**
  - Bathymetric data, temperature, salinity, currents, contour line of them

# Marine Cadastre: screen shots

Traffic routes, volume  
Sunken vessels

The screenshot displays the Marine Cadastre web application interface. The browser address bar shows the URL: <http://www.kaiyoudaichou.go.jp/KaiyowebGIS/>. The page title is "海洋台帳 - WebGISで...".

The main interface includes a navigation menu on the left with the following items:

- 海洋台帳 Marine Cadastre
- 海事情報
- 船舶通航量
- 情報項目

The map shows a coastal area with a color-coded traffic volume overlay. A legend on the left indicates the volume ranges (ships per month):

- 301~ (Red)
- 151~300 (Orange)
- 31~150 (Yellow)
- 6~30 (Blue)

A scale bar shows 10km and 6nm. The coordinates at the bottom left are 35° 30' 46.486"N 140° 42' 0.372"E.

The "船舶通航量" popup window displays the following information:

- 船舶通航量
- 緯度: 35.25'15"N ~ 35.25'30"N
- 経度: 139.43'15"E ~ 139.43'30"E
- 2012年1月

The popup contains two pie charts:

**Chart 1: Nationality**

国籍	割合
日本船	71.3%
外国船	28.7%
国籍不明	0%

**Chart 2: Length**

長さ	割合
全長100m未満	60.6%
全長200m未満	26.7%
全長200m以上	11.6%
長さ不明	1.1%

船舶通航量: 449隻

Additional text in the popup includes "アンケートにご協力ください", "規約", "情報項目一覧", "ご意見・お問い合わせ", "印刷", and "操作説明".

A tooltip on the map says "マップ上をクリックして下さい".

At the bottom right, there is a copyright notice: "海上保安庁 | 背景図: 海上保安庁, 国土地理院承認番号平24情使、第916号 | © Esri/japan".

# Marine Cadastre: screen shots

National park area  
Turtles spawn area  
Coastal shoreline sensitivity

The screenshot displays the Marine Cadastre WebGIS interface. At the top, the browser address bar shows the URL <http://www.kaiyoudaichou.go.jp/KaiyowebGIS/>. The main header features the title "海洋台帳 Marine Cadastre" and navigation links for "アンケートにご協力ください", "規約", "情報項目一覧", and "ご意見・お問い合わせ". A toolbar below the header includes icons for "計測/メモ", "情報項目", "背景図", "地域検索", "検索", "共有", "印刷", and "操作説明". On the left side, there are vertical navigation buttons for "社会情報", "海洋情報", "背景図", and "環境情報". The central map area shows a topographic map of the Ise Peninsula with several overlays: a yellow grid, a green outline representing the national park area, and red circular markers indicating turtle spawn areas. A popup window titled "国定公園区域" (National Park Area) is open, displaying the following information:  
名称: 室戸阿南海岸  
読み: むろとあなにかいがん  
所在地: 徳島県阿南市~海部郡海陽町、高知県安芸郡東洋町~室戸市  
データ年度: H23(2011)  
作成機関: 海上保安庁  
出典・情報提供者: 環境省  
指定年月日: 1964(S39)/06/01  
A "ズーム" (Zoom) button is located at the bottom of the popup. At the bottom left of the map, the coordinates are shown as 33° 47' 22.065" N 134° 42' 11.299" E. The bottom right corner contains the footer text: "海上保安庁 | 背景図: 海上保安庁, 国土地理院承認番号平24情使、第916号, (C)Esri japan".

# Marine Cadastre: screen shots

Marine energy potential map (wave height)

The screenshot displays the Marine Cadastre WebGIS interface. The browser address bar shows the URL: <http://www.kaiyoudaichou.go.jp/KaiyowebGIS/>. The page title is "海洋台帳 Marine Cadastre".

The main map area shows a contour map of wave height potential along the Japanese coast. The map is color-coded from blue (low potential) to yellow (high potential). Contour lines are labeled with values such as 0.8, 1.2, and 1.6. A scale bar indicates 400km and 200nm. The map coordinates are 38° 10' 52.042"N 144° 36' 44.875"E.

The left sidebar contains navigation and information controls. A panel titled "海洋再生可能エネルギー情報" (Marine Renewable Energy Information) is open, showing a list of data layers with checkboxes:

- 海洋再生可能エネルギー情報
- 再生可能エネルギーに関するゾーニング基礎情報
- 海洋エネルギー・ポテンシャルの把握に係る業務情報
  - 波高[m](沿岸波浪実況データ: 1年平均)
  - 周期[s](沿岸波浪実況データ: 1年平均)
  - 波高[m](沿岸波浪予報データ: 1年平均)
  - 周期[s](沿岸波浪予報データ: 1年平均)
  - 波高[m](沿岸波浪予報データ: 3年平均)
  - 周期[s](沿岸波浪予報データ: 3年平均)
  - 波力エネルギー密度[kWm] (沿岸波浪実況: 1年)
  - 波力エネルギー密度[kWm] (沿岸波浪予報: 1年)
  - 波力エネルギー密度[kWm] (沿岸波浪予報: 3年)
  - 使用データの海洋温度差[°C] (5年平均)
  - 海洋温度差エネルギー密度[Wthm2] (5年平均)



# Marine Cadastre: screen shots

Marine energy potential map (wind)

The screenshot displays the Marine Cadastre WebGIS interface. The browser address bar shows the URL <http://www.kaiyoudaichou.go.jp/KaiyowebGIS/>. The page title is "海洋台帳 - WebGISで...". The main header includes the logo "海洋台帳 Marine Cadastre" and navigation links: "アンケートにご協力ください", "規約", "情報項目一覧", and "ご意見・お問い合わせ". A toolbar contains icons for "計測/メモ", "情報項目", "背景図", "地域検索", "検索", "共有", "印刷", and "操作説明". On the left, there are buttons for "海洋情報", "情報項目", "海洋再生可能エネルギー情報", and "海事情報". The central map shows a wind energy potential map of Japan, with a color scale from green (low) to red (high). A scale bar indicates 400km and 200nm. The coordinates are 38° 45' 42.162"N 119° 46' 20.558"E. A legend for "1月 平均値" (January Average) shows a scale from 0 to 12. The footer includes the text "海上保安庁 | 背景図: 海上保安庁, 国土地理院承認番号平24情使、第916号, (C)Esri japan".

# Marine Cadastre: screen shots

Tidal stations  
(linked to real-time data)

The screenshot shows the Marine Cadastre WebGIS interface. The browser address bar displays <http://www.kaiyoudaichou.go.jp/KaiyowebGIS/>. The page title is "海洋台帳 - WebGISで..." and the current page is "東京[気象庁]の潮位の実況". The interface includes a navigation menu with "計測/メモ", "情報項目", "背景図", "地域検索", "検索", "共有", "印刷", and "操作説明". A toolbar on the left provides navigation controls. The map shows the Kanto region of Japan with numerous orange tidal station icons. A pop-up window titled "潮汐情報(リアルタイム)" provides the following details:

- 観測地点名: 東京
- URL: リアルタイム
- 所管機関名: 気象庁
- 所在地: 東京都 中央区 晴海5丁目
- 観測の方式: 電波式
- 球分体基準(cm): 530.2
- 標高(cm): 341.8
- 観測基準面(cm): -188.4
- 備考:
  - 出典・情報提供者: 国土交通省防災情報提供センターHP
  - データ年度: H25(2013)

The bottom of the page includes a scale bar (60km), coordinates (1.205°N 138° 20' 41.154"E), and a background map attribution: "背景図: 海上保安庁, 国土地理院承認番号平24情使、第916号, (C) Esri japan".

# Marine Cadastre in 2<sup>nd</sup> Basic Plan on Ocean Policy (2013-present)

Integration of marine-related information is picked up as  
“Measures to be Intensively Promoted (1-2)” .

## 1-3.(3)

- Take measures including improvement and strengthening of the Marine Information Clearing House and the **Marine Cadastre** and development of systems for analyzing and visualizing data **in order to further increase use of marine information.**

## 2-1.(2)

- **To facilitate the use of marine renewable energy**, take initiatives to improve **Marine Cadastre** and strengthen their functions.

## 2-6.(2)

- From a perspective of encourage sharing of marine-related information, **improve** the **Marine Cadastre**, in which marine-related information is visualized, selected and merged on geographic maps, and **enhance its functions.**

# Stepwise integration of marine-related data and information

**Integration of meta-data**

**Clearing-House**

Moderate cooperation among related organizations

**Integration of information into GIS**

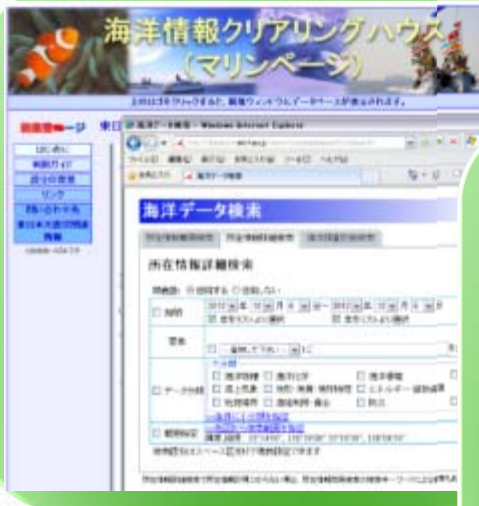
**Marine Cadastre**

High-level cooperation among related organizations

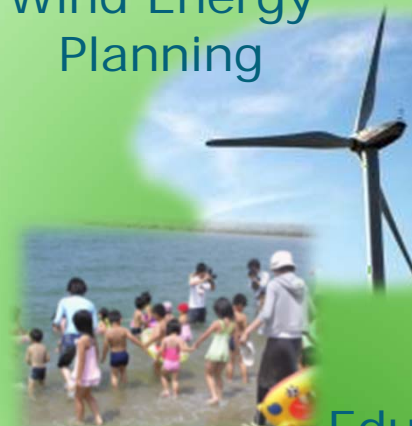
**Utilization of the information**

**Marine Cadastre**

utilized for regulation or coordination on the use of maritime area



**Wind Energy Planning**



**Education**



# Future Issues

# Future issues

- Further improvements and utilization of the Marine Cadastre
- Discussions with realization of Maritime Domain Awareness
  - MDA : a concept originally developed for maritime security in the US
  - Utilization of satellite data
  - More focus on real-time information

MDA defined in Japan (tentative translation)

“An effective understanding of marine-related situations and circumstances through the efficient collection and sharing of a variety of marine-related information **conducive to Japan's maritime security, marine safety, natural disaster countermeasures, the marine environment conservation, the promotion of marine industries, and the development of science and technology**, while paying attention to the handling thereof.”



# Summary

# Summary

- With the situation where marine-related information is widely scattered in different organizations in Japan, “[Integration of marine-related information](#)” was described as important issues on the “Basic Plan on Ocean Policy” in 2008.
- For visualization and utilization of the integrated marine-related information, [Marine Cadastre was launched in 2012 by JCG](#).
- The Marine Cadastre is utilized for ocean policy promotion such as the development of marine renewable energy.
- Further improvements of the Marine Cadastre together with the discussions of maritime domain awareness is necessary.





Thank you for your attention !