



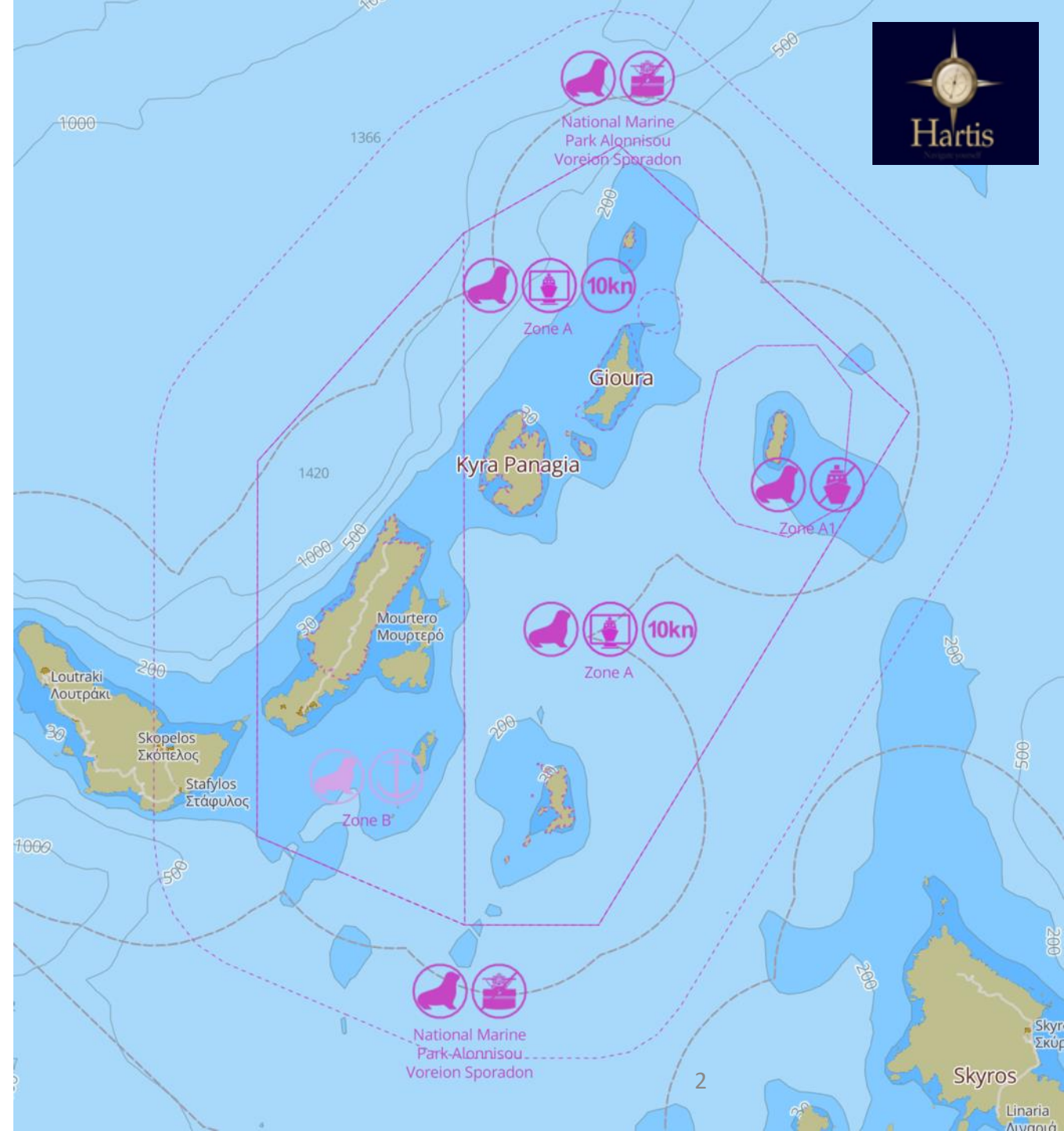
# Applying SECOM for Access and Portrayal of IHO S-122 Marine Protected Areas

Technical seminar on SECOM and MCP - 09/10/2025  
Stelios Contarinis, Hartis



# About HARTIS

- **Headquarters:** Athens, Greece — established in 2013
- **Mission:** Delivering cutting-edge geospatial solutions, focusing on **maritime safety** and **environmental sustainability**
- **Specialization:** Pioneers in **Hydrospatial Technologies**, emphasizing **Open Science** practices for hydrography and nautical cartography
- **Expertise:** Development of **Nautical Charts**, **Sailing Guides**, and **Environmental Data Products**, adhering to international standards



# Marine Protected Areas – ProtectedSeas Database



**24000+**  
**MPAs**



The number of marine areas that were independently resourced and reviewed by **ProtectedSeas** team.

**9**

**YEARS**



The time it took to research, compile and summarize the legal protections for the global MPA database.

**46**

**PERSON YEARS**



The labor that the small but dedicated team put in to complete the global MPA review.

**8000+**

**PAGES**



The size of the database of all worldwide legal restrictions for marine managed and protected areas if printed.

**2400+**

**AREA BOUNDARIES DIGITIZED**



The number of boundaries created from legal descriptions for areas where no digital boundary existed previously.

# MPAs Navigational Restrictions by Area Count

Restriction	Prohibited	Restricted
Entry	495	6187
Discharge	4258	3193
Speed	n/a	2199
Stopping	271	350
Anchoring	740	2191
Landing	287	1081

Additionally, ~6000 areas are No Take (no fishing, mining, or collecting) and ~8600 areas are Restricted Take (controlled or seasonal extraction under specific rules).

# MPAs Coverage and ENC Usage Band

ENC Usage Band	Navigational Purpose	Standard ENC Scale (Largest)	Maximum MPA Area (km <sup>2</sup> )	Example Area	Example MPA	Approximate Count of MPAs
1	Overview	1:3,500,000	< 12,250,000	The entire North Sea	Great Barrier Reef Marine Park, Australia	207
2	General	1:700,000	< 490,000	The Gulf of Mexico	Papahānaumokuākea Marine National Monument, USA	483
3	Coastal	1:180,000	< 32,400	The coastline of California	Monterey Bay National Marine Sanctuary, USA	849
4	Approach	1:45,000	< 2,025	The approach to New York Harbor	Flower Garden Banks National Marine Sanctuary, USA	2,217
5	Harbor	1:12,000	< 144	The Port of Singapore	Biscayne National Park, USA	6,711
6	Berthing	1:2,000	< 4	A specific docking area within the Port of Rotterdam	Wakatobi National Park, Indonesia	10,730

# NavMPA – Smart S-122 Viewer

← → ↻ 🏠 🌐 navmpa.hartis.org/?z=3&lat=30.00&lng=10.00 ☆ 🗄️ ⬇️ S Finish update

NavMPA Not for Navigation

Feedback Stelios Contarinis

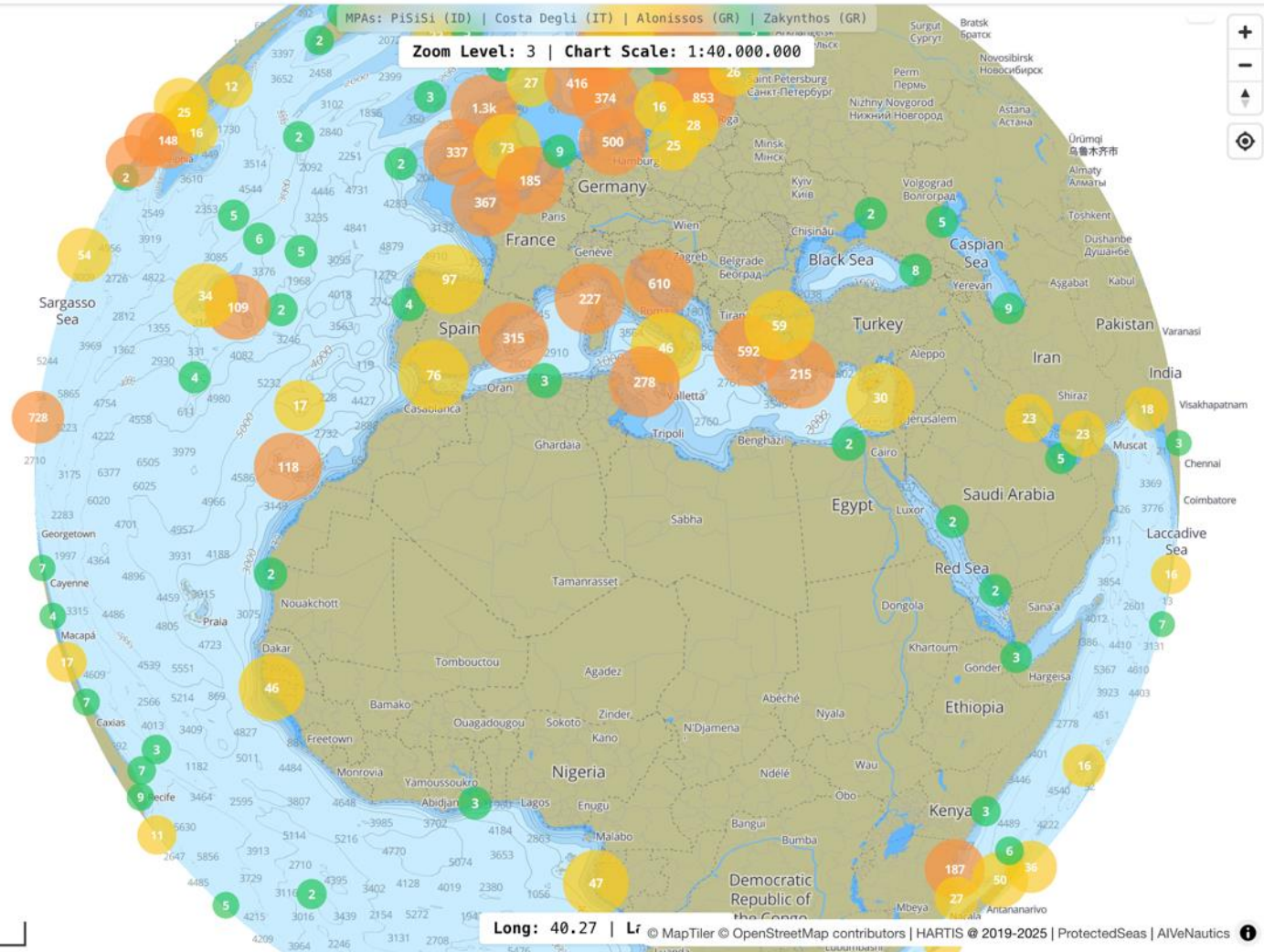
Search MPAs

MPAS SHOWN ON THE MAP

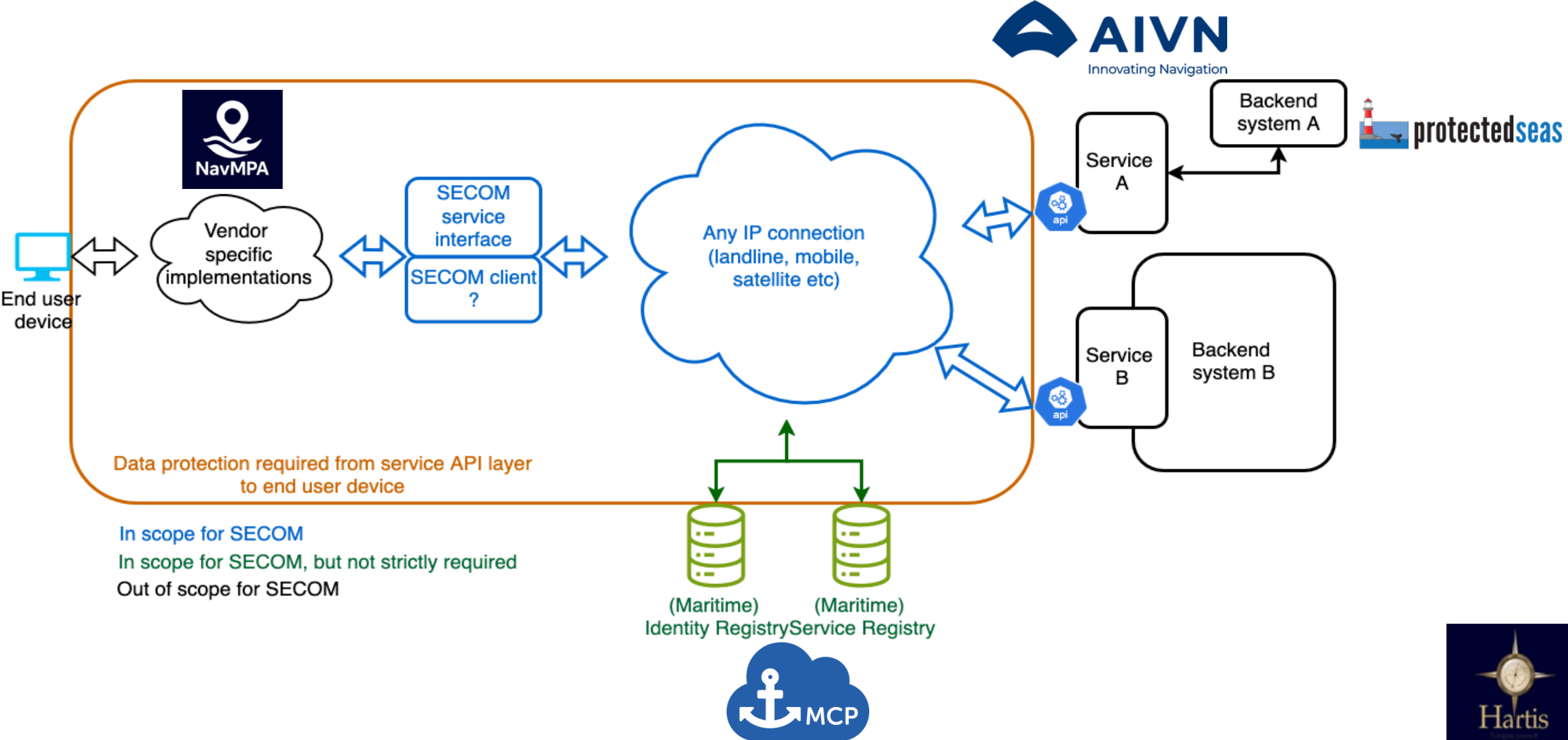
MPAs will be fetched after zoom level 4



[navmpa.hartis.org](https://navmpa.hartis.org)



# NavMPA – Architecture Overview



Data protection required from service API layer to end user device

In scope for SECOM

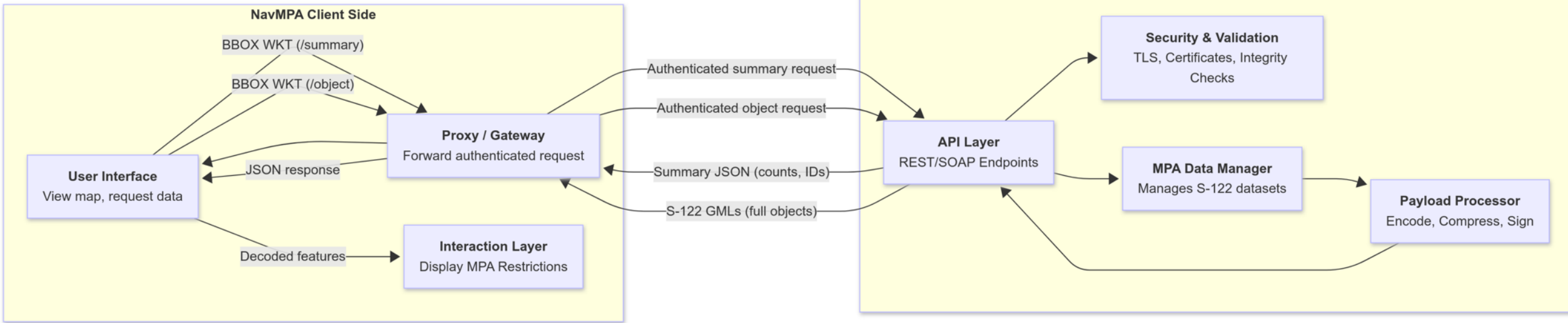
In scope for SECOM, but not strictly required

Out of scope for SECOM

(Maritime) Identity Registry (Maritime) Service Registry



# NavMPA – SECOM Client–Server Exchange



# SECOM Information Service – API Structure (OpenAPI 3.0)

Endpoint	Purpose	Typical Use
/v1/capability	Returns service metadata: supported interfaces, product types, and schema URLs	Discovery before data access
/v1/object/summary	Lists available datasets with ID, type, status, description	To preview S-122 areas in an AOI
/v1/object	Retrieves actual S-100/S-122 dataset(s)	To fetch and visualize MPAs
/v1/access + /v1/access/notification	Handles access control requests and async responses	When restricted datasets require authorization
/v1/subscription + /v1/subscription/notification	Manages real-time subscriptions for updates	For live MPA updates or temporal restrictions
/v1/encryptionKey	Exchanges temporary keys for secure transfer	Used during encrypted payload delivery
/v1/acknowledgement	Confirms message receipt and processing	For operational traceability
/v1/ping	Simple status check	Used for health monitoring



# SECOM Client Setup – Authentication

← → ↻ 🏠 🌐 management.maritimeconnectivity.net/login ☆ 📄 | 🔄 Finish update ⋮

LANG: ENGLISH ▾

## Management Portal

PUBLIC-DEMONSTRATOR environment

LOG IN

REQUEST TO JOIN

[I want to know more about registration](#)


2024 MCC MCP Testbed [Maritime Connectivity Platform Consortium](#)

### MCP USERS

#### Sign in to your account

Username or email

Password

[Forgot Password?](#)

Sign In

To use the service, need to authenticate with a certificate from the MCC public demonstrator MIR (**Maritime Identity Registry**). You can apply for registration using the "REQUEST TO JOIN" button at <https://management.maritimeconnectivity.net/login>



# SECOM Client Setup – Authentication

Management Portal

Identity Registry

My Organization

- Devices
- ID Services
- Users
- Vessels
- Roles

My IR

- Organizations

Service Registry

About

BACK

### User details

MRN: urn:mrn:mcp:entity:mcc:hartis:admin **1**

First name: Admin

Last name: Admin

e-mail: stelios.contarinis@hartis.org

Permissions: ORGADMIN

Subsidiary MRN:

Created at: 27/06/2025, 12:04:36

Updated at: 27/06/2025, 12:04:36

Active certificates

**2** **+** ADD **X** REVOKE **↓** DOWNLOAD **4**

<input type="checkbox"/>	Serial number	Valid from	Valid until
<input type="checkbox"/>	161882425002729351108125023327733687009304233259	27/06/2025, 12:39:15	27/12/2025, 11:39:15

items per page 10 1 - 1 of 1 certificates



# SECOM Client Setup – Authentication

Name	Size	Owner	Mode	Modified
..				
Certificate_urn:mrn:mcp:entity:mcc:hartis:admin.pem	2.77 KiB	snproxy:snproxy	0600	2025/06/27 - 10:15:13
Keystore_urn:mrn:mcp:entity:mcc:hartis:admin.p12	2.89 KiB	snproxy:snproxy	0600	2025/06/27 - 10:15:13
KeystorePassword_urn:mrn:mcp:entity:mcc:hartis:admin.txt	26 bytes	snproxy:snproxy	0600	2025/06/27 - 10:15:13
PrivateKey_urn:mrn:mcp:entity:mcc:hartis:admin.pem	306 bytes	snproxy:snproxy	0600	2025/06/27 - 10:15:13
PublicKey_urn:mrn:mcp:entity:mcc:hartis:admin.pem	215 bytes	snproxy:snproxy	0600	2025/06/27 - 10:15:13
mcp-root-ca.pem	2.43 KiB	snproxy:snproxy	0600	2025/06/27 - 10:51:26
dmc-root-ca.pem	1.26 KiB	snproxy:snproxy	0600	2025/06/27 - 11:02:38
dmc-chain.pem	2.77 KiB	snproxy:snproxy	0600	2025/06/27 - 11:06:16
mcc-mcp-idreg.pem	1.22 KiB	snproxy:snproxy	0644	2025/06/27 - 11:32:08
trust-bundle.pem	5.65 KiB	snproxy:snproxy	0600	2025/06/27 - 11:34:20

# NavMPA – Examples of SECOM Queries

[https://<secom-server>/api/secom/v1/object/summary?geometry=POLYGON\(\(-61.9000 17.6000, -61.9000 17.7000, -61.8000 17.7000, -61.8000 17.6000, -61.9000 17.6000\)\)](https://<secom-server>/api/secom/v1/object/summary?geometry=POLYGON((-61.9000 17.6000, -61.9000 17.7000, -61.8000 17.7000, -61.8000 17.6000, -61.9000 17.6000)))

[https://<secom-server>/api/secom/v1/object?geometry=POLYGON\(\(-61.9000 17.6000, -61.9000 17.7000, -61.8000 17.7000, -61.8000 17.6000, -61.9000 17.6000\)\)](https://<secom-server>/api/secom/v1/object?geometry=POLYGON((-61.9000 17.6000, -61.9000 17.7000, -61.8000 17.7000, -61.8000 17.6000, -61.9000 17.6000)))

The first request retrieves a **summary** of Marine Protected Areas (MPAs) intersecting the specified polygon.

The second request retrieves the **full S-122 dataset(s)** corresponding to those MPAs.

# NavMPA – Proxy Implementation

```
// CommonJS version — use this on the server
const express = require('express')
const https = require('https')
const fs = require('fs')
const axios = require('axios')
const cors = require('cors')

const app = express()
app.use(express.json())

const corsOptions = {
  origin: ['https://sail-navi.com', 'https://navmpa.hartis.org'],
  methods: ['GET', 'OPTIONS'],
  allowedHeaders: ['Content-Type']
}

app.use(cors(corsOptions))

const splitCerts = fs.readFileSync('./certs/trust-bundle.pem', 'utf8')
  .split('-----END CERTIFICATE-----')
  .filter(Boolean)
  .map(c => c.trim() + '\n-----END CERTIFICATE-----');

const httpsAgent = new https.Agent({
  cert: fs.readFileSync('./certs/Certificate_urn:mrn:mcp.entity:mcc:hartis:admin.pem'),
  key: fs.readFileSync('./certs/PrivateKey_urn:mrn:mcp.entity:mcc:hartis:admin.pem'),
  ca: splitCerts,
  rejectUnauthorized: false
})

const baseUrl = 'https://mpa.aivn.kro.kr:8080/api/secom/v1'
```

```
app.get('/summary', async (req, res) => {
  try {
    const { geometry, ...rest } = req.query
    const response = await axios.get(`${baseUrl}/object/summary`, {
      params: {
        geometry,
        ...rest,
      },
      httpsAgent
    })
    res.json(response.data)
  } catch (err) {
    res.status(500).json({ error: err.message })
  }
})
```


```
app.get('/object', async (req, res) => {
  try {
    const { geometry, ...rest } = req.query
    const response = await axios.get(`${baseUrl}/object`, {
      params: {
        geometry,
        ...rest,
      },
      httpsAgent
    })
    res.json(response.data)
  } catch (err) {
    res.status(500).json({ error: err.message })
  }
})

app.listen(3005, () => {
  console.log('SECOM proxy running on http://localhost:3005')
})
```

# NavMPA – S-122 MPA Viewer Access

← → ↻ 🏠 <https://navmpa.hartis.org> 📄 | ⬇️

📄 NavMPA Not for Navigation



## Welcome to NavMPA

### Marine Protected Areas Viewer (S-122)

NavMPA is a web-based application for exploring Marine Protected Areas (MPAs) based on the [IHO S-122 standard](#). It provides harmonized spatial and regulatory data sourced from the [ProtectedSeas](#) database, enabling users to understand activity-specific restrictions across national and international waters.

The platform enables secure, standards-based data exchange provided by [AlVeNautics](#) via the [SECOM protocol](#), aligned with the architectural framework of the [Maritime Connectivity Platform \(MCP\)](#). NavMPA is part of ongoing activities under the [Open Digital Incubator Initiative \(ODI\)](#), contributing to the development of trusted digital maritime services.

🔒 **Access is restricted** to users participating in SECOM trials or related maritime spatial data initiatives.

### Log in to NavMPA

Please enter your credentials to access the content.

Email \*

Password \*

 [Forgot your password?](#)

Remember me

Login

Access is restricted to registered users. If you do not yet have an account, you may register here .



# NavMPA - S-122 Viewer Demonstration

navmpa.hartis.org/?z=3&lat=30.00&lng=10.00

Finish update

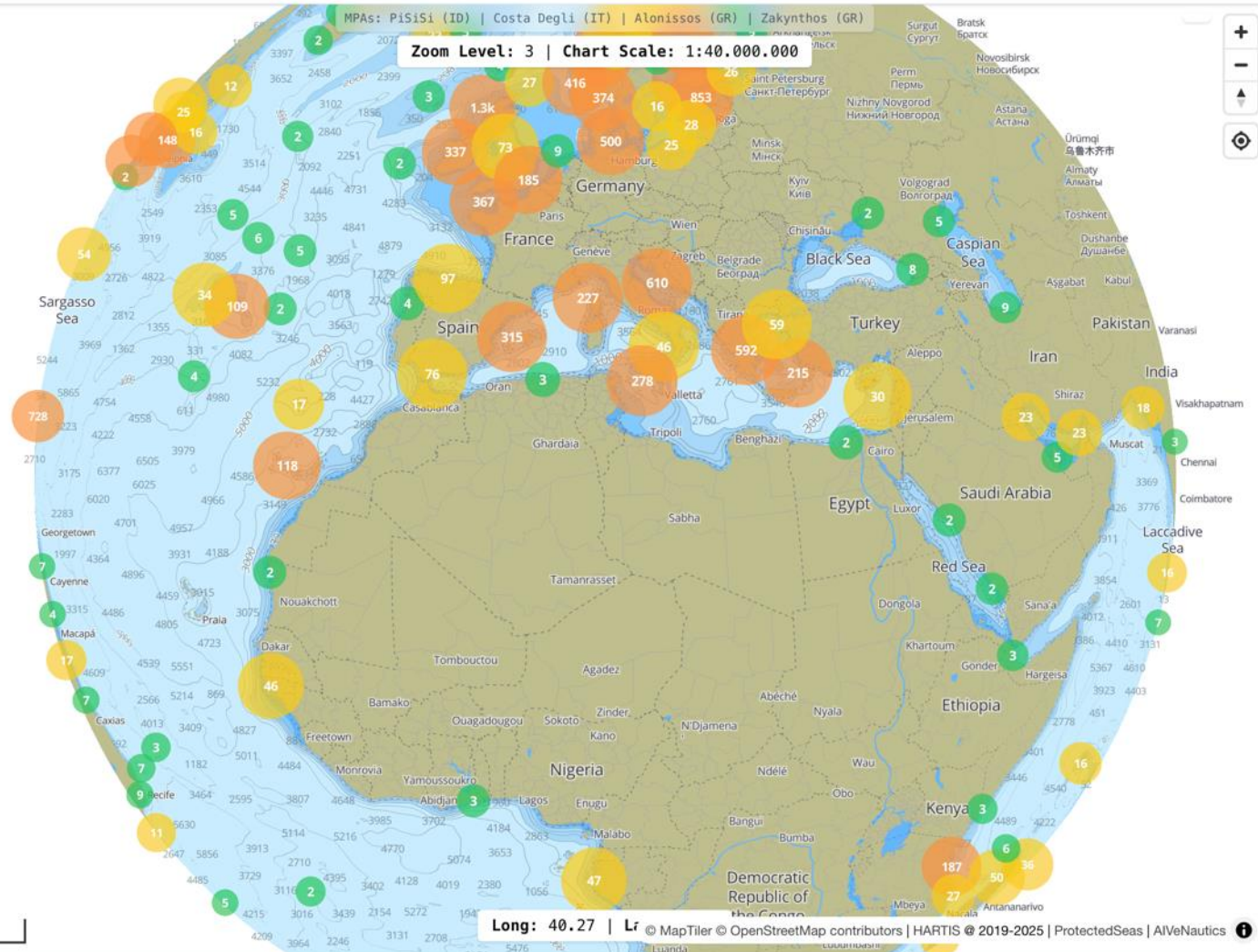
NavMPA Not for Navigation

Feedback Stelios Contarinis

Search MPAs

MPAS SHOWN ON THE MAP

MPAs will be fetched after zoom level 4



# MPA Example - PiSiSi Aquatic Nature Sanctuary (ID)

NavMPA Not for Navigation Feedback Stelios Contarinis

MPAs: PiSiSi (ID) | Costa Degli (IT) | Alonissos (GR) | Zakynthos (GR)

Zoom Level: 11 | Chart Scale: 1:160.000 | ENC Scale: 3 (Coastal)

S122

Search MPAs

**MPAS SHOWN ON THE MAP**

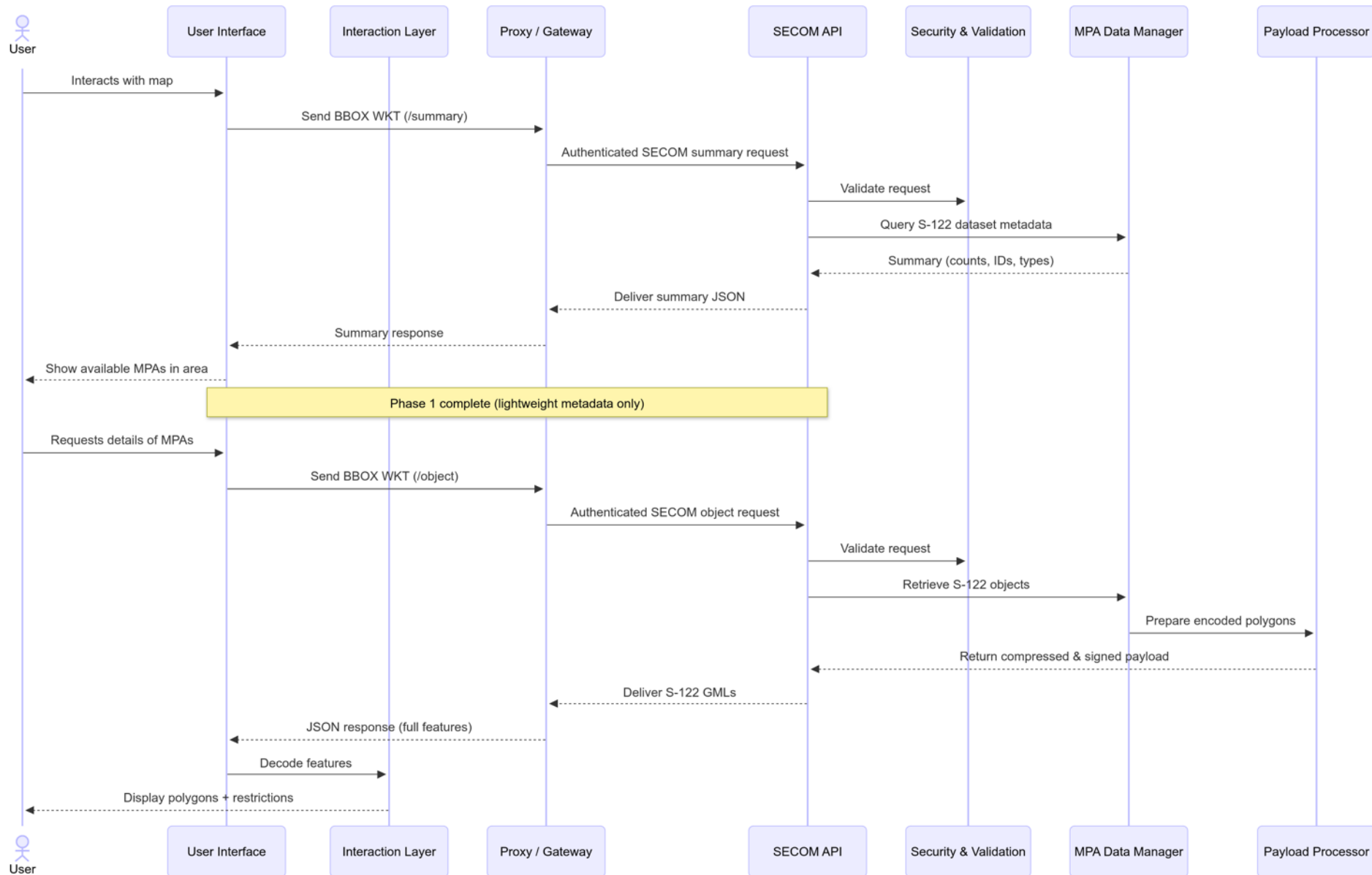
📍 Pinang Is., Siumat Is. and Simanaha Is. (PiSiSi) Aquatic Natu	445 km <sup>2</sup>
📍 PiSiSi Aquatic Nature Sanctuary - Sustainable Fishery Zone	413 km <sup>2</sup>
📍 PiSiSi Aquatic Nature Sanctuary - Core Zones	10 km <sup>2</sup>
📍 PiSiSi Aquatic Nature Sanctuary - Core Zones	7 km <sup>2</sup>
📍 PiSiSi Aquatic Nature Sanctuary - Utilization Zones	7 km <sup>2</sup>
📍 PiSiSi Aquatic Nature Sanctuary - Utilization Zones	2 km <sup>2</sup>
📍 PiSiSi Aquatic Nature Sanctuary - Core Zones	2 km <sup>2</sup>
📍 PiSiSi Aquatic Nature Sanctuary - Core Zones	2 km <sup>2</sup>
📍 PiSiSi Aquatic Nature Sanctuary - Utilization Zones	1 km <sup>2</sup>
📍 PiSiSi Aquatic Nature Sanctuary - Utilization Zones	1 km <sup>2</sup>
📍 PiSiSi Aquatic Nature Sanctuary - Core Zones	1 km <sup>2</sup>
📍 PiSiSi Aquatic Nature Sanctuary - Other Zone - Rehabilitation Subzo	
📍 PiSiSi Aquatic Nature Sanctuary - Other Zone - Rehabilitation Subzo	
📍 PiSiSi Aquatic Nature Sanctuary - Sustainable Fishery Zone	
📍 PiSiSi Aquatic Nature Sanctuary - Utilization Zones	
📍 PiSiSi Aquatic Nature Sanctuary - Core Zones	
📍 PiSiSi Aquatic Nature Sanctuary - Other Zone - Rehabilitation Subzo	
📍 PiSiSi Aquatic Nature Sanctuary - Other Zone - Rehabilitation Subzo	
📍 PiSiSi Aquatic Nature Sanctuary - Other Zone - Rehabilitation Subzo	

The map displays the PiSiSi Aquatic Nature Sanctuary in Indonesia, covering the Pinang, Siumat, and Simanaha islands. It is divided into several zones: Sustainable Fishery Zone (413 km<sup>2</sup>), Core Zones (10 km<sup>2</sup>), Utilization Zones (7 km<sup>2</sup>), and Other Zone - Rehabilitation Subzones. The map also shows surrounding land areas with various towns and villages, and a scale bar indicating 1 nm.

Long: 96.48 | © MapTiler © OpenStreetMap contributors | HARTIS © 2019-2025 | ProtectedSeas | AIveNautics



# SECOM Request Sequence for S-122 Retrieval



# PiSiSi Sanctuary – MPA Restrictions

### Pinang Is., Siumat Is. and Simanaha Is. (PiSiSi) Aquatic Nature Sanctuary

**Basic Info**

- **Area:** 445 km<sup>2</sup>
- **Jurisdiction:** national
- **Status:** permanent
- **Category:** IUCN Category IV

**Restrictions**

**Restrictions:**  
Please see the restrictions for the individual subzones.

**Allowed:**  
Please see the allowed activities for the individual subzones.

**Regulation**

**Decree of the Minister of Marine Affairs and Fisheries No. 78/2020, 13 July 2020; Document from the MAF Provincial Office of Aceh, January 2020 Latest Updates** As of the Ministerial Regulation No.31/2020 on the Management of Conservation Areas, categories and zonings of MPAs are changed. The existing MPAs have to adjust to this new regulation within 2 years. Therefore, it is advised to update this information every 2 years.

**Nautical Information**

**Purpose**  
To protect, conserve, and exploit the potential of fisheries.

MPAs: PiSiSi (ID) | Costa Degli (IT) | Alonissos (GR) | Zakynthos (GR)

Zoom Level: 11 | Chart Scale: 1:160.000 | ENC Scale: 3 (Coastal)

Pinang Is., Siumat Is. and Simanaha Is. (PiSiSi) Aquatic Nature Sanctuary (MRTM 1071)

PiSiSi Aquatic Nature Sanctuary - Core Zones

PiSiSi Aquatic Nature Sanctuary - Rehabilitation Subzones

PiSiSi Aquatic Nature Sanctuary - Other Zones

Long: 96.29 | Lat: 2.64



# PiSiSi Sanctuary – Fishery Zone Restrictions

## PiSiSi Aquatic Nature Sanctuary - - Sustainable Fishery Zone

### Basic Info

- Area: 413 km<sup>2</sup>
- Jurisdiction: national
- Status: permanent
- Category: IUCN Category IV

### Restrictions

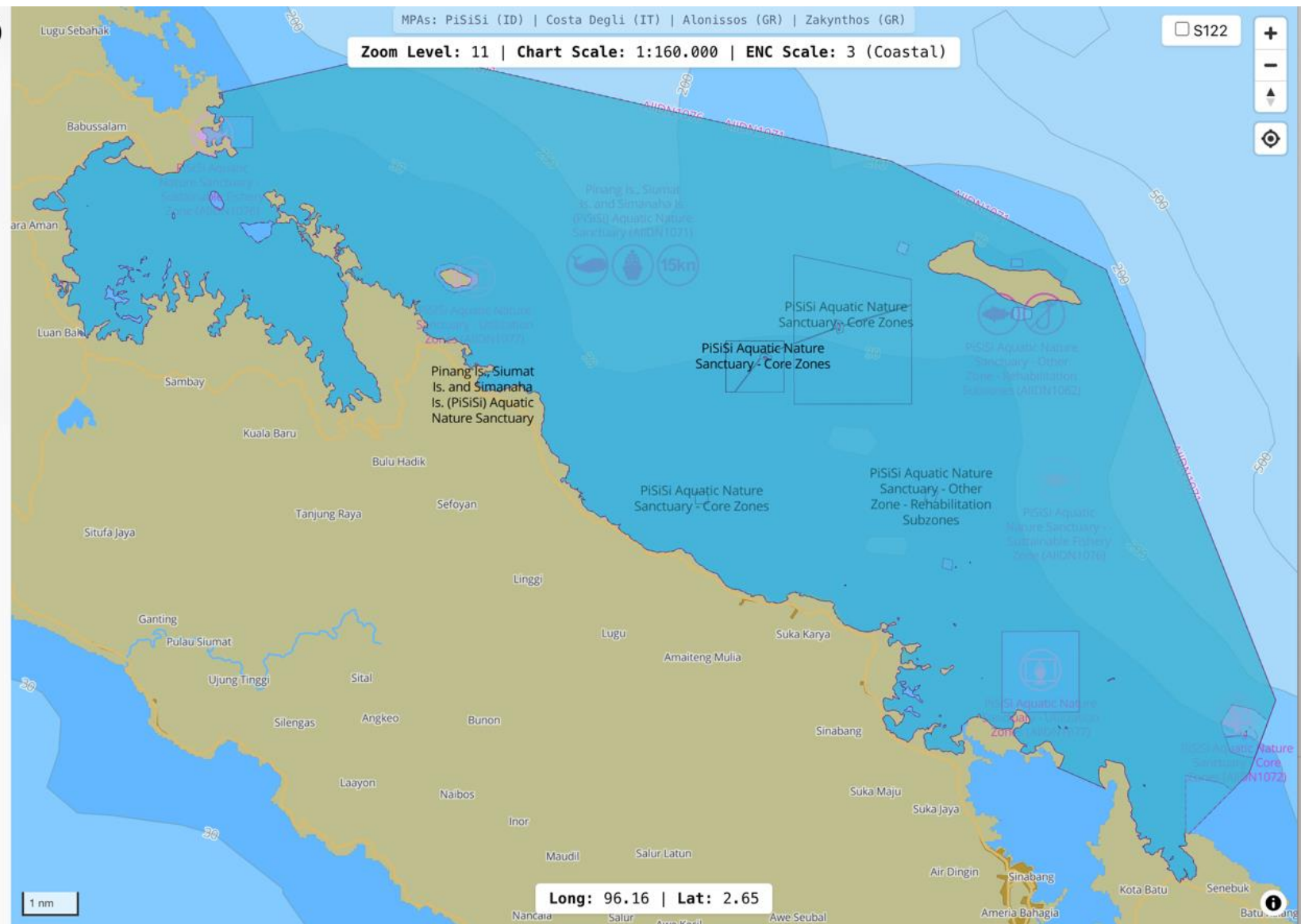
#### General Restrictions:

- Fishing restricted
- Discharge prohibited
- Diving restricted
- Anchoring restricted
- Industrial or mineral exploration prohibited

#### Restrictions:

The following activities are prohibited in the Sustainable Fisheries Zone:

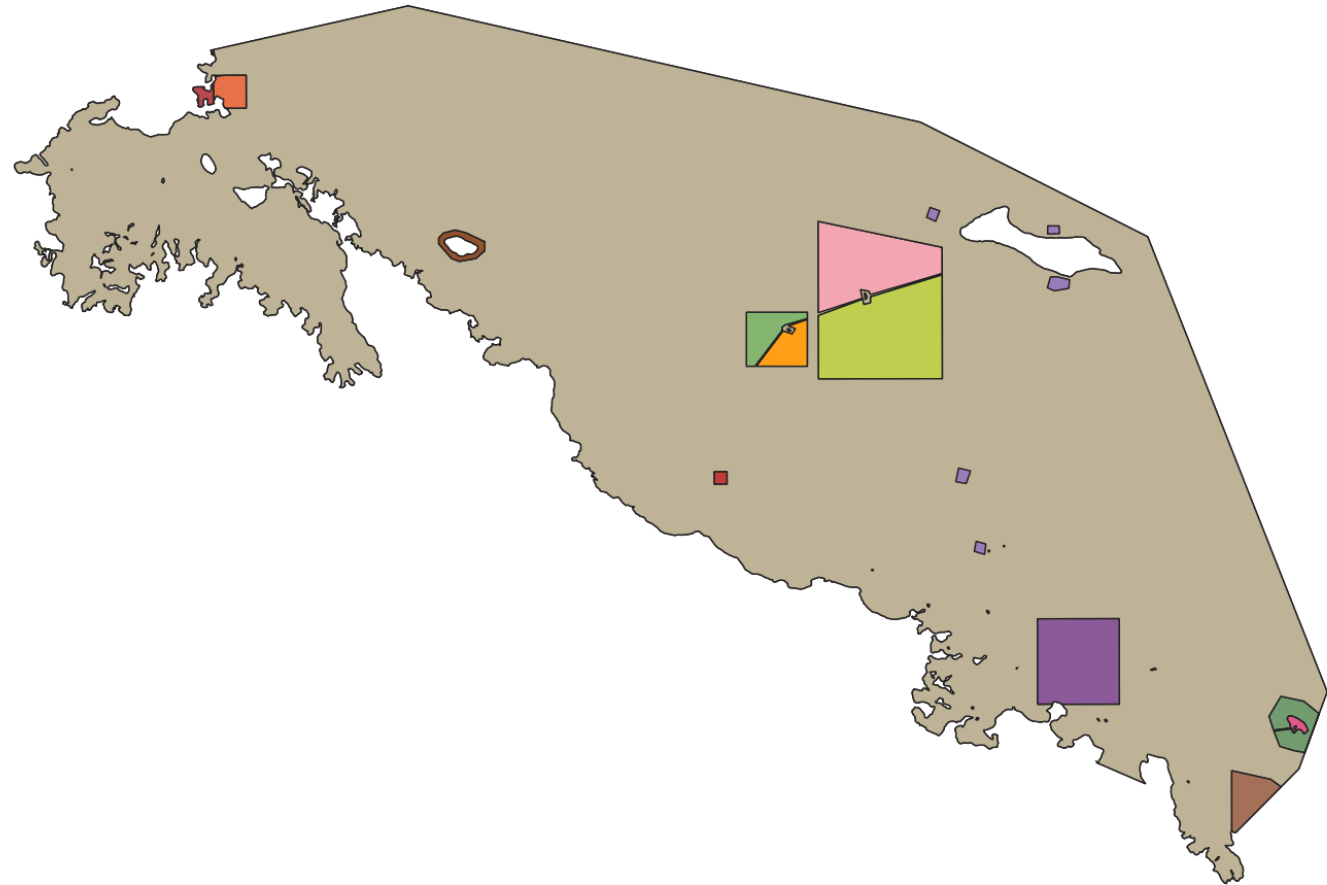
1. Catching fish using fishing gears and/or fishing aids that are destructive to the ecosystems, such as: bombs or explosives, potassium or toxic materials, trawlers, and compressors;
2. Activities and/or businesses of aquatic nature tourism that alters the characteristics of the landscape or eliminates its main functions;
3. Anchoring in places that are coral reef ecosystems;
4. Tourism and aquaculture activities and/or businesses that close or eliminate traditional sea lanes without permission or approval from community;
5. Tourism activities and/or businesses that do not comply with conservation rules;
6. Tourism and aquaculture activities and/or businesses that disturb, remove or move coral reefs and/or marine biota;



# Raw S-122 Dataset (Unformatted Source)

Layers

- AIMP20250306\_AIIDN1077\_1\_0\_4
  - Authority
  - MarineProtectedArea
  - NauticalInformation
  - Regulations
  - Restrictions
- AIMP20250306\_AIIDN1077\_1\_0\_3
  - Authority
  - MarineProtectedArea
  - NauticalInformation
  - Regulations
  - Restrictions
- AIMP20250306\_AIIDN1077\_1\_0\_2
  - Authority
  - MarineProtectedArea
  - NauticalInformation
  - Regulations
  - Restrictions
- AIMP20250306\_AIIDN1077\_1\_0\_1
  - Authority
  - MarineProtectedArea
  - NauticalInformation
  - Regulations
  - Restrictions
- AIMP20250306\_AIIDN1077\_1\_0\_0
  - Authority
  - MarineProtectedArea
  - NauticalInformation





# NavMPA - User Feedback

1

Feedback

Stelios Contarinis

NavMPA Not for Navigation

Search MPAs

MPAS SHOWN ON THE MAP

MPAs will be fetched after zoom level 4

2

## NavMPA Review

Share feedback and help improve NavMPA

What did you like or appreciate about the NavMPA?

e.g. Boundaries are clear, map is responsive.

Do you have any suggestions for improvement?

e.g. Add info about restricted activities...

Did you encounter any issues or errors?

e.g. Some MPAs return blank info...

Please rate its usefulness:

-- Select Rating --

You may upload a screenshot (optional)

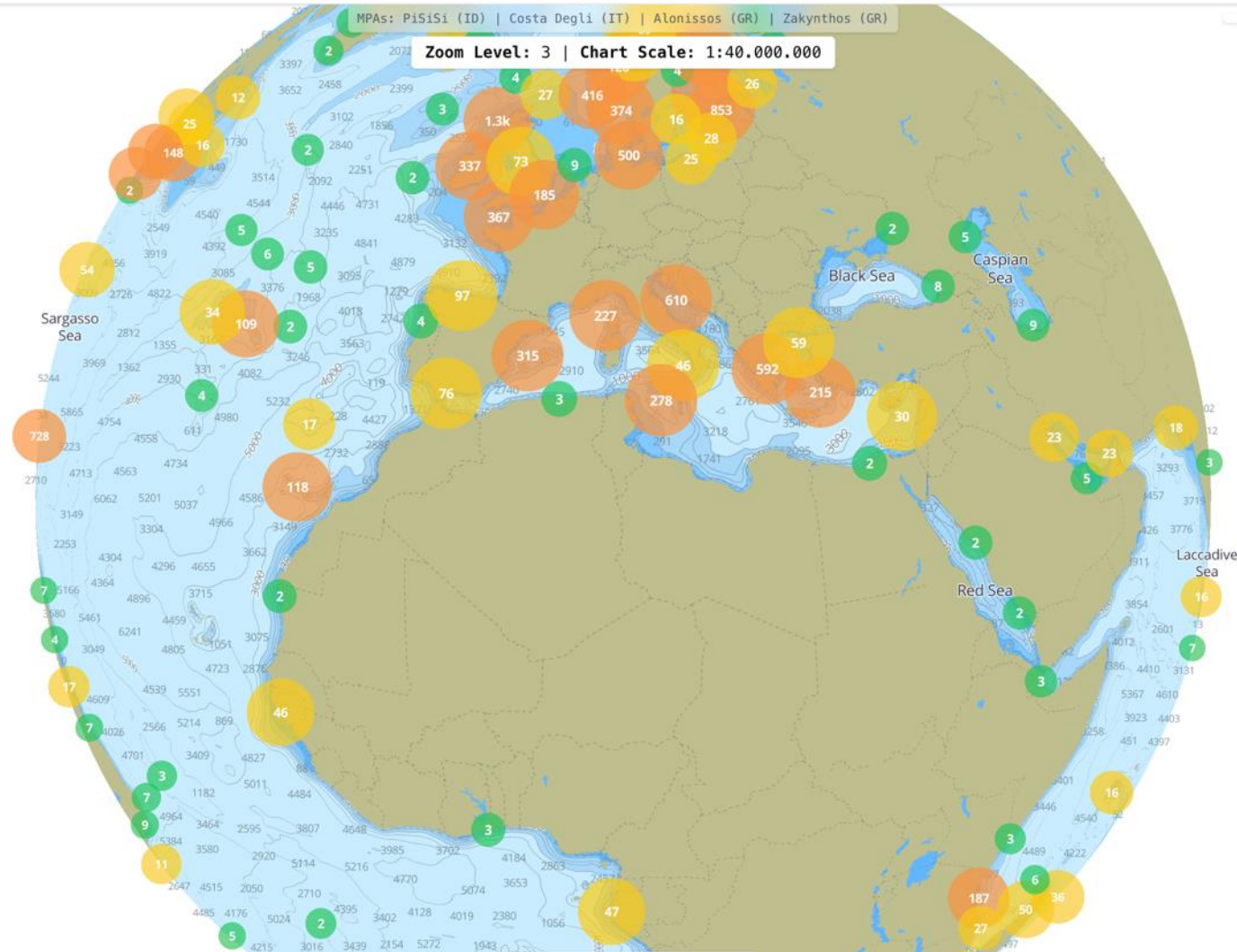
Choose file No file chosen

Upload screenshot or PDF if it helps clarify your feedback.

I agree to be contacted for clarifications.

Cancel

Submit



# Thank you!

## Applying SECOM for Access and Portrayal of IHO S-122 Marine Protected Areas

[stelios.contarinis@hartis.org](mailto:stelios.contarinis@hartis.org)

