

# Sea2Land Navigator

## Technical Specification

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# 1. Executive summary

The Sea2Land Navigator (the "Navigator") is a comprehensive web-based platform designed to support maritime and coastal planners in enhancing collaboration, knowledge sharing, multi-level governance, and evidence-based decision-making among stakeholders in the Baltic Sea region.

## 1.1 Purpose

This technical specification provides detailed documentation of the Navigator's architecture, tools, and data management strategies. It serves as the authoritative reference for developers, system administrators, and project managers responsible for maintaining, extending, and supporting the platform.

## 1.2 Key features

- **Open access platform:** Built on ArcGIS Hub, providing public access to maritime and coastal planning data
- **Multi-stakeholder collaboration:** Enables cooperation between project partners through partnered collaboration
- **Integrated tools:** Combines ArcGIS Survey123, Dashboards, and Experience Builder for comprehensive functionality
- **Geospatial data services:** Uses REST services for efficient distribution of spatial data
- **Customized user experience:** Enhanced with HTML and CSS modifications for improved usability

## 1.3 Target audiences

This document is intended for:

- **System administrators:** Managing platform infrastructure and access
- **Developers:** Implementing features and customizations
- **Data managers:** Maintaining geospatial datasets and survey content
- **Project managers:** Overseeing platform development and maintenance
- **Partner organizations:** Understanding collaborative workflows

## 1.4 Platform URL

The Sea2Land Navigator is accessible at: <https://navigator-hel.com.hub.arcgis.com/>

## 3. System overview

### 3.1 Platform architecture

The Sea2Land Navigator operates on a distributed cloud-based architecture combining ArcGIS Hub with multiple specialized ArcGIS components. The platform follows a service-oriented architecture (SOA) pattern, where discrete services communicate through standardized interfaces.

The decision to build the Navigator on ArcGIS Hub was driven by several factors that align with the project's goals of accessibility, collaboration, and data integration. ArcGIS Hub serves as the centralized collaboration workspace part of ArcGIS Online (Figure 1). This structured environment allows multiple partner organizations to jointly create, update, and manage content, ensuring that the platform remains dynamic and accurate.

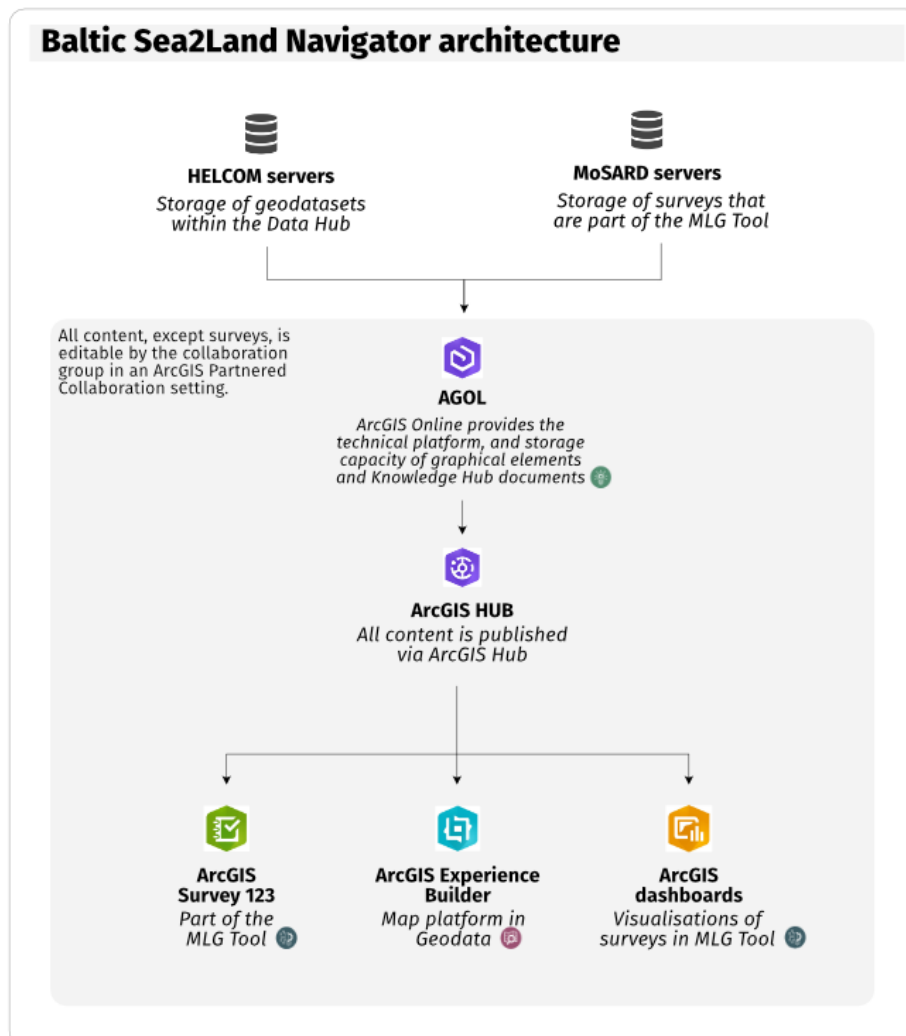


Figure 1 Sea2Land Navigator data architecture

## 3.2 Key components

### 3.2.1 ArcGIS Hub

- Function: Central public portal and content management system
- Hosted by: HELCOM
- Responsibilities: Site structure, navigation, branding, public access

### 3.2.2 ArcGIS Survey123

- Function: Stakeholder data collection and survey management
- Hosted by: MoSARD (Latvian Ministry of Smart Administration and Regional Development)
- Key Features: Multi-language support, conditional logic, geospatial data capture

### 3.2.3 ArcGIS Dashboards

- Function: Survey data visualization and analytics
- Hosted by: AGOL collaborative environment
- Key Features: Real-time updates, interactive filtering, customized selectors

### 3.2.4 ArcGIS Experience Builder

- Function: Interactive map services for Data Hub and MLG Tool
- Hosted by: HELCOM through AGOL
- Key Features: Custom widgets, filtering, spatial exploration

### 3.2.5 REST Services

- Function: High-performance geospatial data distribution
- Server: HELCOM hc-gis02 machine
- Endpoint: <https://maps.helcom.fi/arcgis/rest/services/BalticSea2Land/>

## 3.3 Technology stack

Layer	Technology	Purpose
Frontend	ArcGIS Hub	Public portal interface
Survey	ArcGIS Survey123 Connect and its online version	Advanced form design
Visualization	ArcGIS Dashboards	Survey visualizations
Mapping	ArcGIS Experience Builder	Interactive maps

Layer	Technology	Purpose
Platform	ArcGIS Online (AGOL)	Cloud infrastructure
Data Server	ArcGIS Server	REST services
Desktop GIS	ArcGIS Pro	Data management
Customization	HTML/CSS	UI enhancements
Translation	R with Google Translate API	Survey translations

## 4. Project background and collaborative development

### 4.1 The challenge

Coastal and maritime planning require the integration of land-based and marine data; however, planners often struggle with the complexity of overlapping jurisdictions, governance structures, and legal frameworks that regulate different aspects of land-sea interactions. In many cases, national, regional, and local authorities have distinct and sometimes conflicting regulations, making it difficult to determine which rules apply to a specific planning issue. Additionally, maritime and terrestrial planning processes often operate in separate silos, leading to gaps in coordination and a lack of integrated decision-making.

Beyond regulatory challenges, planners also face difficulties in identifying, involving, and effectively communicating with relevant stakeholders, including governmental agencies, industry representatives, environmental organizations, and local communities. Engaging the right stakeholders at the right time is critical for ensuring that planning decisions are both inclusive and sustainable, yet there is often a lack of structured mechanisms to facilitate this process.

### 4.2 The solution

The Sea2Land Navigator is primarily designed to address these challenges by providing a centralized platform, where planners and practitioners can access relevant data, and engage stakeholders in a more transparent and structured manner. The tool facilitates evidence-based decision-making for planners, policymakers, and stakeholders by integrating data, methods and decision-support mechanisms exclusively designed in this project.

### 4.3 Partner roles and responsibilities

The development of the Sea2Land Navigator has been a collaborative effort between all project partners, particularly HELCOM (Helsinki Commission), MoSARD (Latvian Ministry of Smart Administration and Regional Development), and TLU (Tallinn University). HELCOM, as a regional intergovernmental organization focused on the protection of the Baltic Sea, has played a key role in hosting and managing the platform's geospatial data and services. MoSARD, responsible for spatial planning in Latvia, has contributed by designing, hosting and managing various content in the MLG Tool, ensuring that stakeholder input is integrated into the planning processes. Meanwhile, Tallinn University has provided expertise in data content and information sharing techniques, particularly in the Knowledge Hub. Baltic Environmental Forum in Latvia (BEF) also has a key contribution providing feedback to improve essential parts of the tool and overall user experience and durability.

Through this collaboration, the Navigator has been built as an open-access tool, ensuring that maritime and coastal planners, as well as other relevant stakeholders, can freely explore datasets and information.

The platform utilizes ArcGIS Hub to provide an intuitive, web-based interface, integrating multiple ArcGIS applications such as Survey123, Dashboards, and Experience Builder to enhance functionality. Additionally, a shared Partnered Collaboration through ArcGIS Online (AGOL) has been established, enabling partners to manage and update datasets, surveys, and geospatial layers collaboratively. The Navigator offers a scalable, interactive, and user-friendly tool for maritime and coastal spatial planning across the Baltic Sea region.

Partner	Role	Responsibilities	Technical assets
HELCOM	Platform Host and Geospatial Data Manager	<ul style="list-style-type: none"> <li>○ Host and maintain the Navigator platform infrastructure</li> <li>○ Manage the ArcGIS Hub site structure and navigation</li> <li>○ Store and serve geospatial datasets through REST services</li> <li>○ Coordinate partnered collaboration settings</li> <li>○ Maintain the Data Hub and geodata services</li> <li>○ Implement HTML/CSS customizations for user experience</li> </ul>	<ul style="list-style-type: none"> <li>○ ArcGIS Hub instance</li> <li>○ hc-gis02 data server (geodata storage)</li> <li>○ ArcGIS Online organizational account</li> <li>○ REST service endpoints</li> </ul>

Partner	Role	Responsibilities	Technical assets
		<ul style="list-style-type: none"> <li>○ Monitor platform performance and accessibility</li> <li>○ Manage survey translations and multilingual support</li> <li>○ Manage user access and permissions</li> </ul>	
<b>MoSARD</b>	Survey Management and Stakeholder Data Collection	<ul style="list-style-type: none"> <li>○ Design and host stakeholder surveys using Survey123</li> <li>○ Create advanced survey forms with conditional logic</li> <li>○ Store and maintain survey response data</li> <li>○ Delete or edit survey responses upon request</li> </ul>	<ul style="list-style-type: none"> <li>○ ArcGIS Online user account</li> <li>○ ArcGIS Survey123 Web Designer</li> <li>○ ArcGIS Survey123 Connect Desktop application</li> <li>○ Survey data storage</li> </ul>
<b>Tallinn University</b>	Knowledge Hub Content and Information Architecture	<ul style="list-style-type: none"> <li>○ Develop and curate Knowledge Hub content</li> <li>○ Provide expertise in information sharing techniques</li> <li>○ Contribute to data content standards</li> <li>○ Support research-based content development</li> <li>○ Advice on user experience and information architecture</li> </ul>	
<b>Baltic Environmental Forum Latvia (BEF)</b>	User Experience and Quality Assurance	<ul style="list-style-type: none"> <li>○ Provide feedback on platform usability</li> <li>○ Test new features and functionalities</li> <li>○ Contribute to improving overall user experience</li> <li>○ Representing end-user perspectives in development</li> </ul>	

## 5. Platform architecture and infrastructure

### 5.1 ArcGIS Hub as development platform

#### 5.1.1 Why ArcGIS Hub?

The selection of ArcGIS Hub was driven by strategic considerations aligned with project objectives:

### *Technical advantages*

- Cloud-Based Infrastructure: Eliminates need for dedicated server management
- Built-In Collaboration: Native support for multi-organization partnerships
- Integrated Ecosystem: Seamless connection to Survey123, Dashboards, Experience Builder, and any other ArcGIS product
- REST API Support: High-performance geospatial data delivery
- Scalability: Handles multiple simultaneous users without performance degradation

### *Operational benefits*

- Open Access Model: Public visibility with granular access control
- Template System: Rapid deployment using pre-built layouts
- Customization Flexibility: HTML/CSS modifications for branding
- Multi-Language Support: Interface localization capabilities

### *Collaboration features*

- Partnered Collaboration: Distributed content management across organizations
- Shared Update Groups: Collaborative editing capabilities
- Content Ownership: Clear attribution and control over contributed content

### **5.1.2 Hub architecture layers**

The Navigator uses four architectural layers:

1. Presentation layer (ArcGIS Hub)
  - Public-facing website
  - Navigation structure
  - Branding and styling
  - Content pages and galleries
2. Application layer (ArcGIS Online)
  - Survey123 forms and data collection
  - Dashboard analytics and visualization
  - Experience Builder interactive maps
  - Web maps and feature layers
3. Data layer (Distributed Storage)
  - HELCOM servers: Geospatial datasets
  - MoSARD servers: Survey responses
  - AGOL storage: Documents, images, web maps
4. Service layer (REST APIs)

- Geospatial data services
- Feature services for surveys
- Map services for visualization

## 5.2 Data architecture

### 5.2.1 Data storage locations

Data type	Storage location	Access method	Owner
Geospatial datasets	HELCOM hc-gis02 server	REST services	HELCOM
Survey forms	MoSARD local drives	Survey123 Connect	MoSARD
Survey responses	MoSARD AGOL	Feature services	MoSARD
Web maps	HELCOM AGOL	Web map services	HELCOM
Documents	HELCOM AGOL	Direct download	HELCOM
Images and icons	HELCOM AGOL	Direct URLs	HELCOM
Experience Builder apps	HELCOM AGOL	Web applications	HELCOM
Dashboards	MoSARD AGOL, HELCOM AGOL	Web applications	MoSARD, HELCOM
Metadata	HELCOM AGOL	Excel files	HELCOM

### 5.2.2 Data flow diagram

The following tree illustrates how user requests are routed through the ArcGIS Hub to different components and data services:

- User request:
  - ArcGIS Hub
    - Component
      - Survey123
        - MoSARD Feature Service
          - Survey responses
      - Dashboards
        - AGOL Feature Service
          - Survey responses
      - Experience Builder
        - HELCOM REST Service
          - Geodata layers

### 5.2.3 Data publishing workflow

HELCOM geodata publishing:

- Data preparation in ArcGIS Pro (BS2L.aprx project)
- Data stored at \\hc-gis02\gis\_input\_data\BalticSea2Land\data
- Data published to ArcGIS Server as REST service
- Web map created in AGOL referencing REST service
- Web map shared with collaboration group
- Experience Builder application configured with web map
- Application embedded in ArcGIS Hub

MoSARD survey publishing:

- Survey design in Survey123 Connect (XLSForm)
- Translation using R scripts (made by HELCOM)
- Survey published to AGOL
- Survey shared with collaboration group (manually)
- Survey embedded in ArcGIS Hub pages
- Dashboard created to visualize survey responses
- Dashboard shared to collaboration group

## 5.3 Security and access control

### 5.3.1 Access levels

Level	Description	Permissions
<b>Owner</b>	HELCOM administrators	Full platform control, collaboration management
<b>Group Managers</b>	Designated coordinators	Edit content, invite members, manage groups
<b>Authenticated</b>	AGOL users	View shared content, access member tools
<b>Public</b>	Anonymous users	View public content, fill surveys

### 5.3.2 Content sharing model

- Public: Hub landing pages, geodata, Knowledge Hub documents
- Organization: Internal drafts, work-in-progress content
- Collaboration Groups: Shared items between partners
- Private: Survey123 Connect forms (local storage only)

## 6. Partnered collaboration setup

### 6.1 Overview

The partnered collaboration was created in ArcGIS Online, to share content with other partners and to ensure that they had appropriate access to add and update content.

In a Partnered collaboration environment, all partners must have an ArcGIS Online license. One partner, in this case HELCOM, hosts the application and others join to collaborate adding and updating content. The hosting partner is responsible for adding new users.

To create the collaboration, HELCOM invited the other organization (in this case MoSARD and TLU) to join the collaboration. The collaboration became active when MoSARD and TLU accepted the collaboration request and both organizations designated collaboration coordinators.

### 6.2 Key characteristics

- Each organization maintains its own AGOL instance
- Content ownership remains with creating organization
- Shared update groups enable collaborative editing
- Collaboration coordinator (HELCOM) manages cross-organization access
- Content is synchronized across partner organizations

### 6.3 Prerequisites

Before establishing partnered collaboration:

Organizational requirements:

- All partner organizations have active ArcGIS Online licenses
- Administrator access in each organization
- Named collaboration coordinators
- Agreed-upon content sharing policies

Technical requirements:

- HTTPS home page URL for each organization
- Network connectivity between organizations
- User accounts for collaboration coordinators

Governance requirements:

- Data sharing agreement between organizations
- Clear roles and responsibilities defined

- Content contribution guidelines established
- Conflict resolution procedures agreed

## 6.4 Implementation guide

There are several steps involved in creating a partnered collaboration in ArcGIS:

- Step 1- setting up the collaboration
- Step 2 – create groups
- Step 3 – Add members to the group
- Step 4 – Add content to the group

### Step 1- Setting up the collaboration

Initiating Organization (HELCOM).

To create a partnered collaboration, click on Organization > Settings > Collaborations. In the Partnered section, click Start a collaboration (Figure 2):

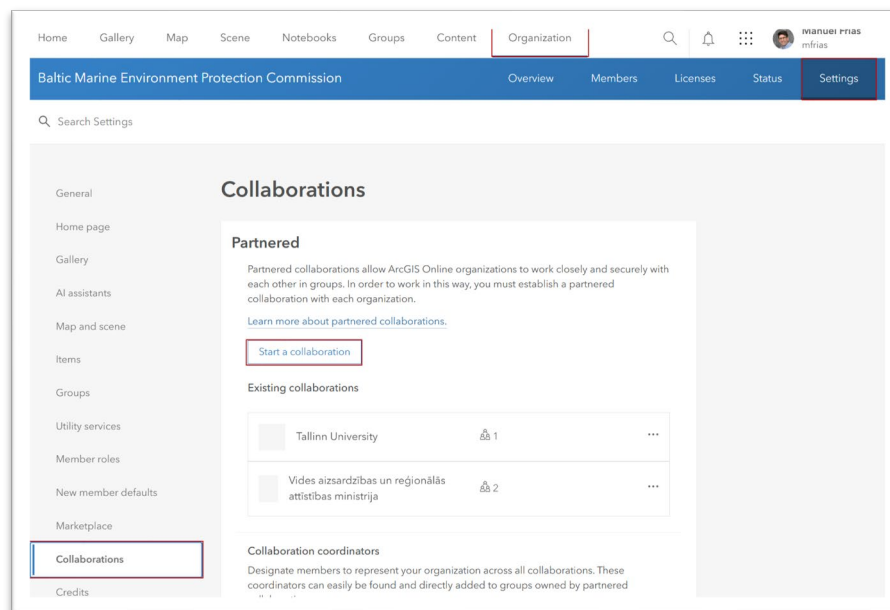


Figure 2 Setting up a partnered collaboration. In this case, MoSARD and TLU are already members

Enter the home page URL for the organization you are collaborating with and modify the email message that is sent with your collaboration request. Click Start collaboration.

Figure 3 Starting a collaboration

Click Set up collaboration coordinators to select up to 20 members to HEL-COM in the partnered collaboration. Click Save when finished.

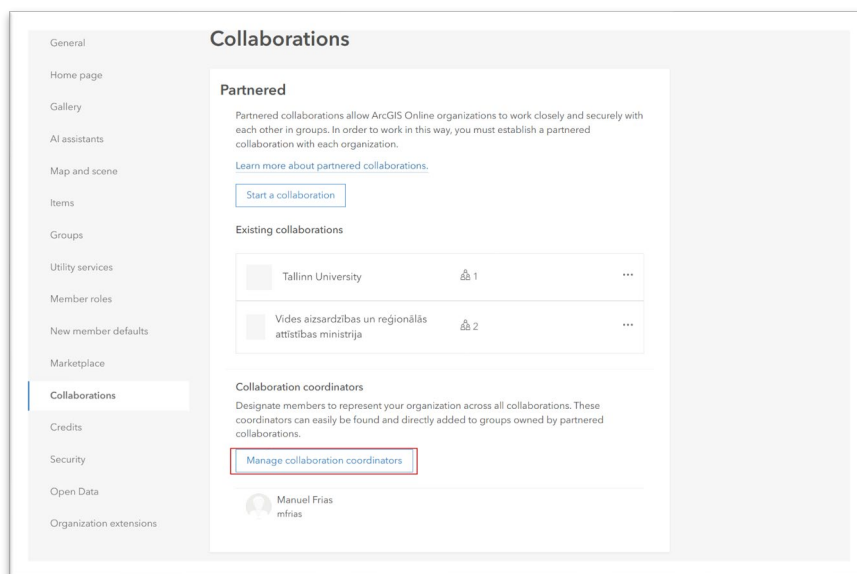


Figure 4 Selecting collaborators

An administrator of the other organizations must now accept the collaboration request and designate collaboration coordinators to represent the organization in the collaboration. They do so by clicking Organization > Settings > Collaborations > Partnered, click Review collaboration requests, and click Accept & configure.

## Step 2 – Create groups

Once you have established the partnered collaboration and both participating organizations have designated collaboration coordinators, members with group creation privileges from both organizations can start creating collaboration groups. These groups will be used to collaborate with other members of the partnered collaboration.

At the top of the site, click Groups. On the My Groups tab, click Create group.



Figure 5 Create groups to collaborate with other members

Add a thumbnail image, name, summary, and tags for the group. Configure the group membership settings:

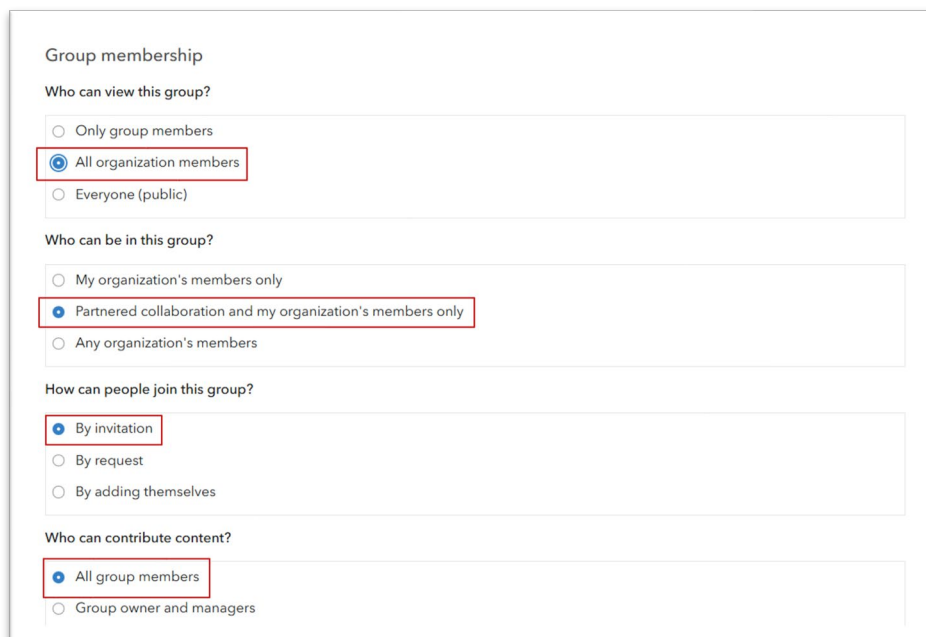


Figure 6 Settings for group membership

Under Group designations, if you want collaboration group members to be able to edit any items shared with the group, turn on the Shared update toggle button.

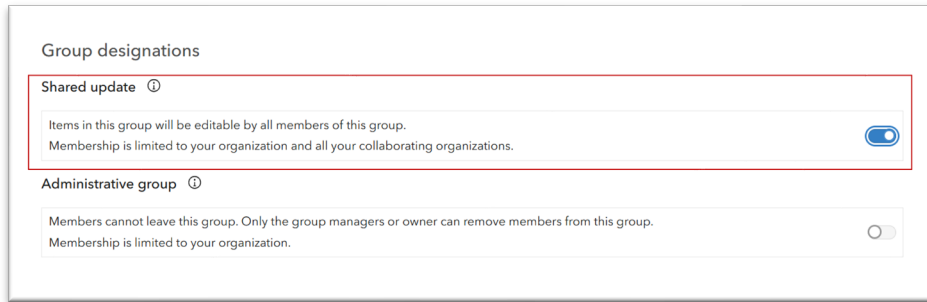


Figure 7 Enable shared update to be able to edit items

The group is finally created:

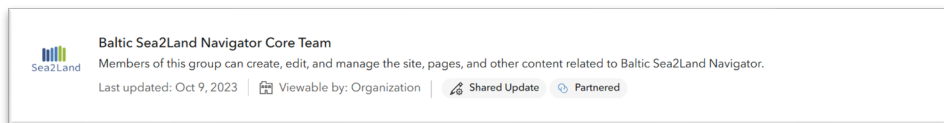


Figure 8 The group has been created

### Step 3 – Add members to the group

Once a collaboration group is created, the group owner (HELCOM) can start inviting collaboration coordinators and other members to it. The group owner can also promote collaboration coordinators to group managers so they can invite members from their respective organizations to the group.

### Step 4 – Add content to the group

Now that members of both organizations have been added to the collaboration group, you're ready to add content to it. The content you add to the group is automatically shared with the other members in the group. If the group is designated as a shared update group, items that are shared with the group can be edited by all group members. Each organization in a partnered collaboration continues to own and manage its content while allowing the other group members to view and contribute content. Members can also use shared items to create content, such as maps and apps.

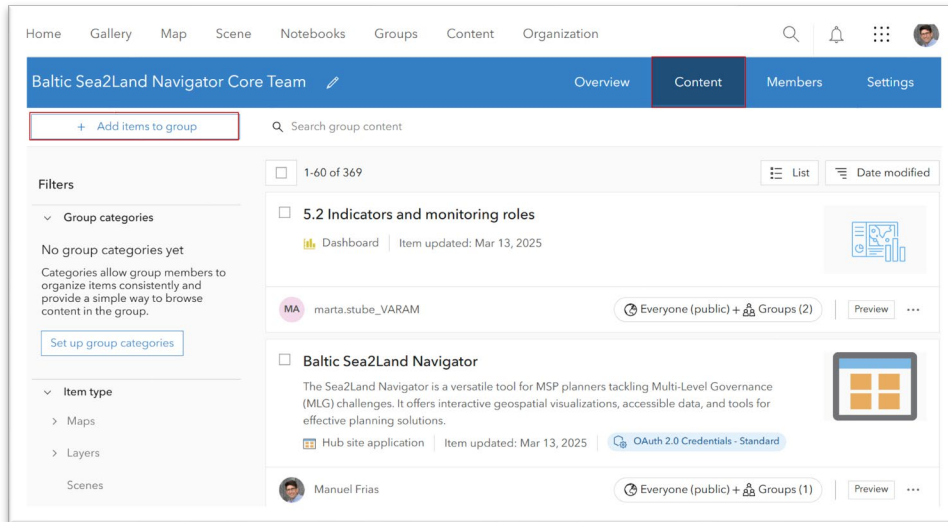


Figure 9 Adding content to groups

The partnered collaboration consists of two groups:

- **Baltic Sea2Land Navigator Content:** It is used to share content. Shared items are searchable, accessible only to authorized users, and editable by the core team.
- **Baltic Sea2Land Navigator Core Team:** core team members have access to this site for editing. While visible to your ArcGIS Online organization, only core team members can modify this group's content.

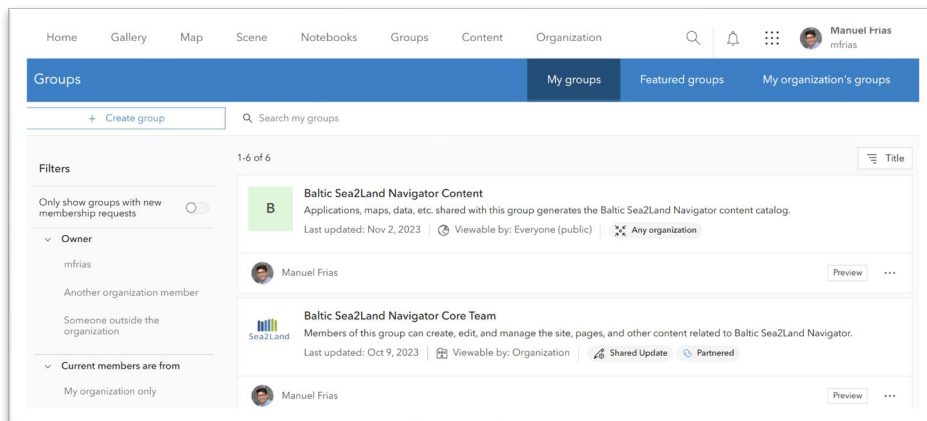


Figure 10 Groups for the Navigator

The Core Team consists of five members (as of March 2025). There is one owner, and four group managers.

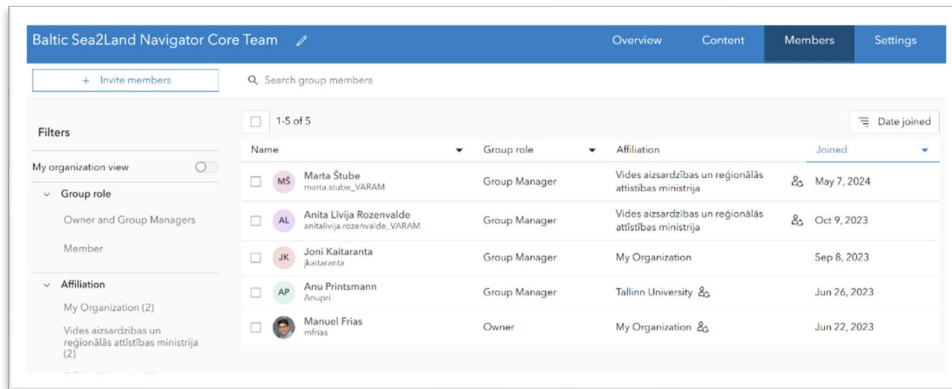


Figure 11 Group members

### Member Roles and Permissions

Role	View Content	Contribute Content	Invite Members	Edit Group	Delete Group
Owner	✓	✓	✓	✓	✓
Manager	✓	✓	✓ (from own org)	✓ (limited)	✗
Member	✓	✓	✗	✗	✗

## 6.5 Data storage in AGOL

The [HELCOM ArcGIS online portal](#) stores all the data that is used in the Navigator:

- Documents that are mainly available in the Knowledge Hub and that are mainly in Word or pdf format
- Icons and images that are part of the design
- Web maps part of the Data Hub
- Web Experience sites for the maps in the MLG tool

# 7. Component implementation details

## 7.1 ArcGIS Survey123

### 7.1.1 Overview

ArcGIS Survey123 is a data collection tool that allows designing and distributing customized digital surveys aimed at gathering critical input from

planners, policymakers, coastal communities, and other stakeholders involved in maritime and coastal planning.

Surveys are tailored to the needs of different stakeholder groups, capturing relevant information. Responses can be linked to specific geographic locations, helping planners visualize stakeholder concerns and recommendations on interactive maps. The data collection process remains structured and standardized, ensuring that responses are easy to interpret and integrate into planning workflows.

### 7.1.2 Why Survey123 Connect?

Survey123 offers two creation environments:

Feature	Web Designer	Survey123 Connect
Interface	Browser-based	Desktop application
Ease of Use	Simple, visual	Requires XLSForm knowledge
Logic	Basic skip logic	Advanced conditional logic
Calculations	Simple	Complex formulas
Languages	Manual duplication	Multi-language support
Styling	Limited	Extensive CSS control
Offline	No	Yes
Version Control	Automatic	Manual (local files)

The surveys have been developed using ArcGIS Survey123 Connect, rather than the standard web-based Survey123 interface. This choice was made to enhance customization and enable more advanced survey logic. ArcGIS Survey 123 Connect uses XLSForm, a powerful form definition standard based on Microsoft Excel, allowing for:

- Advanced logic (conditional questions based on previous answers)
- complex calculations (automated scoring, pre-filled responses)
- multilingual support, enabling surveys to be delivered in different languages.

### 7.1.3 XLSForm structure

Surveys are defined using XLSForm, a Microsoft Excel-based specification for forms. Each survey consists of a “form.xlsx” file with multiple sheets:

Required Sheets:

- survey: Question definitions, types, logic
- choices: Multiple choice options

- settings: Form metadata and behavior

Key columns in survey sheet:

Column	Purpose
<b>type</b>	Question type
<b>name</b>	Variable name
<b>label</b>	Question text
<b>hint</b>	Help text
<b>required</b>	Mandatory field
<b>relevant</b>	Conditional display
<b>constraint</b>	Validation rule
<b>calculation</b>	Computed value

#### **7.1.4 Survey storage and collaboration limitations**

Critical Limitation: Survey123 Connect stores configuration files on the creator's local computer, typically at:

C:\Users\[username]\ArcGIS\My Survey Designs\[survey\_name]\

Folder Contents:

- form.xlsx: XLSForm definition
- media/: Images, logos, audio files
- scripts/: Custom JavaScript
- esriinfo: Publishing metadata
- .itemInfo: Item properties

Implications:

1. Single Editor: Only the creator can edit survey from their machine
2. No Collaboration Sharing: Cannot be shared via partnered collaboration groups
3. Manual Transfer: To transfer ownership, entire folder must be copied to another user's machine

#### **7.1.5 Survey translation workflow**

The ArcGIS Hub built-in function for automatic translations does not translate the embedded surveys. They need to be translated separately. The process involves editing the form.xlsx XLSForm to add new columns for each language. For each language, add columns to XLSForm:

##### **Translation Columns**

- label::[language\_code] (e.g., label::fi, label::sv)

- `hint::[language_code]`
- `guidance_hint::[language_code]`
- `required_message::[language_code]`

### Choices sheet translation

- `label::[language_code]` columns to choices sheet

### *Automated translation process*

HELCOM developed an R script using Google Translate API. This [video tutorial](#) introduces translations, and contains [detailed instructions](#).

Here is a concise flowchart-style description of the script:

1. **Start**
2. **Initialize**
  - Load required R packages.
  - Set `input_dir`.
  - Build list of `main_dirs` (first-level subfolders).
  - Define `target_languages` map (name → language code).
3. **Define helper processes**
  - Translate text (`translate_safe`)
    - If text is empty/NA → return as is.
    - Else call Google Translate → on error, return original text.
  - Translate HTML text (`translate_html_safe`)
    - If text contains HTML → parse HTML, translate all text nodes with `translate_safe`, rebuild HTML content.
    - Else call `translate_safe`.
  - Translate survey sheet
    - For each target language and each of: `label`, `hint`, `guidance_hint`, `required_message`:
      - If column exists → create new column `<col>::<language name>` with translated content.
  - Translate choices sheet
    - For each target language:

- If label column exists → create label::<language name> with translated content.

#### 4. Record start time

#### 5. Loop over main folders

- For each dir in main\_dirs:
  - Print “folder is being translated”.
  - Set target\_files list
    - form.xlsx
    - 1.3 Step 2 SWOT.xlsx
    - 3.3a Scenario building.xlsx

#### 6. Loop over target files in folder

- Build file\_path.
- Decision: **Does file exist?**
  - **No** → skip to next file.
  - **Yes** →
    - Try to open workbook.
    - Decision: **Sheet "choices" present?**
      - If yes: read sheet → translate choices → write back.
    - Decision: **Sheet "survey" present?**
      - If yes: read sheet → translate survey fields → write back.
    - Save workbook (overwrite existing).
    - On error: print error message.

#### 7. After finishing all files in folder

- Print “folder translated, X remaining”.

#### 8. After all folders processed

- Record end time.
- Compute elapsed time.
- Print “Translations completed” and elapsed time.

#### 9. End

### *Manual Review Required*

Automated translations should be reviewed by native speakers for:

- Technical terminology accuracy
- Cultural appropriateness
- Context-specific meaning
- Formatting consistency

#### *7.1.6 Survey data management*

##### *Deleting user data*

The deletion procedure can only be done by administrators hosting the surveys, in this case MoSARD staff only:

Open Survey123 web app:

1. Navigate to <https://survey123.arcgis.com/>
2. Sign in with MoSARD AGOL account

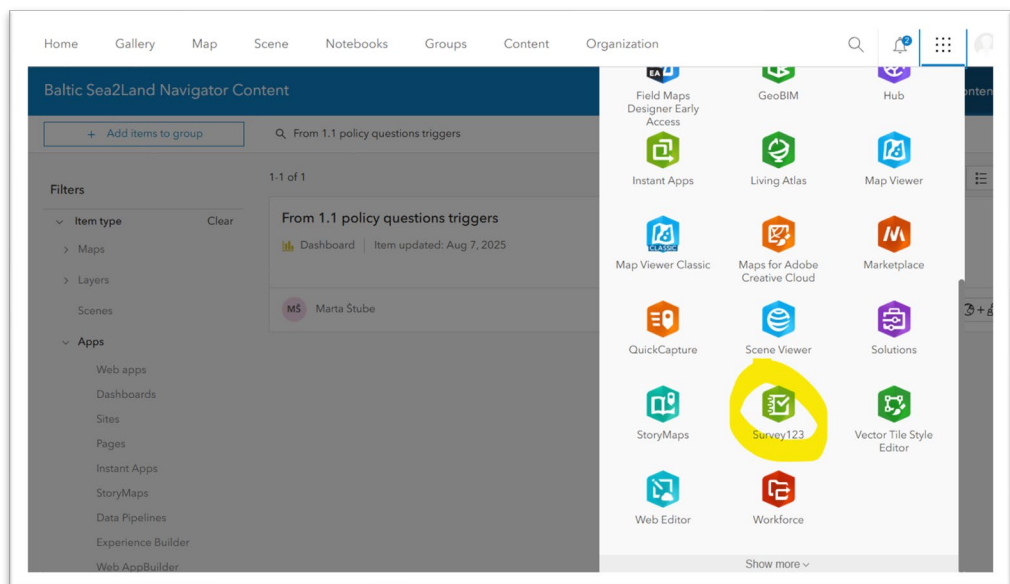


Figure 12 Select the Survey123 app from AGOL

3. Locate the survey containing data to delete

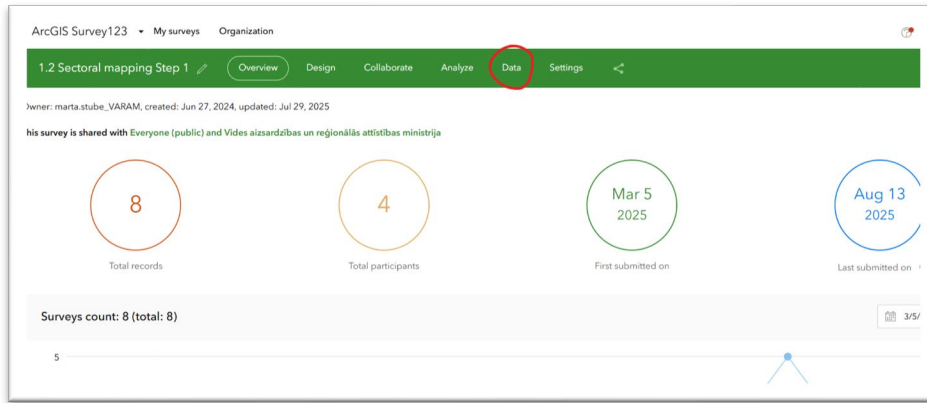


Figure 13 Locate the survey

4. Click on survey thumbnail
5. Select Data tab at top of page
6. Identify the record to delete:
  - a. Use search/filter tools
  - b. Verify user identifier
  - c. Confirm request matches record
7. Select the row by clicking checkbox
8. Click Delete button on right side

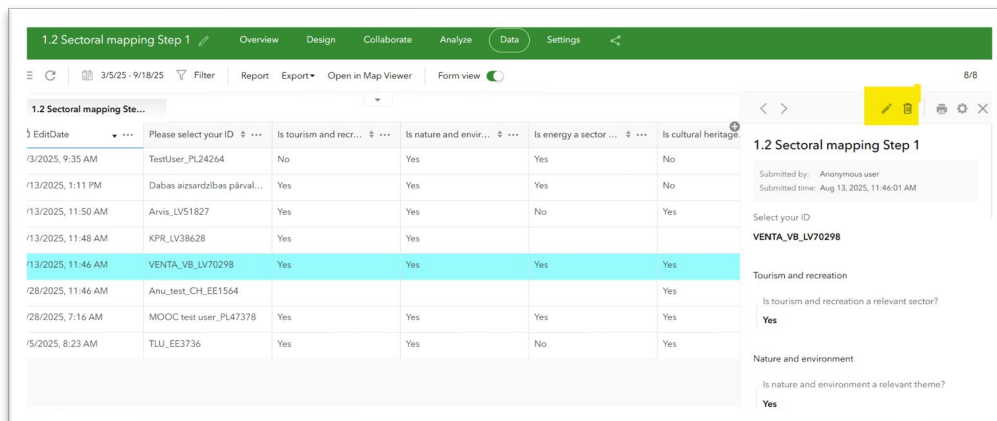


Figure 14 Delete by clicking on the icon

9. Confirm deletion in popup dialog
10. Record deletion in data management log

#### Important notes:

- Deletions are permanent and cannot be undone
- Only one record can be deleted at a time (no bulk deletion)
- Must be performed from creator's AGOL account
- Dashboards and visualizations update automatically after deletion

### *Editing survey responses*

Users can edit their own responses if Edit functionality is enabled. The implementation is done via ArcGIS Experience Builder which provides anonymous editing capability ([How-to guide](#))

*Edit application components:*

1. Feature Layer: Survey response data
2. Edit Widget: Allows record modification
3. Filter: Shows only user's own records (based on ID)

*User workflow:*

1. User accesses edit application URL
2. Enters their unique survey ID
3. Application filters to show only their responses
4. User selects response to edit
5. Makes changes in form
6. Submits updated response
7. Changes sync to feature layer and dashboards

#### **7.1.7 Survey best practices**

To improve usability and accessibility, use clear, jargon-free language, and provide helpful hint text for complex questions.

Make accessibility a priority by ensuring sufficient color contrast, providing text alternatives for images, using logical tab order, and supporting keyboard navigation.

To enhance data quality use constraints to validate input, provide clear required\_message text, and use consistent terminology across questions

## **7.2 ArcGIS Dashboards**

### **7.2.1 Overview**

ArcGIS Dashboards provide real-time visualization of survey data collected through Survey123. Dashboards enable stakeholders to explore aggregated results, identify patterns, and understand collective perspectives.

### **7.2.2 Dashboard architecture**

Data source: Survey123 feature layers (hosted by MoSARD)

*Key components:*

- Header: Branding, title, global filters
- Charts: Bar, pie, line, serial charts

- Lists: Tabular data views
- Filters: Category and ID selectors

### 7.2.3 User interface enhancements

The Navigator dashboards include two major UI customizations:

1. User ID dropdown selector for personalized data filtering
2. Text wrapping in dashboard fields for improved readability

#### *Enhancement 1: Adding a User ID Dropdown Selector*

This customization enables users to filter dashboard data to view only their own survey responses.

#### *Implementation Procedure:*

##### *Step 1: Open Dashboard for Editing*

1. Navigate to dashboard in AGOL content
2. Click Edit button
3. Dashboard opens in edit mode

##### *Step 2: Add Header*

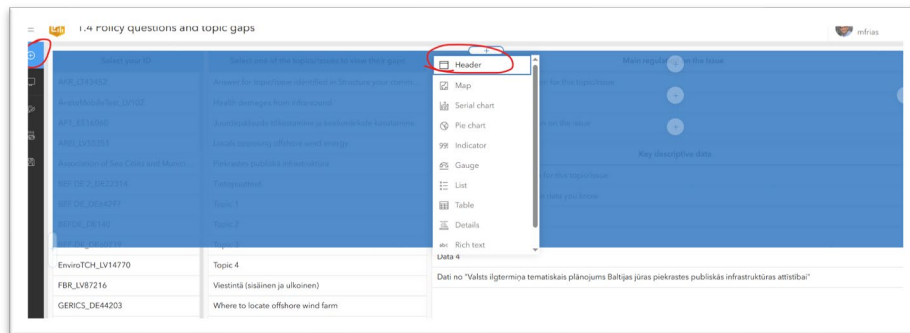


Figure 15 Add header to dashboard

1. In left panel, click Add > Header
2. Configure header:
  - Title: Survey name or section title
  - Description: Optional context
  - Margins and sign out: Set off

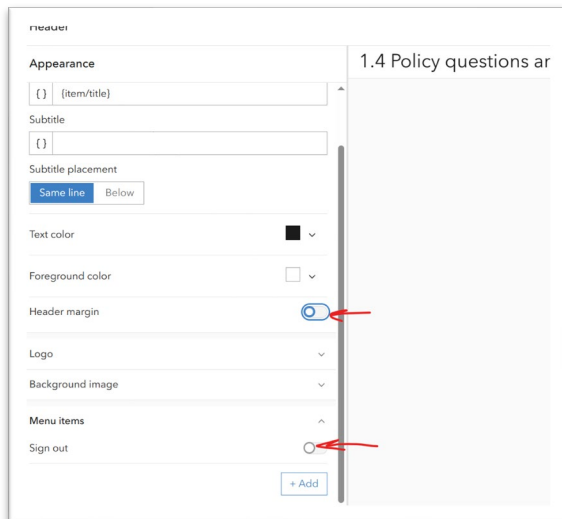


Figure 16 Apply these settings to improve usability

### 3. Click Done

#### Step 3: Add Category Selector to Header

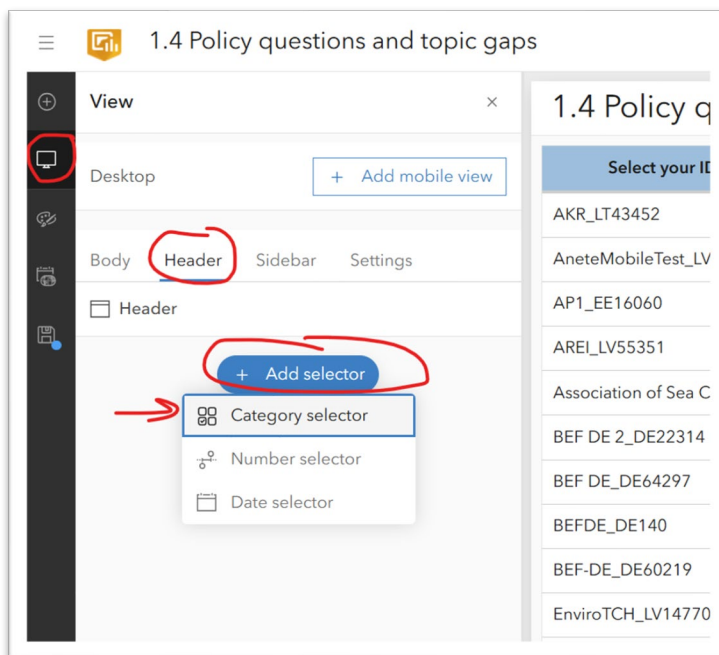


Figure 17 Add a selector to choose category

1. Click View in top menu
2. Select Header
3. Click Add > Selector > Category selector

#### Step 4: Configure Data Source

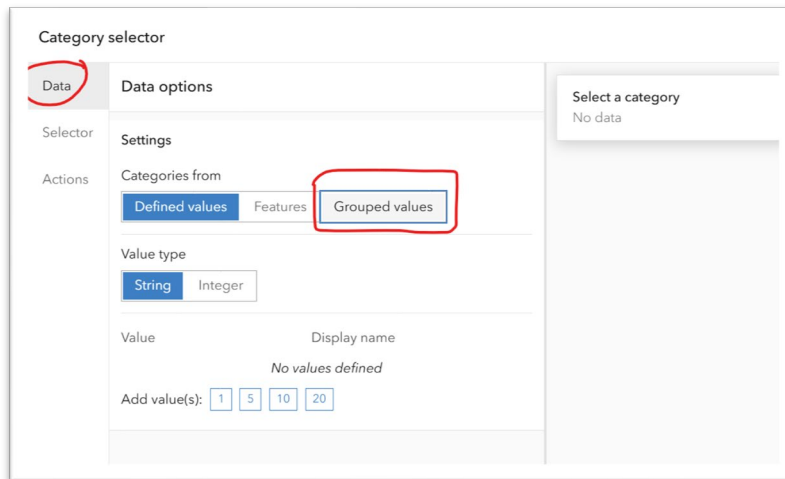


Figure 18 Select group values

1. In right panel under Data, select Grouped values
2. Click Select layer button
3. Choose the Survey123 feature layer



Figure 19 Choose feature layer

4. Under Category field, select the user ID field
  - Typically named: `your\_id\_for\_using\_the\_tool` or similar

- This is the field where users entered their unique identifier

Category selector

Data

Data options

Selector: Defined values Features **Grouped values**

Actions: Layer: ID\_with\_prefix\_public\_view [Change](#)

Filter: [+ Filter](#)

Category field

Your ID for using the tool:

- ObjectID (objectid) 🔑
- Please enter a name for your organisation (org\_name) abc
- Please select your country abbreviation (country\_abbr) abc
- Other (country\_othe) abc
- random number (random\_number) int
- Your ID for using the tool: (your\_id\_for\_using\_the\_tool) abc**
- Your ID for using the tool: (your\_full\_id) abc

Figure 20 Choose unique identifier

### Step 5: Configure selector appearance

Category selector

Data

Selector options

Selector: **Selector**

Actions: Label:

Placeholder text:

Icon: [Add icon](#)

Presentation mode:  Inline  **Dropdown**

Selection:  Single  **Multiple**

Show search:

Show reset and select all:

Maximum height:  **Compact**  Extended

Operator:  **include**  does not include  contains

No override defined

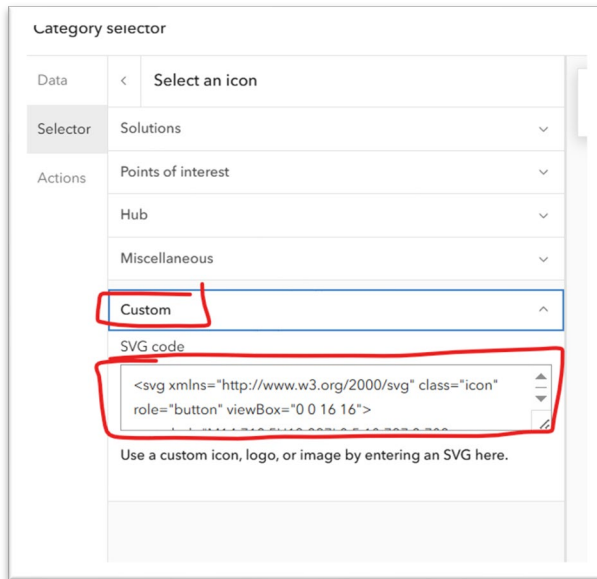
[+ Override](#) [Load categories](#)

General

Figure 21 Apply selector style settings

1. Under selector section:
  - Label: "Select your ID" (or localized equivalent)
  - Placeholder text: Enter a single space character ( ` ` )
  - Purpose: Prevents default text from showing
  - Presentation mode: Dropdown
  - Selection: Multiple (allows selecting multiple IDs if needed)
  - Show search: ON (enables search within dropdown)
2. Click Select an icon

*Step 6: Add custom dropdown icon*



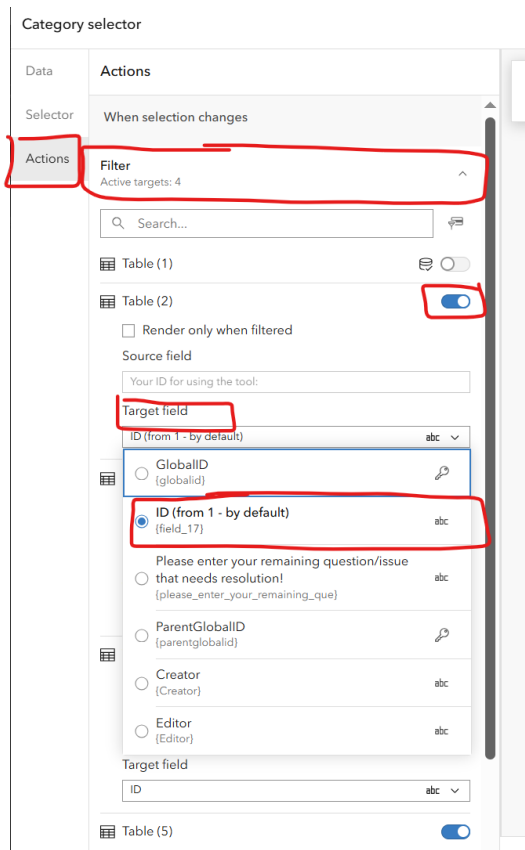
*Figure 22 Custom dropdown icon*

1. Under icon selection, click Custom tab
2. Paste the following SVG code:

```
<svg xmlns="http://www.w3.org/2000/svg" class="icon" role="button"
view-Box="0 0 16 16"> <path d="M14.712 5H13.297L8.5 10.797 2.702
5H1.288L8.5 12.21z"/> </svg>
```

3. Click OK

*Step 7: Configure filter actions*



1. Under Actions section, click Filter
2. Select all dashboard elements that should respond to filter
3. Under Target field, select the user ID field for each element
4. Click Done

*Step 8: Clean Up Interface*

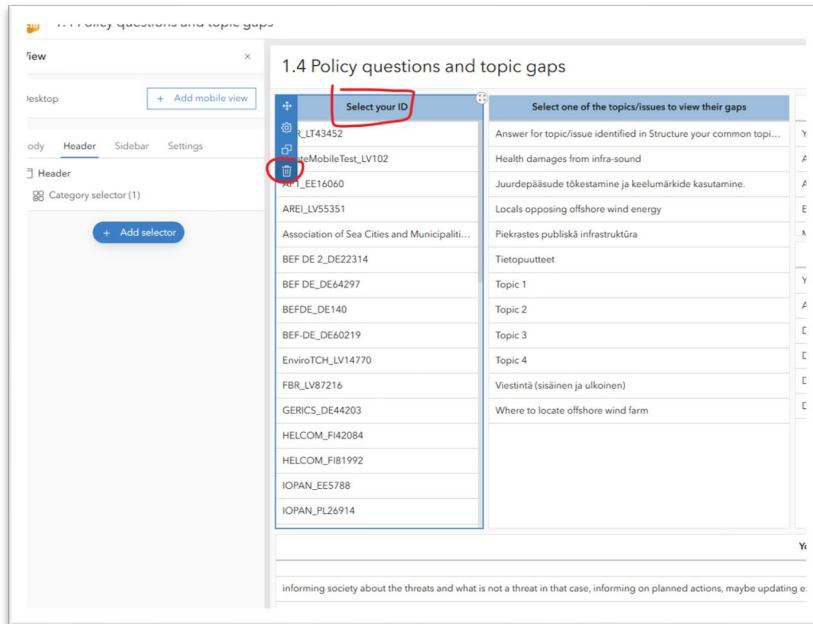


Figure 23 Clean up interface

1. Locate the selector label "Select your ID" (appears by default)
2. Delete the label if you added a custom header title
3. Adjust selector width and positioning as needed

#### Step 9: Save dashboard

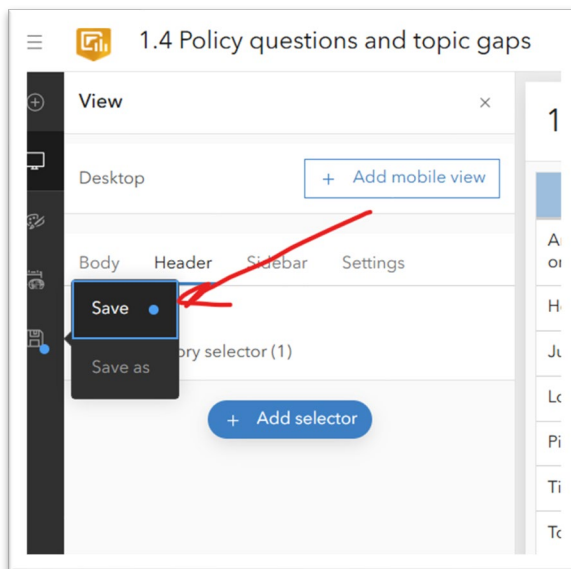


Figure 24 Do not forget to save

1. Click Save button (top right)
2. Choose save option:
  - Save: Updates existing dashboard
  - Save As: Creates new copy

3. Test the dropdown selector:
  - Enter Preview mode
  - Select a user ID from dropdown
  - Verify that charts and data filter correctly

#### Technical details:

The selector works by:

1. Querying distinct values from the user ID field
2. Populating dropdown with unique IDs
3. Sending filter action to connected dashboard elements
4. Each element queries its data source with filter condition: `user\_id IN (selected\_values)`

#### Enhancement 2: Wrapping text in dashboard fields

Long text responses often get truncated in dashboard list elements, making them difficult to read. By default, text in list fields appears on a single line and truncates with "..." if too long. To solve it, we apply custom CSS styling to wrap text within cells.

#### Implementation procedure:

Step 1: Open list element for configuration

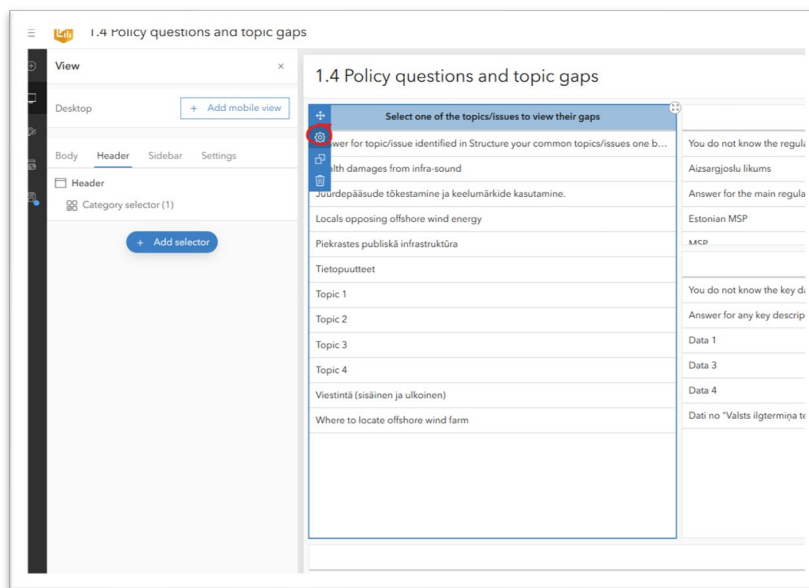


Figure 25 Access configuration

1. In dashboard edit mode, click on the list element
2. Click Configure button
3. List configuration panel opens

Step 2: Locate the text field and enable advanced formatting

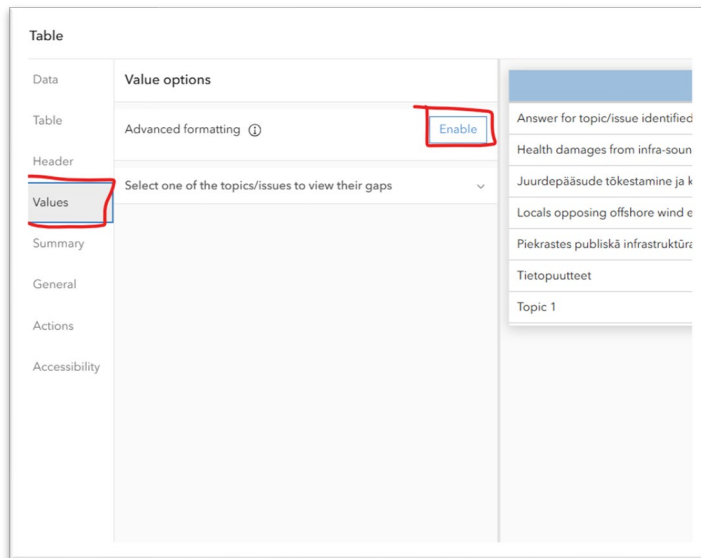


Figure 26 Enable advanced formatting

1. Click Values
2. Toggle to Enable
3. Code editor appears with Arcade expression

Step 4: Modify display text

Original Arcade expression might look like:

```
displayText: $datapoint.enter_the_topicissuetheme_you_h,
```

Replace with HTML div tag to enable text wrapping:

```
displayText: ` <div style="text-wrap: wrap;">${$datapoint.enter_the_topicissuetheme_you_h}</div> `,
```

Explanation:

- Wraps field value in HTML ``<div>`` element
- ``style="text-wrap: wrap;"` CSS property enables text wrapping`
- Backticks (`) enable template literal for string interpolation
- ``${...}`` syntax inserts field value into HTML`

Step 6: Save and test

1. Click Done in configuration panel
2. Save dashboard
3. Enter preview mode
4. Verify text wraps properly in list cells

Best practices:

- Apply to fields with expected long text (descriptions, comments, feedback)
- Consider max-height to maintain consistent dashboard layout
- Apply consistently across all list elements for uniform appearance

## 7.3 ArcGIS Experience Builder

### 7.3.1 Overview

ArcGIS Experience Builder creates custom web applications with interactive maps, widgets, and user interface elements. The Navigator uses Experience Builder for two primary purposes:

1. Data Hub Geodata Services: Interactive exploration of geospatial datasets
2. MLG Tool Maps: Spatial exploration tools in Multi-Level Governance workflows

### 7.3.2 Geodata service implementation

The purpose of the Geodata section is to allow public access to geospatial datasets provided by project partners relevant to maritime and coastal planning.

*Application URL:* Embedded in Navigator Data Hub section

#### Architecture

Experience Builder App:

- Map Widget
  - Web Map: "Navigator-geodata"
    - HELCOM REST Services
      - Datasets from hc-gis02 server

#### Data workflow

1. Data Preparation (HELCOM GIS Team):
  - Open ArcGIS Pro project: `BS2L.aprx`
  - Project location: `\\hc-gis02\gis\_input\_data\BalticSea2Land\project\`
  - Data source folder: `\\hc-gis02\gis\_input\_data\BalticSea2Land\data\`
  - Prepare datasets following HELCOM data standards:
  - Symbology definition
2. Publishing to ArcGIS Server:

- Right-click map in Contents pane
- Select Share As > Web Layer
- Choose Reference registered data (faster, no data copy)
- Configure service properties:
  - Enable WMS, WFS
  - Set access permissions
  - Define feature access capabilities
- Publish to HELCOM ArcGIS Server
- Service endpoint:
  - https://maps.helcom.fi/arcgis/rest/services/BalticSea2Land/BalticSea2Land/MapServer*
- 3. Web Map creation:
  - Open ArcGIS Online
  - Create new web map
  - Add published REST service layers
  - Configure:
    - Popup templates with informative attribute displays
    - Filter and query capabilities
    - Basemap selection
  - Save as "Navigator-geodata"
  - Share to collaboration group
- 4. Experience Builder configuration:
  - Create new Experience Builder application
  - Add Map widget
  - Connect to "Navigator-geodata" web map
  - Add supporting widgets:
    - Legend: Display layer symbology
    - Layer List: Toggle layer visibility
    - Search: Find locations or features
    - Filter: Advanced data queries
  - Configure layout and branding
  - Publish application
  - Embed in Hub

### Metadata management

Metadata for all geodata layers is maintained in an Excel file:

- Location: HELCOM AGOL content
- Access: Public download
- Contents:
  - A tab for each country
  - Category
  - Dataset

- Metadata
- Additional info

*REST service endpoint:*

<https://maps.helcom.fi/arcgis/rest/services/BalticSea2Land/BalticSea2Land/MapServer>

### 7.3.3 MLG Tool maps

The Multi-Level Governance (MLG) tool includes interactive maps at two stages:

1. Section 1.1: Find the Planning or Policy Question, Step 2
2. Section 1.2: Sectoral Mapping, Step 2

Both applications share similar architecture with user-specific data filtering.

*Application components:*

Component	Widget	Purpose
Map	Map widget	Visualize spatial data
Legend	Legend widget	Explain map symbology
Filter	Query widget	Filter data by user ID

*Data source:*

- Web Map: "MLG - Spatial exploration"
- URL (private access): <https://helcom.maps.arcgis.com/home/item.html?id=06e92f86cca34fd78af48f53074dde70>

*User filter implementation:*

The filter enables users to view only their own contributed data.

Configuration steps:

1. Add Query widget:
  - In Experience Builder, add Query widget
  - Position prominently (top right of interface)
2. Configure data source:
  - Select the survey feature layer containing user data
  - This is typically the Survey123 response layer
3. Build SQL expression:

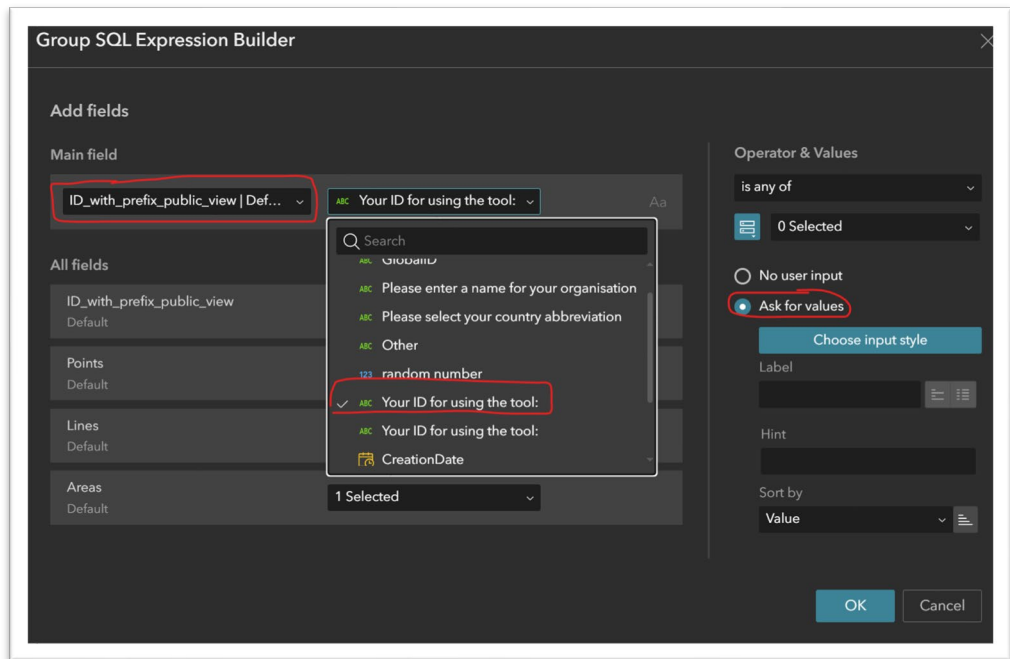


Figure 27 Query implementation

- Click Add expression in Query widget settings
- Use Expression Builder
- Configure:
  - Field: Select the user ID field (first occurrence in schema)
    - Common name: *your\_id\_for\_using\_the\_tool*
  - Operator: "is any of"
  - Value: Enable "Ask for values"
    - This creates a user input field
    - User enters their ID to filter results

#### User workflow:

1. User opens MLG tool map application
2. Enters their unique ID in filter widget
3. Map updates to show only features they created
4. Legend displays only relevant symbology
5. User can interact with their data spatially

#### Technical considerations:

- Field selection: Use the first occurrence of the user ID field in the schema
  - Survey123 may create multiple fields with similar names
  - First occurrence is typically the primary key
- Multiple values: "is any of" operator allows filtering by multiple Ids. This allows viewing collective data.

#### Experience Builder advantages for MLG Tool:

- Seamless integration with Survey123 data
- Real-time updates as users submit surveys (refresh browser is often needed)
- Spatial visualization of stakeholder input
- Customizable interface for specific workflows

## 7.4 Data Hub Geodata services

### 7.4.1 Data storage infrastructure

Server: HELCOM hc-gis02

Path: \\hc-gis02\gis\_input\_data\BalticSea2Land\

*Directory structure:*

BalticSea2Land/

- project/
  - BS2L.aprx: ArcGIS Pro project file
- data/

### 7.4.2 REST service architecture

Base URL: <https://maps.helcom.fi/arcgis/rest/services/BalticSea2Land/BalticSea2Land/MapServer>

*Service capabilities:*

- Query: Feature attribute and spatial queries
- Identify: Get feature information by location
- Find: Search features by attribute value
- Export: Download data in various formats (GeoJSON, KML, etc.)

*Layer access pattern:*

Base URL/[layer\_id]/query?where=1=1&outFields=&f=json

### 7.4.3 Metadata management

Format: Excel spreadsheet

Location: HELCOM AGOL (publicly accessible)

Update Frequency: When new layers are added or significantly modified

Metadata for all geodata layers is maintained in an Excel file:

- Location: HELCOM AGOL content
- Access: Public download
- Contents:

- A tab for each country
- Category
- Dataset
- Metadata
- Additional info

## 8. User interface customization

### 8.1 HTML and CSS Modifications

Although ArcGIS Hub provides built-in templates, the Navigator implements custom HTML and CSS to enhance user experience and align with project branding.

#### 8.1.1 Customization locations

Hub Site Editing:

1. Sign in to ArcGIS Hub
2. Navigate to Navigator site
3. Click Edit Site
4. Use Layout Editor for visual customization

Editable components:

- Page layouts and card arrangements
- Navigation menu structure and styling
- Header and footer content
- Custom text blocks with HTML/CSS

#### 8.1.2 Branding consistency

These settings are applied in Customize/Theme

Color Palette:

- Header Background Color: #00497f
- Header Text Color: #ffffff
- Body Background Color: #ffffff
- Body Text Color: #4c4c4c
- Body Link Color: #00497f

Typography:

- Base Font: Source Sans Pro
- Heading Font: Source Sans Pro

## 8.2 Branding guidelines

### 8.2.1 Project Logos

Interreg Baltic Sea Region Logo and Baltic Sea2Land Logo: Used in site footer across all pages

HELCOM Logo: used only in favicon

#### *Logo usage rules:*

Refer to Interreg [Baltic Sea Region Logo communication toolkit](#). General rules:

- Always maintain aspect ratio
- Provide sufficient white space around logos
- Provide alternative text for accessibility

### 8.2.2 Visual style

- Clean, professional appearance
- Maritime-inspired color scheme
- High contrast for readability
- Consistent spacing and alignment
- Clear visual hierarchy

## 8.3 Accessibility considerations

Esri's official Accessibility Conformance Report (ACR) for ArcGIS Hub Premium (version 5.368.0, dated May 5, 2025) evaluates against WCAG 2.2 Level AA (which extends WCAG 2.1 AA). It shows "Partially Supports" for multiple AA criteria under Perceivable, Operable, and other principles, including issues like insufficient text alternatives (1.1.1), improper info/relationships (1.3.1), and low contrast (1.4.3).

For more information refer to [ArcGIS Hub accessibility Status Report](#)

# 9. Data management and storage

## 9.1 HELCOM data storage

### 9.1.1 Server infrastructure

Server: hc-gis02

Operating system: Windows Server

GIS Software: ArcGIS Server

### **9.1.2 Data organization**

Project files:

- Location: \\hc-gis02\gis\_input\_data\BalticSea2Land\project\  
○ Contents: ArcGIS Pro project files (BS2L.aprx)

Source data:

- Location: \\hc-gis02\gis\_input\_data\BalticSea2Land\data\  
○ Formats: Shapefiles, geodatabase feature classes, rasters

### **9.1.3 AGOL storage**

Content types in HELCOM AGOL:

- Web maps
- Experience Builder applications
- Documents (Word, PDF)
- Images and icons
- Metadata files
- Dashboard applications

Storage quotas:

- Monitor AGOL credit usage regularly
- Optimize large datasets (generalization, compression)
- Archive outdated content

## **9.2 MoSARD survey storage**

### **9.2.1 Local storage**

Survey designs:

- Location: Local creator machines
- Path: C:\Users\[username]\ArcGIS\My Survey Designs\  
○ Backup: Manual, creator responsibility

### **9.2.2 Cloud storage**

Survey responses:

- Hosted in MoSARD AGOL as feature services
- Automatic backups by Esri cloud infrastructure
- No manual backup required

## 9.3 Backup and recovery procedures

### 9.3.1 HELCOM server backups

Managed by HELCOM IT

### 9.3.2 AGOL Content backups

Automated:

- Esri provides infrastructure-level backups
- No action required for cloud-hosted content

Manual Snapshots:

- Export critical web maps periodically
- Download important documents
- Store locally as secondary backup

### 9.3.3 Survey123 backups

Survey Designs:

- Maintain local backups of entire survey folder
- Store on shared drive accessible to team

Survey Responses:

- Automatically backed up by AGOL
- Periodically export to CSV for archival
- Store in institutional repository

## 10. Maintenance and operations

### 10.1 Regular maintenance tasks

The frequency of this maintenance tasks are decided by the main administrator:

- Monitor platform availability
- Respond to user support requests
- Check dashboard data refreshes
- Update content as needed
- Monitor AGOL credit usage
- Check for broken links or errors

- Review collaboration group memberships
- Audit content sharing permissions
- Review and update documentation
- Review and renew ArcGIS licenses

## 10.2 User support procedures

Issue	Solution
Cannot submit survey	Check browser compatibility, clear cache
Dashboard not loading	Verify feature service is published and accessible
Data not appearing on map	Check filter settings, verify data extent
Cannot access collaboration content	Verify user is member of collaboration group
Translation not working	Check language selector, verify survey has translations

# 11. Technical procedures

## 11.1 Survey translation workflow

Detailed procedure documented in [Section 7.1.5](#)

Quick Reference:

1. Edit form.xlsx in Survey123 Connect
2. Add language columns: *label::[lang\_code]*, *hint::[lang\_code]*, etc.
3. Run R translation script or manually translate
4. Review translations for accuracy
5. Republish survey from Survey123 Connect
6. Test all languages in survey preview

## 11.2 User data management

Detailed procedures documented in [Section 7.1.6](#)

Quick reference - Delete Data:

1. Open Survey123 web app
2. Navigate to survey
3. Select Data tab
4. Locate and select record
5. Click Delete button
6. Confirm deletion
7. Log the action

**Quick Reference - Edit Data:**

1. User accesses edit application
2. Enters their survey ID
3. Selects response to modify
4. Makes changes
5. Submits updated response

**11.3 Dashboard Configuration**

Detailed procedures documented in [Section 7.2](#)

**Quick Reference - Add User Selector:****Edit dashboard**

1. Add header
2. Add category selector to header
3. Connect to survey layer
4. Set category field to user ID
5. Configure dropdown appearance
6. Add custom SVG icon
7. Configure filter actions
8. Save and test

**Quick Reference - Wrap Text:**

1. Edit dashboard
2. Configure list element
3. Select field with long text
4. Enable advanced formatting
5. . Wrap field in ``<div style="text-wrap: wrap;">`` tag
6. Save and test

**12. Appendices****Appendix A: Glossary of Terms**

<b>Term</b>	<b>Definition</b>
<b>AGOL</b>	ArcGIS Online - Esri's cloud-based GIS platform
<b>ArcGIS Hub</b>	Platform for open data sharing and community engagement
<b>ArcGIS Server</b>	GIS server software for publishing geospatial services
<b>BEF</b>	Baltic Environmental Forum Latvia

<b>Term</b>	<b>Definition</b>
<b>BS2L</b>	Baltic Sea2Land (project abbreviation)
<b>Collaboration Coordinator</b>	User designated to manage partnered collaboration
<b>Dashboard</b>	Visual display of data through charts, graphs, and indicators
<b>Experience Builder</b>	Tool for creating custom web applications
<b>Feature Layer</b>	Web-based layer representing geographic features
<b>Feature Service</b>	Web service providing access to feature data
<b>GDPR</b>	General Data Protection Regulation (EU data privacy law)
<b>Geodata</b>	Geographic or spatial data
<b>HELCOM</b>	Helsinki Commission - Baltic Marine Environment Protection Commission
<b>Hub</b>	Short for ArcGIS Hub
<b>Map Service</b>	Web service providing map images
<b>MLG Tool</b>	Multi-Level Governance Tool
<b>MoSARD</b>	Latvian Ministry of Smart Administration and Regional Development
<b>Partnered Collaboration</b>	AGOL feature for cross-organization content sharing
<b>REST</b>	Representational State Transfer (API architecture)
<b>Shared Update Group</b>	Collaboration group allowing all members to edit content
<b>Survey123</b>	Form-centric data collection tool
<b>Survey123 Connect</b>	Desktop application for advanced survey design
<b>TLU</b>	Tallinn University
<b>Web Map</b>	Map published to ArcGIS Online for web viewing
<b>XLSForm</b>	Excel-based form specification for Survey123 Connect

## Appendix B: Technical Requirements

### *B.1 User requirements*

To View Navigator (Public):

- Modern web browser (Chrome, Firefox, Safari, Edge)
- Internet connection
- No account required

To Submit surveys:

- Modern web browser
- Internet connection
- No account required (surveys are anonymous or self-identified)

To collaborate (Partner Organizations):

- ArcGIS Online organizational account
- Designated as collaboration coordinator or group member
- Modern web browser
- Network access to AGOL

### ***B.2 Administrator requirements***

To manage Hub:

- ArcGIS Hub license
- Publisher or Administrator role in HELCOM AGOL
- Collaboration coordinator designation

To manage Surveys:

- ArcGIS Survey123 Connect installed (Windows or macOS)
- Creator or Administrator role in MoSARD AGOL
- Local drive access to survey folders

To publish geodata:

- ArcGIS Pro license
- Publisher role in HELCOM AGOL
- Network access to hc-gis02 server
- ArcGIS Server publishing permissions

### ***B.3 Browser compatibility***

<b>Browser</b>	<b>Minimum version</b>	<b>Recommended version</b>
<b>Chrome</b>	90+	Latest stable
<b>Firefox</b>	88+	Latest stable
<b>Safari</b>	14+	Latest stable
<b>Edge</b>	90+	Latest stable

### ***B.4 Software versions***

<b>Software</b>	<b>Version</b>	<b>Last verified</b>
<b>ArcGIS Online</b>	Current	March 2025
<b>ArcGIS Hub</b>	Current	March 2025
<b>Survey123 Connect</b>	3.x	March 2025
<b>ArcGIS Pro</b>	3.x	March 2025
<b>ArcGIS Server</b>	10.9+	March 2025

## Appendix C: API documentation

### C.1 REST service endpoints

BalticSea2Land Map Service:

Base URL:

<https://maps.helcom.fi/arcgis/rest/services/BalticSea2Land/BalticSea2Land/MapServer>

## Appendix D: Troubleshooting guide

### D.1 Common issues and solutions

Issue: Dashboard not displaying data

Symptoms: Dashboard loads but charts/lists are empty

Possible causes:

- Feature layer not shared properly
- Filter excluding all data
- Data source query failing

Solutions:

1. Verify feature layer is shared to appropriate group/level
2. Check dashboard filters - temporarily remove all filters to test
3. Verify feature service is online (check service URL)

Issue: Survey won't submit

Symptoms: User completes survey but submission fails

Possible causes:

1. Network connectivity issue
2. Browser compatibility issue

Solutions:

1. Check internet connection
2. Verify survey is published and feature service is running
3. Try different browser or device
4. Clear browser cache and cookies
5. Check if browser allows third-party cookies

Issue: Experience Builder app not loading

Symptoms: App shows loading spinner indefinitely or blank screen

**Possible causes:**

1. Web map not accessible
2. Data sources not shared properly
3. Browser compatibility
4. Network/firewall issue

**Solutions:**

1. Open web map directly in AGOL to verify it loads
2. Check all data layers are shared to appropriate audience
3. Test in different browser
4. Check browser console for errors
5. Verify no VPN/firewall blocking ArcGIS domains

**Issue: Text not wrapping in dashboard**

Symptoms: Long text is truncated with ellipsis (...)

**Solutions:**

1. Verify Advanced Formatting is enabled for the field
2. Check Arcade expression syntax:
3. displayText: ` <div style="text-wrap: wrap;">\${\$datapoint.field\_name}</div> `,
4. Ensure backticks (`) are used, not regular quotes
5. Verify field name matches exactly (case-sensitive)
6. Save dashboard and refresh browser

**Issue: Partnered collaboration not working**

Symptoms: Content shared to collaboration group not visible to partners

**Possible causes:**

1. Collaboration not fully established
2. Content not added to collaboration group
3. Member not added to group
4. Incorrect sharing level

**Solutions:**

1. Verify collaboration status is "Active" in both organizations
2. Confirm item is shared to correct collaboration group
3. Check user is member of the collaboration group
4. Verify group is designated as partnered collaboration group
5. Check item sharing level (may need to be Organization or Public)

**Issue: Translation not appearing in survey**

Symptoms: Survey only shows default language

**Possible causes:**

1. Translation columns not added to XLSForm
2. Survey not republished after adding translations
3. Language selector not configured
4. Browser language settings

**Solutions:**

1. Open form.xlsx and verify *label::[lang]* columns exist and contain translations
2. Republish survey from Survey123 Connect
3. Clear Survey123 app cache
4. Check survey settings for language support
5. Manually select language in survey (if option available)

***D.2 When to contact support*****Contact HELCOM IT:**

- Server access issues (hc-gis02)
- ArcGIS Server service failures
- Hub site infrastructure problems
- Collaboration setup issues

**Contact MoSARD IT:**

- Survey123 publishing failures
- Survey data deletion/privacy requests
- Feature service issues for surveys

**Contact Esri Support:**

- Software bugs or crashes
- License activation issues
- Complex technical configuration problems
- Platform-wide outages

**Appendix E: External Resources**

- ArcGIS Hub Documentation: <https://doc.arcgis.com/en/hub/>
- Survey123 Documentation: <https://doc.arcgis.com/en/survey123/>
- ArcGIS Dashboards Documentation: <https://doc.arcgis.com/en/dashboards/>
- Experience Builder Documentation: <https://doc.arcgis.com/en/experience-builder/>
- ArcGIS REST API Reference: <https://developers.arcgis.com/rest/>
- Community Forums: <https://community.esri.com/>