LIFE24-PRE-IT-LIFE-MAPPER

Guidelines for **MAP**ping, **P**rot**E**cting, and **R**estoring Marine Ecosystems

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1.0 Tech documento	25/06/2026	Upload by coordinator on platform demo release	1-16
1.0 Tech documento	07/07/2026	Revised by CNR and uploaded to the EU Funding & Tenders Portal	1-16

Executive Summary

The LIFE MAPPER Knowledge Platform is the public-facing knowledge hub of the EU-funded LIFE24-PRE-IT-LIFE-MAPPER project, whose mission is to provide science-based guidelines for mapping, protecting, and restoring European marine ecosystems. Version 1.0 of the platform, described in this report, marks the first complete release of all front-end and back-end components, fully deployed and accessible to the public at life-mapper.eu.

The platform is built as a reusable, multilingual knowledge-publishing engine: structured content is organised into thematic chapters, a searchable resource catalogue, and video tutorials, all navigable through controlled taxonomic filters, full-text search, and an integrated geoportal. The same codebase can serve future knowledge-platform instances with minimal configuration changes, making it an asset beyond the LIFE MAPPER project itself.

This deliverable provides a comprehensive account of what has been built and released. It covers the platform's architecture, the new visual identity and user-experience design, the structure of the content catalogue and its taxonomy, the user roles and editorial workflow, the four tutorial modules, and the path forward for content population and feature additions.

> **Milestone — version 1.0 is live since 15/06/2026 when presented in the LIFE Platform Meeting in Valencia.**
>
> The public site and the Knowledge Platform are online at https://life-mapper.eu over HTTPS. Search indexing is enabled (robots, sitemaps, canonical/Open-Graph/JSON-LD metadata), and the bilingual administrator manual (EN/IT) has been delivered.

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1 Context

Marine ecosystems across Europe are under increasing pressure from climate change, habitat degradation, and human activity. The LIFE MAPPER project responds to this challenge by producing and synthesising the scientific knowledge needed to map, protect, and restore these environments — in direct support of the EU Nature Restoration Law and the EU Biodiversity Strategy. A central commitment of the project is to make that knowledge openly and permanently accessible: not buried in project archives, but structured, searchable, and useful to researchers, policymakers, practitioners, and the public alike.

The LIFE MAPPER Knowledge Platform is the vehicle for that commitment. It collects the project scientific outputs — datasets, papers, protocols, case studies, tools, interviews — and makes them navigable through an intuitive web interface. Its thematic chapters mirror the structure of the LIFE MAPPER technical manual; its taxonomy aligns with EU habitat classification (Annex II of the Regulation (EU) 2024/1991 here after Nature Restoration Regulation - NRR) and marine research domains.

The platform has been designed with longevity and reusability in mind. Version 1.0 is the first public milestone, but the architecture anticipates a catalogue growing from tens to thousands of resources, an expanding community of editors, and the possibility of future instances serving other EU knowledge-sharing projects with the same underlying engine.

2 Platform Architecture & Technical Stack

The platform is built on a modern, open-source stack, entirely self-hosted on a dedicated virtual private server (VPS) with full HTTPS termination and a reverse-proxy layer. All services run as Docker containers, orchestrated so that the full stack can be started, stopped, backed up, or migrated with a single command.

Technology	Role in the platform
Astro (SSR)	Front-end framework; generates server-side-rendered pages for fast initial load and SEO friendliness
Directus	Headless CMS; data model, editorial workflow (draft → published), REST/GraphQL API, role management
PostgreSQL + PostGIS	Relational database with geospatial extension; stores all content and powers the geoportal queries
Redis	In-memory cache; reduces CMS API latency for repeated page loads
Meilisearch	Full-text search engine; indexes all resources, returns results with highlighted match terms in milliseconds
Docker Compose	Container orchestration; the monorepo is a single composable unit deployable on any Linux VPS
Nginx	Reverse proxy; handles HTTPS termination, legacy 301 redirects, and static asset caching

Table 1 A list of the technologies involved in the LIFE MAPPER Knowledge Platform, along with their respective roles.

The front-end and Content Management System (CMS) are decoupled: Astro fetches data from Directus at build time (for static pages) and at request time (for dynamic catalogue queries). This separation means that editorial changes in Directus propagate to the public site without requiring a full rebuild, while static content benefits from CDN-level caching.

Search-engine readiness was a first-class requirement: the deployment includes dynamic XML sitemaps, canonical and Open-Graph metadata, JSON-LD structured data, and a branded 404 page. A legacy redirect map ensures that any URLs from earlier prototype versions resolve without error.

3 New Visual Identity & User Experience

One of the defining achievements of Version 1.0 is the translation of the LIFE MAPPER brand into a coherent, production-quality digital design system. The visual language was developed in close collaboration with the project's communication team and is documented in the LIFE MAPPER Brand Manual and Design System Pack.

3.1 Brand System

The LIFE MAPPER identity draws on the palette of the Mediterranean and northern European seas: deep oceanic blues anchor the primary interface, while a clean white canvas and an accent green (referencing marine vegetation and restoration) provide contrast. Typography uses a geometric sans-serif that balances scientific authority with digital readability.

Figure 1 Home page of the LIFE MAPPER Knowledge Platform.

The logo and iconography have been adapted for web contexts, supplied in both full-colour and monochrome variants and in vector and raster formats for multi-resolution rendering. All assets are packaged in the Brand Manual referenced in the project repository, ensuring consistency across the platform, project publications, and partner communications.

3.2 Design Principles

Five principles guided every interface decision:

- **Clarity** — users arriving from any background. Scientists, policymakers, practitioners can orient themselves within the first page view.
- **Discoverability** — content is reachable by at least three independent paths: free-text search, thematic chapter, or taxonomy filter.
- **Trust** — resource cards surface provenance signals (institution, DOI, citation count via OpenAlex, publication date) before the user opens a record.
- **Performance** — server-side rendering and aggressive asset optimisation keep Time-to-First-Byte under 500 ms on standard connections.
- **Accessibility** — colour contrast ratios, keyboard navigability, and screen-reader-friendly markup follow WCAG 2.1 AA targets.

4 Knowledge Platform Structure & Navigation

The public site is organised into five top-level areas, all reachable from the home page navigation bar and the home-page entry points.

4.1 Home

The home page acts as a control room rather than a landing brochure. Four entry points — free-text search, chapters, tutorials — sit beneath the project tagline and direct users immediately to the section most relevant to their task.

4.2 Chapters

The Chapters section mirrors the four thematic topics of the LIFE MAPPER technical manual, providing a conceptually structured entry point for users who prefer to navigate by subject rather than search:

- Chapter 1 — Habitat mapping and conditions assessment
- Chapter 2 — Assessing marine restoration efforts
- Chapter 3 — Estimating restoration costs
- Chapter 4 — Spatial prioritisation

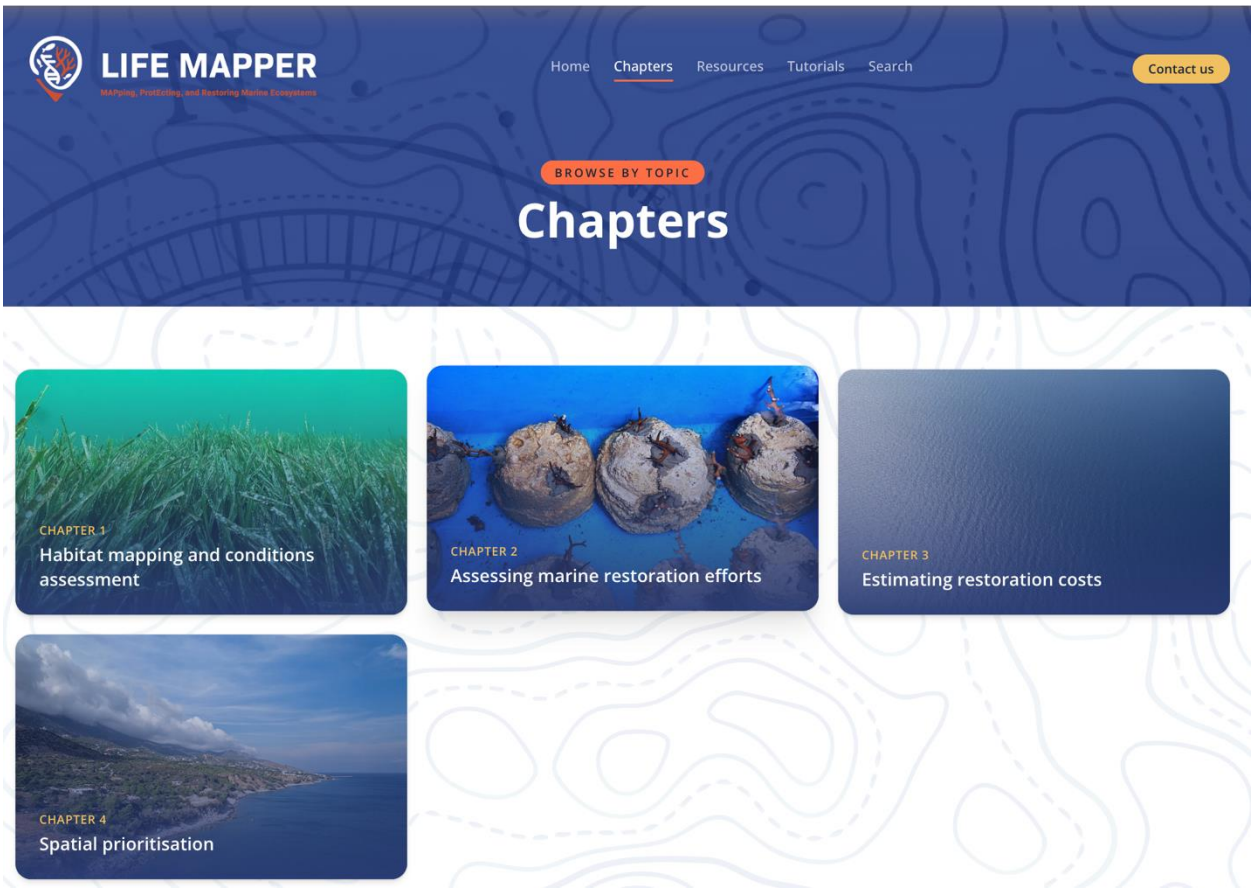

Figure 2 Chapters section's overview in the LIFE MAPPER Knowledge Platform.

Selecting a chapter displays all catalogue resources tagged to it, sorted by recency by default and refinable via the sidebar filters. Each chapter also carries a short editorial introduction written by the scientific team.

4.3 Resources

The Resources section is the heart of the platform. It presents the full catalogue as a filterable, searchable grid of cards. Users can narrow results through eleven facets: chapter, resource type, project, geographic area, thematic area, habitat group, methodology, output format, synergetic projects, keywords, and resource type.

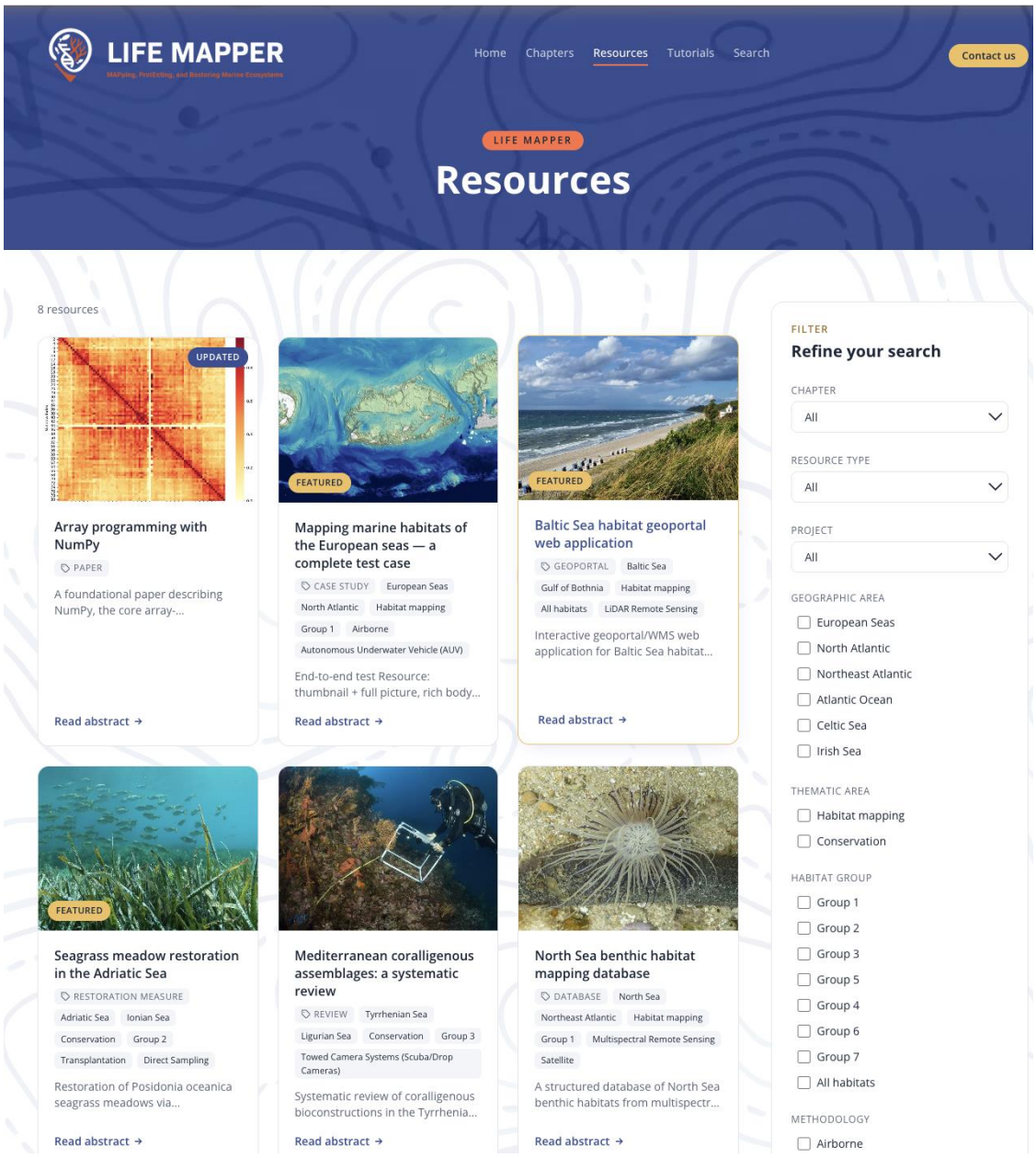

Figure 3 Resources section's overview in the LIFE MAPPER Knowledge Platform.

Resource types cover the full spectrum of scientific and operational knowledge: datasets, scientific papers, geoportals, tools, case studies, guidelines, protocols, project sheets, interviews, and videos.

Each type has a dedicated card layout that surfaces the most relevant metadata at a glance.

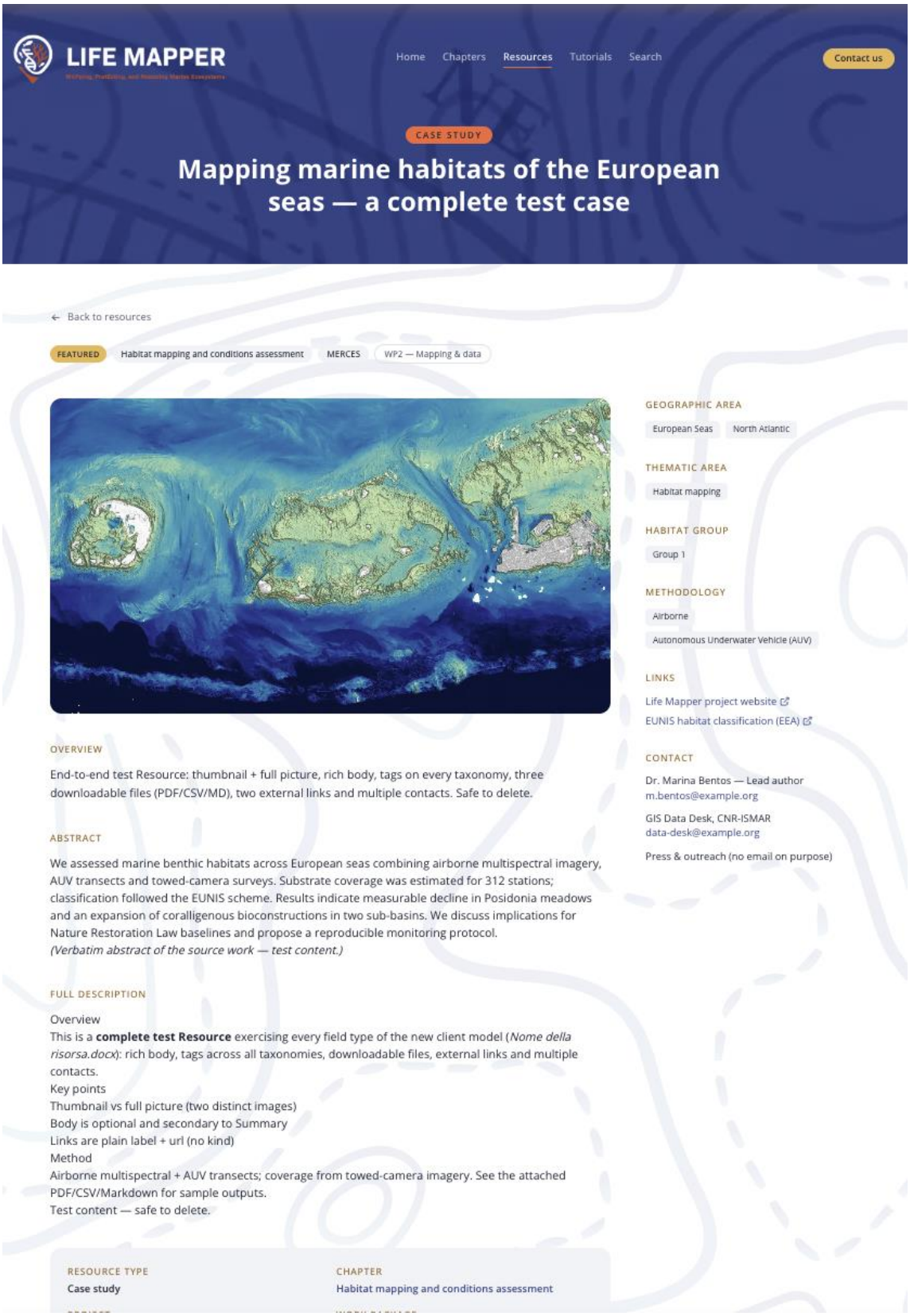

Figure 4 Resource' s overview in the LIFE MAPPER Knowledge Platform.

4.4 Tutorials

The Tutorials section presents four structured video modules with accompanying editorial text that contextualises each video, lists prerequisites, and links to related resources. See Section 8 for a description of each module.

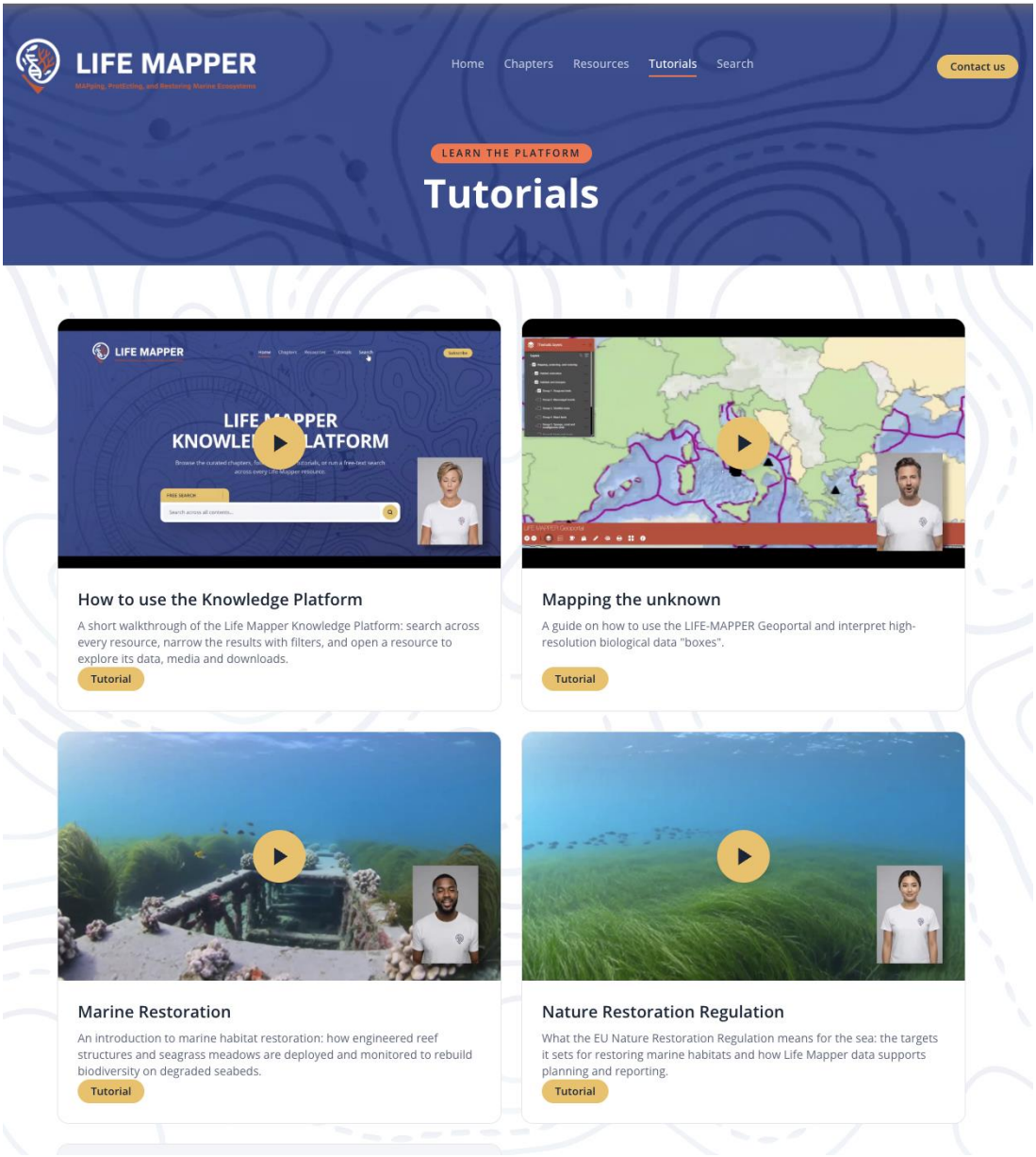

Figure 5 Tutorials' section in the LIFE MAPPER Knowledge Platform.

4.5 Search

The platform-wide Search is powered by Meilisearch, a high-performance full-text engine. Results are grouped by resource type and returned with the matched terms highlighted in context. Typo-tolerance and stemming are enabled, so queries produce meaningful results

even with partial or misspelled input. The search index is updated automatically whenever content is published.

5 Content Catalogue & Taxonomy

The catalogue is the living heart of the platform. Its long-term value depends entirely on the quality of the content and the rigour of its classification. The taxonomy was designed in close alignment with EU regulatory frameworks (e.g. NRR Annex II, Habitat Directive, Marine Spatial Planning directive) and the research domains represented by the LIFE MAPPER consortium.

5.1 Content Categories

The catalogue is organised into six content categories, each mapped to a document type and to the project Work Package that produces it:

Category	Type of resource	Description
Data & knowledge gaps	Cartography	Maps, including spatial representation, symbology, and layout.
Data & knowledge gaps	OGC services	Web services compliant with Open Geospatial Consortium standards that allow sharing and accessing geospatial data, such as WMS, WFS, and WCS.
Data & knowledge gaps	Questionnaires	A research instrument consisting of a structured series of questions used to systematically collect quantitative and/or qualitative data from participants for analysis and interpretation.
Data & knowledge gaps	Database	An organized system for storing, managing, and retrieving data
Data & knowledge gaps	Review	Research method that identifies, evaluates, and synthesizes all relevant studies on a specific research question using a structured, transparent, and reproducible methodology
Scientific insights	Case study	An in-depth analysis of a real-world example used to illustrate practical applications and lessons learned.
Scientific insights	Project	Research projects dealing with marine restoration.
Scientific insights	Papers	Scientific or technical articles presenting research findings, methods, or innovations.
Scientific insights	Interview	A structured conversation used to collect information, experiences, or expert opinions through questions and answers.
Best practices and tools	Guidelines	Documents providing recommendations and best practices.
Best practices and tools	Protocol	A standardized and detailed procedure describing step-by-step how to perform a specific activity.
Best practices and tools	Geoportal	A web platform that allows users to search, view, and access geospatial data and services.
Best practices and tools	Workbook	A practical document with exercises, instructions, and examples to support learning or operational tasks.

Best practices and tools	Decision-making assistance tool	A tool designed to support decision-making by providing analysis, models, or visualizations to evaluate different options.

Table 2 List of resources managed by the LIFE MAPPER Knowledge Platform.

5.2 Indexing & Tagging Strategy

Each resource is indexed across five orthogonal tag dimensions, forming a multi-faceted classification that supports precise filtering without forcing a rigid hierarchy:

- Field of Research — Habitat Mapping, Marine Restoration, Conservation, Economics, Spatial Prioritisation, Assessment.
- **Sea Basin / Study Area** — Adriatic Sea, North Sea, Aegean Sea, Deep Sea Regions, Coastal Zone — among others.
- **Habitat Group (NRR Annex II)** — 1. Seagrass beds, 2. Macroalgal forests, 3. Shellfish beds, 4. Maerls beds, 5. Sponge, coral and coralligenous beds, 6. Vents and seeps, 7. Soft sediments (not deeper than 1 000 metres of depth).
- **Output Format** — R-Package, Excel workbook, Policy brief, Interactive map, Project sheet— among others.
- **Synergetic Projects** — MERCES, REDRESS, LIFE DREAM, CLIMAREST, PNRR MER, ACT NOW — enabling cross-project discovery.

Tags are drawn from controlled vocabularies managed in Directus; editors select from approved lists and cannot introduce free-form tags, ensuring consistent classification over time. Geographic tags additionally support the geoportal, which can render a resource's study area as an embedded map layer.

5.3 Scientific Paper Integration

Resources of type "Paper" receive special treatment. When an editor enters a DOI, the platform queries the OpenAlex open-access bibliographic API and auto-fills the title, authors, journal, publication year, abstract, and subject classifications. The citation count is refreshed periodically, providing a live signal of scientific impact. Editors can override any auto-filled field if the authoritative source differs from the API data.

6 User Roles & Editorial Workflow

The platform is designed for three distinct user types, each with a clearly bounded interface and permission set.

6.1 Visitor

A Visitor is any unauthenticated user of the public site. Visitors browse chapters, search the catalogue, read resource pages, play tutorial videos, and interact with the geoportal. No account is required. The public site is optimised for speed and discoverability; all content is indexed by search engines.

6.2 Editor

An Editor is a credentialled member of the LIFE MAPPER consortium (researcher or content manager) who creates and maintains catalogue records through the Directus administration panel. The editorial workflow enforces a two-stage cycle:

- Draft — the editor creates or updates a record; it is invisible to Visitors.
- Published — a Researcher Admin or Administrator approves the record; it immediately appears on the public site.

Editors are scoped by Institution:a researcher affiliated with CNR-ISMAR can create and manage records attributed to CNR-ISMAR but cannot modify records belonging to another institution's scope. This allows multiple organisations to share the same platform instance without risking cross-contamination of editorial ownership. Three CMS roles are defined: Researcher User (create and edit own drafts), Researcher Admin (approve and publish within institutional scope), and Administrator (full access, including taxonomy management and user provisioning).

6.3 Operator (Space42)

The Operator is the technical team responsible for the infrastructure. Space42 manages the monorepo, deploys updates, monitors server health, maintains backups, and implements the documented scaling roadmap as the catalogue grows. The operator layer is entirely separate from editorial access: platform updates do not require editorial intervention and vice versa.
An optional researcher single sign-on via ORCID is ready to enable at any time. Once activated, researchers can authenticate with their global scientific identifier, eliminating the need for platform-local credentials.

7 Demonstration Catalogue & Resource Page Anatomy

7.1 Demonstration Resources

At launch, the catalogue contains eight demonstration resources, one for each supported resource type (dataset, paper, geoportal, tool, case study, guideline, project sheet, video/interview). These are synthetic test records, deliberately identifiable by their "test" slug and a "Trial content" label. Their purpose is to exercise the full rendering, classification, filtering, and search pipeline end to end, and to allow editors to see exactly how each resource type will look before populating real content.
Figures and data in demonstration resources are illustrative and must not be read as real scientific data. They will be replaced by the LIFE MAPPER team's authentic editorial content as the projects' knowledge production advances.

7.2 Resource Page Anatomy

Every resource page, regardless of type, follows a consistent five-section layout:

Header	Title, resource type, chapter assignment, publication date, and automatic badges (Featured, New, Updated) assigned by recency rules.
Overview / Abstract / Body	The editorial summary (all types); the verbatim abstract for scientific papers; the extended body for detailed records.
Tags	Geographic, thematic, habitat and methodology labels drawn from controlled vocabularies; these power the sidebar filter logic.
Downloads & Links	Attached files with name, type and size; external links; for papers, a live citation count via OpenAlex.
Contacts & Map	The responsible contact person or institution; where relevant, an embedded geoportal layer showing the resource's study area.

Table 3 List of the five-section layout in the LIFE MAPPER Knowledge Platform.

The fixed anatomy makes every record predictable: a user who has read one resource page knows exactly where to look for any piece of information in the next, regardless of resource type. This consistency is a deliberate design choice that reduces cognitive load in a catalogue expected to eventually contain hundreds of records.

8 Tutorial Modules

The platform's tutorial section contains four structured learning modules, each addressing a key methodological dimension of the LIFE MAPPER project. Each module combines an embedded video with editorial context, a list of prerequisites, and curated links to related catalogue resources.

#	Title	Description
1	Mapping the Unknown	A guide on how to use the LIFE MAPPER Geoportal and interpret high-resolution biological data layers.
2	Defining Habitat Health	Instructions on applying indicators and thresholds to define the good condition.
3	The Restoration Roadmap	A walkthrough for selecting effective protocols and identifying favourable reference areas for restoration.
4	Financial Feasibility	Tutorials on using the Cost-Effectiveness Analysis Manual to build sustainable business cases for marine restoration.

Table 4 List of the tutorial sections in the LIFE MAPPER Knowledge Platform.

The tutorials are intended for two overlapping audiences: practitioners who need operational guidance (how to use the geoportal, how to apply indicators, how to run a cost-effectiveness model) and newcomers to the LIFE MAPPER scientific framework who want an accessible entry point before diving into the primary literature.
Video hosting uses YouTube and Vimeo, embedded with native controls. No tracking pixels from the hosting platforms are loaded unless the user interacts with the embed, in line with the platform's privacy posture.