ESPON

EUROPEAN UNION

Co-financed by the European Regional Development Fund

Inspire Policy Making with Territorial Evidence

TARGETED ANALYSIS //

LAKES

Spatial progress and integrated development opportunities of large lakes in Europe

Final Report // October 2021

This Targeted Analysis is conducted within the framework of the ESPON 2020 Cooperation Programme, partly financed by the European Regional Development Fund.

The ESPON EGTC is the Single Beneficiary of the ESPON 2020 Cooperation Programme. The Single Operation within the programme is implemented by the ESPON EGTC and co-financed by the European Regional Development Fund, the EU Member States and the Partner States, Iceland, Liechtenstein, Norway and Switzerland.

This delivery does not necessarily reflect the opinions of members of the ESPON 2020 Monitoring Committee.

Authors
Clément Corbineau, Erik Gløersen, Christian Lüer (Spatial Foresight)
Tobias Chilla, Anna Heugel, Dominik Bertram (Friedrich-Alexander University in Erlangen-Nürnberg)
Viktor Varjú, András Igari (HÉTFA Research)

Contributors to case studies and regional analysis
Clément Corbineau, Erik Gløersen, Maria Toptsidou (Spatial Foresight)
András Csite, Zsolt Szendrei, Anett Endrédi, András Igari, Bence Kovács, Viktor Varjú, Georgina Verhás, Zsolt Baranyai (HÉTFA Research)
Anna Heugel, Prof. Tobias Chilla (Friedrich-Alexander University Erlangen-Nürnberg)
Maria Yli-Koski, Janne Antikainen (MDI Consulting)
Rivo Noorkõiv
Giacomo Salvatori
Cormac Walsh

Steering Committee
Gabor Molnar - Lake Balaton Development Coordination Agency (LBDCA)
Marion Hammerl - Lake Constance Foundation (LCF)
Anders M. Nilsson – Region Västra Götaland, Cultural Development Administration

Information on ESPON and its projects can be found at www.espon.eu.
The website provides the possibility to download and examine the most recent documents produced by finalised and ongoing ESPON projects.

ISBN: 978-2-919816-26-2

Graphic design by BGRAPHIC, Denmark

Contact: info@espon.eu

Co-financed by the European Regional Development Fund

Inspire Policy Making with Territorial Evidence

TARGETED ANALYSIS //

LAKES

Spatial progress and integrated development opportunities of large lakes in Europe

Final Report // October 2021

Contents

List of maps, figures, charts and tables

List of maps

List of figures

List of tables

Abbreviations

BLI	Balaton Limnological Institute
CBC	Cross-border Cooperation
COVID-19	Coronavirus Disease 2019
DACH+	Territorial Monitoring System in Lake Constance region
EAFRD	European Agricultural Fund for Rural Development
EEA	European Environmental Agency
ELY centre	Centre for Economic Development, Transport and the Environment (deconcentrated state agencies in Finland)
EMFF	European Maritime and Fisheries Fund
EUSALP	EU Strategy for the Alpine Region
EUSDR	EU Strategy for the Danube Region
EUSBSR	EU Strategy for the Baltic Sea Region
ERDF	European Regional Development Funds
EU	European Union
FLAG	Fisheries Local Action Group
FYROM	Former Yugoslav Republic of Macedonia
GDP	Gross Domestic Product
GIS	Geographical Information System
GVA	Gross Value Added
IBK	International Lake Constance Conference
LBDC	Lake Balaton Development Council
LBDCA	Lake Balaton Development Coordination Agency
LBRA	Lake Balaton Resort Area
MICE	Meetings, incentives, conferences & exhibitions
MTÜ	Hungarian Tourism Agency
NGO	Non-Governmental Organisation
NP	National Park
NUTS	Nomenclature of Territorial Units for Statistics
OSM	Open Street Map
PPS	Purchasing Power Standard
R&D&I	Research & Development & Innovation
ROK-B	Spatial Development Commission Lake Constance
SWOT	Strengths, Weaknesses, Opportunities and Threats
UNESCO	United Nations Educational, Scientific and Cultural Organization
USSR	Union of Soviet Socialist Republics
WISE	Water Information System for Europe

Executive summary

ESPON LAKES has explored the challenges and opportunities for spatial development in large lake regions. The first objective of the project was to develop perspectives for sustainable integrated development in the three stakeholder regions of this Targeted Analysis (lake Balaton, lake Constance and lake Vänern). To do so, each lake region was analysed both from a territorial and from a governance perspective. A participative process was then organised, for regional stakeholders to react on main findings.

The second objective of the project was to elaborate a common narrative for European large lake regions. This narrative points out shared challenges and opportunities and highlights potential benefits of enhanced territorial cooperation within and across lake regions. It also provides a 'framework concept' on how to foster the European visibility of large lake regions, and on how their issues and opportunities could best be addressed at all levels. Other key outputs of the study are the structured description of the most important lake-related issues, and the overview of cooperation formats in large lake regions.

Major challenges affecting European large lake regions

(1) Large lake regions (including spatial planning, regional development, service provision) are confronted to **administrative and territorial fragmentation**: large lakes are in most cases shared between several regions or countries. This is especially relevant for spatial planning, regional development, and the provision of services of general interest. This requires inter-territorial efforts to establish cooperation adapted to the regional context. In this regard, large lakes are **laboratories for creative territorial cooperation**. The review of more than 50 cooperation initiatives in 12 large lake regions has shown that:

- **Lake-centred cooperation bodies** support the elaboration of long-term common visions for lake regions. Hence, they contribute to building integrated perspectives.
- **Intermunicipal cooperation initiatives** are frequent around large lakes. They can play a key role with regards to local development initiatives and strategic planning on lake shores.
- **Vertical cooperation between local and regional actors** is important in many policy fields. Often, national regulatory frameworks oblige them to cooperate or strengthen integration between regional and local policy making.
- **Bottom-up cooperation initiatives such as community-led local development groups** can bring together local stakeholders and jointly implement small-scale actions benefitting local communities and businesses (see e.g. for the fishery sector).
- **Other cooperation initiatives** can also play a role: grassroot multi-stakeholder alliances, networks of NGOs, business consortia.

Findings on these cooperation initiatives are collected in Annex to the final report (Annex 1).

(2) Planning in large lake regions mobilises a **spectrum of sectoral policies**: water management, ecosystem management, protection and valorisation of cultural and natural heritage, economic development (territorial attractivity and provision of SGIs), tourism development, fisheries, transport and spatial planning. Each of these policies are affected by the presence of the lake and could benefit from increased coordination.

(3) With few exceptions, large lakes in Europe are locate on the margin of metropolitan areas or outside the direct influence of metropolis, making it "**inner peripheries**". The connection to urban circulations (mobility and residential flows, cultural opportunities) as well as their inclusion into wider values chains is key for long-term regional development. In this regard, the COVID-19 crisis could renew interest for lakes as regional pool of resources and amenities.

(4) Large lakes are **fragile ecosystems**. The EU Water Framework directive adopted in 2000 has contributed to further institutionalise joint efforts to preserve and monitor lake waters and ecosystems. However, the protection of these ecosystems is constant endeavour with three major angles:

- Water management for monitoring and improving water quality,
- Nature protection, focusing on protecting specific habitats and on ensuring that human practices do not jeopardize perspective for an ecologically sustainable development,
- Spatial planning to balance different activities, interests and needs and develop an integrated and comprehensive approach on the lake.

(5) Large lake region remains a fluid concept with no broadly accepted definition. This allows regional stakeholders to build their own cooperation perimeter

Balaton, Vänern and Constance: three lake regions with distinct profiles

ESPON LAKES provided targeted analyses of the three stakeholder regions, in the form of three territorial and governance analyses based on desk research and interview, and three participative processes aiming at fostering the regional dialogue on integrated development and planning.

- Lake Balaton is a shallow lake in Central Europe, more precisely in Hungary. It has developed as a touristic and leisure area since the beginning the 20th century due to the pleasant temperature of the lake and the favourable climatic conditions. The touristic value of the Lake Balaton region is not only determined by the lake water quality and quantity, but also by the natural and built environment, long sandy beaches, traditional vineyards and recreational services built on local traditions. However, Lake Balaton region faces challenges related to seasonality of activities and attractivity for year-round resident population. Another challenge is the increasing concentration of tourists (and newly built second homes) on the shoreline causing conflicts with local dwellers and with stakeholders managing the ecosystem. The spatial structure of Lake Balaton area is determined by the duality of riparian and background municipalities.
- Lake Vänern is a Scandinavian lake. While both riparian regions are Swedish, the water basin area extends into Norway. A significant proportion of surrounding municipalities are rural and sparsely populated areas. Manufacturing and agricultural activities are overrepresented in the lake region, which is both an inner periphery in the shadow of Gothenburg (southern part) and the centre of the Värmland region (around Karlstad, northern part). The lake itself hosts significant freight traffic, fishery and leisure activities with 18 leisure harbours. The lake region is undergoing a transition process to develop a more integrated approach to the use of its tourism potential.
- Lake Constance is a pre-Alpine lake bordering three countries (Austria, Germany and Switzerland). Cross-border governance has a long-standing tradition in the region. As a consequence, the management of water quality, fisheries and transport is regulated with intergovernmental agreements and cooperation. Besides, within the Lake Constance region cross-border commuting is a relevant phenomenon. The lake region is characterised by strong natural elements such as the Rhine river that flows through Lake Constance, the Alpine mountains in the South and the German middle mountain ranges in the North. The lake region is organised in a polycentric way with numerous medium-sized towns and rural areas. The region is economically innovative, based on a strong industry and a several universities. Agriculture (fruit, vegetables, wine grape, hop) also plays a key role in the regional identity. Furthermore, the region is an intensive tourist destination not only with regard to overnight tourism but also a high number of day trips.

Findings on challenges and opportunities for these lakes are collected in three regional reports (Annexes 2a, 2b, 2c).

A framework concept for large lakes

One of the main outputs of this Targeted Analysis is the *framework concept*, a policy document that supports integrated development in large lake regions. This document compiles recommendations for integrated development to make the outcome from the analysis on European lake regions and field work in the three stakeholder regions available to decision makers and practitioners at all administrative levels, from local to EU. It furthermore illustrates the diversity of large lake regions and, hence, facilitates exchange and learning about this diversity in Europe.

Fine-tuned in cooperation with stakeholders from Balaton, Vänern and Constance regions, the framework concept highlights policy options through five access points:

- **Regional integration – EU place-based policies and investments in lake region.** The first access point refers to the integration of the lake and adjacent areas, mainly regions and municipalities through the support of European Structural and Investment Funds and related instruments.
- **Land-lake integration – where land meets water.** Zooming further into the lake, the interface of lake-based and land-based activities along the shoreline could be given more attention in order to better address land-lake interactions.

- **Policy integration – cooperation between sector players.** Various players rely on the lake for their activities. The variety of needs might however lead to conflicting interests and high pressure on the lake and its adjacent areas. This implies a need for cooperation between the representatives of these interests and relevant policy sectors.
- **Vertical integration – lakes in overarching policies.** Going beyond the immediate context, Vertical integration reflects that large lake regions are embedded in multi-level governance systems from local to EU level.
- **European integration – communities of European lakes.** At a wider scale, the joint interests of large lake regions in Europe should be identified and utilised for community building. European integration refers to the representation of interests of lake regions at EU level and European communities of learning, exchange, and capacity building.

The ‘framework concept’ is provided as a separate Annex to the final report (Annex 3).

Introduction

Regional and local policy makers are increasingly aware of the importance of functional relations and interdependencies for balanced territorial development. This is one of the factors that have triggered enhanced interested in geographical features such as mountains, islands, coastal strips and river basins. The provide frameworks to address a wide range of functional challenges, many of which have been overlooked. They for example concern ecosystem services, leisure activities and secondary housing, food provision, rivers and aquatic living environments, commuting patterns and access to services of general interest. Factoring in geographic specificities when addressing these different types of policy concerns makes it possible to elaborate more robust and efficient regional visions and strategies. The added value of such an approach is illustrated by cooperation spaces at different institutional levels: national (e.g. “mountain massifs strategies” in France), cross-border (e.g. cooperation along rivers), and macroregional (EUSALP, EUSBSR, EUSDR), but also regional and sub-regional (e.g. numerous intermunicipal cooperation initiatives built around a geographic feature). The present report presents interim results of an investigation into similar initiatives in lake regions, and of potentials for integrated territorial development around large lakes.

Integrated development of large lake regions

Stakeholders of this targeted analysis would like to foster region-building and integrated regional development processes around large lakes. The underlying hypothesis is that functional relations around lakes require common actions, a structured governance framework and adequate resources. On the one hand, an integrated development process is expected to work as a lever to mobilise actors at local and regional level, to solve lake-related issues and promote a common development perspective on a consensual basis. On the other hand, integrated development could help local and regional actors raise awareness on the specificity of lake-related issues and the needs associated to the lake regions in terms of knowledge, governance and funding.

The objective of promoting integrated regional development around large lake raises an ontological issue: what is a lake region? Political administrative geography usually does not help: Like other large geographical features (e.g. mountain ranges), large lakes tend to be shared between different municipalities, regions or even countries. The lake regions are therefore first approached by reviewing the multiple ways in which *networks of actors, functional zones,* and *representations* relate to the lake.

(1) ***Networks of actors*** connected to the lake are established to tackle issues directly connected to the lake. The emergence of the lake region as a relevant geographic level for planning and policy design and implementation presupposes the existence of *networks of stakeholders*. They create a common ground of action, based on a convergence of perceptions of the social, economic and environmental situation of the lake and its surrounding territories. They also help to reach a consensus on objectives to be pursued. The ESPON ACTAREA project described these as *“communities of intent”*.

(2) Territories around a large lake may be part of ***multiple partially overlapping functional areas***. To take a few examples, the management of water quality both upstream and downstream implies coordination efforts across the whole catchment area. Water supply systems depending on the lake are key for cities and settlements in a wide supply zone around the lake. The development of lake tourism mobilises local authorities and SMEs around the lake, but may also be linked to tourism in surrounding metropolises, mountain areas or other attractive areas. Commuting flows may run around the lake, but may also be oriented in direction of urban nodes at some distance from the lake. Mainstream spatial planning around large lake is therefore rooted in a wider set of functional relations: The establishment of more efficient transport connections between the shores or to bypass the lake is integrated in the regional transport network. The definition of new areas to be urbanised is integrated into territorial urban planning schemes. These functional areas do not necessarily overlap. They define a patchwork of objectives and interests with their own territoriality.

(3) Large lakes provide landscapes that are rich in ***social and cultural values and imaginaries***. Large lakes are often considered as sites of historical and national importance for they hosted settlements in prehistoric times. A number of UNESCO World Heritage sites are located on the shores of European large lakes. The view on waterbodies is also a common quality sought after by real estate

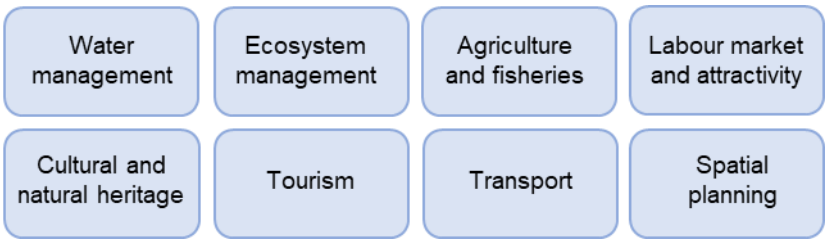
buyers. Moreover, the landscape view on the lake defines a specific bound between communities and the lake. Identities and social imaginaries are shaped by its nearby presence, as it is observed for other large spatial objects such as mountains (Debarbieux, 2019). Altogether, the valorisation of the lake as historical site, cultural landscape, and as living area institute the lake as a **territorial reference**.

Therefore, lake regions are territories with fuzzy boundaries (Haughton et al., 2009) where the management of territorial resources can hardly be organised by one institutional actor alone. The management of the lake (as a physical and ecological object) and the integrated development of its surroundings, require the involvement of actors from several places around the lake (inter-territorial dimension), from multiple sectoral backgrounds (cross-sectoral dimension) and with different ways to relate to the lake (multi-user perspectives).

Lake-related policy areas

In order to operationalise our approach of integrated development of large lakes, a set of eight **lake-related policy areas** has been defined. These policy areas provide entry points into the different lake regions. Integrated development in large lake regions, entails efforts to coordinate several terrestrial and marine issues, from managing the water body and using it for various purposes to more abstract terrestrial planning and lake-related activities onshore. Lake-related policy areas include water management, ecosystem management, agriculture and fisheries, labour market and attractivity, tourism, cultural and natural heritage, transport and spatial planning. Managing and balancing needs, conflicts and interdependencies between all these activities is the core of integrated development around lakes and in lake regions.

Figure 1 Lake-related policy areas



These lake-related policy areas have been further specified in 18 lake-related issues. ***Lake-related issues*** are causally related to proximity to the lake. Examples of such issues are regulation of water levels, regulation of maritime traffic across the lake, management of conflicts between different activities along the shores of the lake (e.g. tourism and industry), management of residential pressures in close proximity to the lake, congestion on road segments around the lake. The full list of lake-related issues is provided in Table 1 in the first chapter of this report.

Large lakes in Europe

The list of lake-related issues show that large lakes may be confronted to common challenges. However European large lakes are highly diverse in location and ecological conditions. Although there is no established definition of large lakes, recent attempts to classify waterbodies in Europe in broad categories have led to the identification of 144 “very large lakes”, i.e. lakes with a size of more than 100 km2 (Lyche Solheim et al., 2019). Most large lakes in Europe can be found in Scandinavia, in the Baltic States, in the Alpine Massif and in the plains of Central and Eastern Europe (see Map 1 in chapter 1).

The three stakeholder regions provide a good sample of the diversity of large lakes and progressive coordination in Europe.

- Lake Balaton has developed as a **touristic resort area** since the beginning the 20th century. It faces challenges related to seasonality of activities and attractivity for year-round resident population. Agriculture (wine grape and cereals) also plays a key role in the regional identity. Territorial planning around the lake started in the 1950’s with a first Regional Plan. Regional development has become more cooperative with the work of the Lake Balaton Regional Council

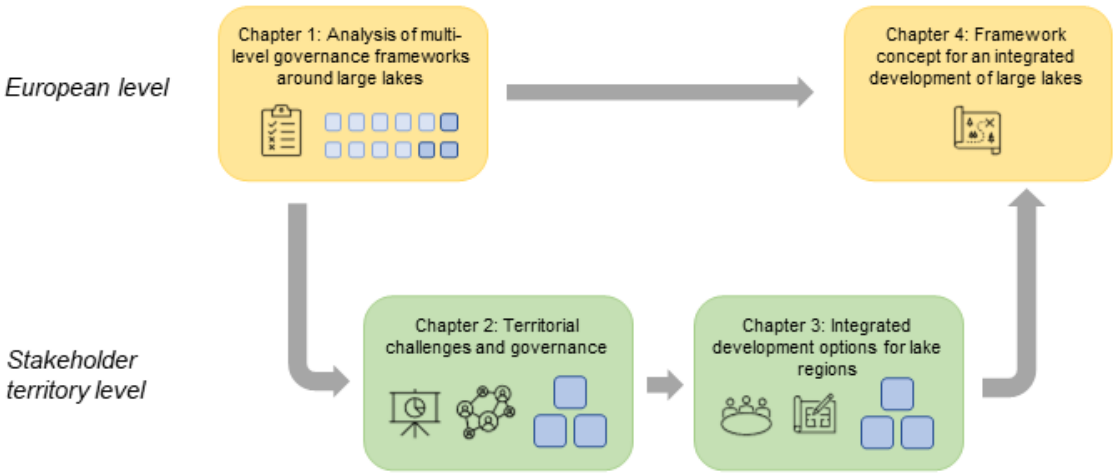
which founded the Lake Balaton Development Coordination Agency in 2000. Other soft territorial cooperation entities are linked to the lake Balaton but play a minor role in regional planning.

- Lake Vänern is surrounded by many rural and **sparsely populated municipalities**. Manufacturing and agricultural activities are overrepresented in the lake region, which is both an inner periphery in the shadow of Gothenburg (southern part) and the centre of the Värmland region (around Karlstad, northern part). The lake itself hosts significant freight traffic, commercial fishing and leisure activities with 18 leisure harbours. The lake region is undergoing a transition process to develop a more integrated approach to the use of its tourism potential.
- Lake Constance is surrounded by a **highly urbanised landscape** with large cities and a dense network of medium size towns. The lake region is economically highly innovative, based on a strong industry and a diverse university setting. At the same the region is an important touristic destination for overnight tourism and day trips as well as leisure activities in general. Furthermore, the region is an important agricultural production area (fruits, vegetables, wine grapes, hop) and provides drinking water to more than 4 mio. people.

Content of this report

This targeted analysis provides perspectives for more integrated development in European large lake regions in general and in these three stakeholder lake regions in particular. To do so, the study provides a comparative examination of multi-level governance in large lake regions in Europe based on 12 case studies (chapter 1), a thorough territorial and governance analysis of the three stakeholder regions (chapter 2), future options for sustainable integrated development in the three stakeholder regions based on the involvement of a wide range of regional and local actors (chapter 3) and a "framework concept" that will work as a tool for policy makers acting in large lake regions in Europe to support integrated development and promote large lake regions (chapter 4). Thus, this project combines a cross-cutting European perspective on large lake regions (chapter 1 and 4) with detailed analyses of the three stakeholder regions. In these regions, the project collected quantitative (statistical, geospatial) and qualitative data. These data were then used as the basis for a participatory process to develop "future options" (chapter 2 and 3). Figure 2 gives an overview of these four content-related chapters and illustrates the strong connectedness between European and regional aspects.

Figure 2 A two-scale approach



1 Overview of multi-level governance models around large lakes in Europe

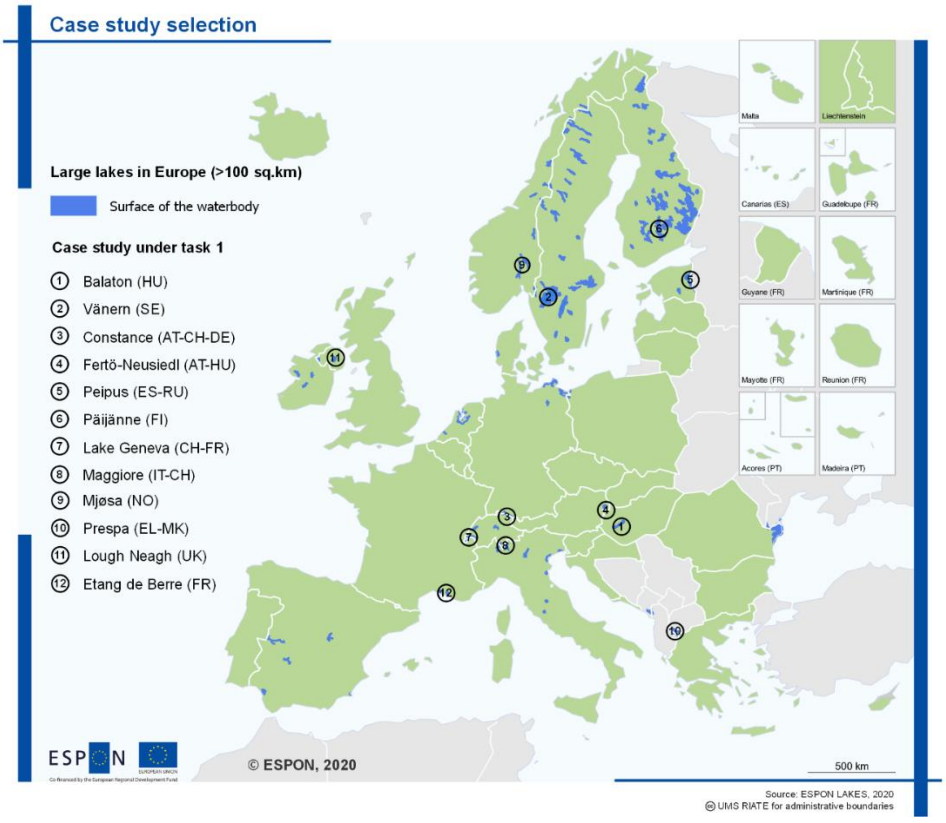
Large lakes generate a number of specific development opportunities and challenges. They can for example be attractive as tourism destinations, residential areas and locations for industrial activities. They can also have fisheries activities. At the same time, lake ecosystems can be particularly fragile. Preserving water quality can require careful planning and coordinated actions among a broad range of actors. The lake can be an obstacle to transport. The attractiveness of the land areas close to the lake, and the coexistence of different activities on the lake, can generate conflicts of interests.

In order to address such issues, and to better identify and exploit development potentials, innovative institutional arrangements or cooperation initiatives have been developed in a number of large lake regions. A better understanding of the objectives they pursue, the ways in which they function and the challenges they are confronted to can help to provide concrete recommendations on how integrated development of large lake regions could best be promoted.

When seeking to describe multi-level governance around lakes, the identification of relevant cooperation initiatives or institutional arrangements can be problematic. Initiatives of such initiatives or arrangement that occur next to a lake, but without an explicit focus on lake-related issues or opportunities are not necessarily relevant. It has been decided to adopt a restrictive approach and to define lake-related multi-level governance as a *combination of initiatives and institutional arrangements* that target *lake-related issues* and involve a *diversity of actors*. Relevant actors are not necessarily based in riparian political-administrative units. Also, the spatial scope of their activities can reach beyond riparian units.

This overview of multi-level governance in large lake regions, is provided through an exploration of lake-based governance around 12 European large lakes: the three lakes of this targeted analysis (Balaton, Vänern, Constance) and nine others (Fertö-Neusiedlersee, Peipus, Päijänne, Lake Geneva, Maggiore, Mjøsa, Prespa, Lough Neagh, Étang de Berre).

Map 1 Case study selection



The objective of this selection is to reflect the diversity of lakes in Europe from a geographical, morphological and institutional point of view: it includes four lake regions from the Scandinavian-Baltic area, three from the Alpine area, two from Central Europe, two from the Mediterranean Region and one in the British Isles. Mountain lakes (Constance, Geneva, Maggiore) and plain lakes (Vänern, Balaton, Peipsi, Neagh) are considered, alongside with a lagoon (Étang de Berre). Some lake regions are close to (or include) densely populated metropolitan areas (e.g. Lake Geneva, Lake Constance, Fertö-Neusiedl, Étang de Berre, Maggiore, Lough Neagh), while networks of small towns with intermediate population density (Balaton, Mjøsa, Peipsi) are found in others, and some are mostly composed of rural areas (Païjänne, Vänern, Prespa). Half the selected lake regions are cross-border, the other half are included in one country (referred below as "one-country lakes").

For these 12 lakes, experts have collected information related to most prominent lake-related issues (maximum 6 issues) and information related to cooperation initiatives in place around the lake. The case studies are gathered in a separate annex "Exploration of multi-level governance around 12 European large lakes: case study report". This report provides a transversal analysis of the 12 cases.

Table 1 Selection of lake related issues

Policy area	No	Standardised lake-related issues	1-Balaton (HU)	2-Vänern (SE)	3-Constance (AT-CH-DE)	4-Fertö-Neusiedl (HU-AT)	5- Peipus (EE)	6-Päijänne	7-Geneva	8-Maggiore	9-Mjøsa	10-Prespa	11-Lough Neagh	12-Etang de Berre	Total (by policy area)
Water management	1.1	Regulation of the water level of the lake		●		●		●		●					4
	1.2	Regulation of the quality of lake water, limiting water pollution	●	●	●		●	●	●	●	●	●	●	●	11
Ecosystem management	2.1	Protection of lake-specific ecosystems (marchland, forests)		●	●	●							●	●	6
	2.2	Protection of lake-specific biodiversity										●			
Agriculture and fisheries	3.1	Lake-related branding for food products													4
	3.2	Regulation of fish catches / support to lake-based fisheries		●			●	●						●	
Economic developement	4.1	Strategic measures for demographic attractivity:	●		●			●						●	6
	4.2	Business development policies targeting entrepreneurs in the lake region			●		●		●						
	4.3	Access to Services of General Interest in the lake region			●										
Tourism	5.1	Development and networking of the tourism industry	●	●			●	●	●	●			●		8
	5.2	Branding of the lake as a tourism destination				●									
Cultural and natural heritage	6.1	Protection and valorisation of cultural and natural heritage around the lake	●					●				●	●		4
Transport	7.1	Regulation of maritime traffic on the lake													4
	7.2	Organisation of public transport across the lake (ferry)								●					
	7.3	Management of daily mobility				●			●		●				
	7.4	Management of transit traffic								●					
Spatial Planning	8.1	Limiting urban-sprawl and soil-sealing	●		●										3
	8.2	Promotion of urban polycentric development (functional complementarity between urban nodes)			●						●				

Table 1 shows that the **selection of policy areas / lake-related issues is rather balanced**. From this point of view, main policy areas are those related to **water management** (and especially the monitoring of water quality), **tourism** and **regional development**.

1.1 Management of lake-related issues in large lake-regions

Each lake-related issue / policy area may be tackled through different governance framework, This section provides transversal insights on typical governance in place by policy area around the 12 lakes.

1.1.1 Water management

Water management in large lake regions encompasses two different lake-related issues: the management of water levels and the management of water quality.

Management of water level

The **management of water levels** can have consequences on lake shores, lake water quality, and regional development. Depending on the level of the lake and the foreseen variation of this level throughout the year, activities may or may not be developed and certain biotopes may or may not prosper. Water level management also has implications on activities downstream and upstream (e.g. for flood regulation or for irrigation in agriculture). For instance, on Lake Vänern water level affects the following sectors (Eklund et al., 2018) : *agriculture*: farmers wish to keep fields dry; *fisheries*, as some species are dependent on natural variations of water levels; *ecosystem protection*, as insufficient variations of water levels lead to bush encroachment and as floods can release pollutants into the lake water; *Inland waterway traffic* affected by low water levels*; energy production* as producers wish to use water reserves to optimise national production (e.g. to meet peak energy demand); and housing as *extensive housing areas* around Lake Vänern are exposed to flooding.

To balance these conflicting interests, water level regulation requires a transparent decision-making process for actors to adapt to predictable conditions. In the four lakes that identified water level regulation as a prominent lake-related issue, decision-making processes usually involve multiple actors. With regard to cross-border lakes, governance of water level can be based on **international legally binding agreements**: e.g. a cooperation between water directorates within the framework of the Austrian-Hungarian Water Committee for Lake Fertö-Neusiedl; an international convention between Italy and Switzerland, implemented on the Italian side by the Po Basin Authority for Lake Maggiore. With regard to one-country lakes, governance of water level can involve **negotiations between authorities at regional level**, as observed on Lake Päijanne, where Southeast Finland ELY centre located downstream manages the water in consultation with other ELY centres from upstream regions (Central Finland and Häme).

Monitoring of water quality

The monitoring and long-term preservation of water quality has been identified as an important lake-related issue around almost all large lakes. Good water quality forms the basis for thriving ecosystems and allows for certain usages associated with the lake: bathing water quality is monitored on most large lakes, while quality is also monitored for drinking purposes in Scandinavia (Mjøsa, Päijänne, Vänern) and around the Alps (Geneva, Constance, Maggiore); fishing resources are also affected by water quality. Main sources of pollution mentioned are related to urban and agricultural activities. Specific issues identified are eutrophication/algal blooms (related to excessive nutrient loads), micropollutants (pesticides, herbicides, metals and pharmaceutical residues) and microplastics (an emerging issue). Specific concentration of activities around lakes may pose localised threats on the quality of waters: in Vänern, eutrophication episodes are concentrated in a small number of bays (Vänern water management association, 2016); on Étang de Berre, the massive discharge of freshwater from a hydroelectrical power plant in the brackish lagoon disrupts the normal functioning of ecosystems; on Balaton, specific sections of shoreline strips are affected by increased environmental load due to the effect of tourism and the overuse of the riparian area. Climate change is also expected to have major consequences on the preservation of the water resource and require specific monitoring measures. Main foreseen consequences of climate change are more frequent droughts (see e.g., Lake Balaton), contamination of drinking water due to rising water temperatures (e.g., in Lake Vänern), eutrophication, brownification and biodiversity loss (for Lake Päijänne) or an overall degradation of the ecological status (e.g., in Lake Peipsi).

In the EU (and partner countries), water quality is monitored through **river basin management plans**, as defined in the Water Framework Directive (2000). These plans provide information on the status of waterbodies (chemical quality, ecological quality), describe measures to be taken to maintain or enhance water quality and identify key players responsible for water monitoring or implementation of measures.

Across the 12 lakes, implementation of monitoring activities and remediation measures involve a wide range of actors**.** It requires both a strong executive power to enforce decisions and bottom-up processes to generate consensus and ownership. **National and regional authorities** are the main executive bodies. Shared responsibilities are recorded in a number of cases (as observed e.g. for Lake Balaton and Lake Vänern). The **involvement of local authorities, non-governmental and business actors through bottom-up processes** fosters ownership over the water basin management plans, as observed on Lake Päijänne (included in the Finnish River Basin management plan for the Kymijoki river – Gulf of Finland. The coordination of such adiversity of interested actors may require specific coordination efforts. That is why the Watercourse association for Mjøsa and tributaries, has appointed a "water area coordinator" ("*vannområdekoordinator*") in charge of moderating the dialogue between interested parties. When **adequate governance frameworks have not been established,** this may lead to deadlock situations and generate frustration at local level, as observed for instance on Étang de Berre where the conflict related to the operation of the hydro-electrical plant opposes national actors on the one hand to local and regional actors on the other.

In most large cross-border lakes, **internationally binding governance frameworks** were established between the 1950s or 1970s to support the preservation of water quality: e.g., the Austrian-Hungarian Water Committee established in 1956 for Lake Fertö-Neusiedl, the International Water Protection Commission (IGBK) established in 1959 for Lake Constance, the International Convention for the Protection of Leman Water (CIPEL) established in 1963 for Lake Geneva, and the International Commission for the Protection on Italian-Swiss waters (CIPAIS) established in 1974 for Lake Maggiore. Cooperation agreement were signed later on after the dissolution of the USSR between Estonia and Russia for Lake Peipsi (1994). Lake Prespa is the only international lake covered by this study without an integrated governance framework for water quality. These frameworks usually operate through a permanent commission and working groups. They foster dialogue on most adequate measures to be taken and coordinated actions (scientific studies, standardisation of quality measures, integrated monitoring tools and reporting), but actual cooperation is seldom. For instance, on Lake Constance, the 'International Water Protection Commission' coordinates "soft" actions (monitoring of quality of waters, provision of guidelines to limit water pollution, recommendation to national authorities and other stakeholders). However, it has no mandate to implement measures to limit water pollution. Implementation lies on the side of national and regional authorities.

1.1.2 Management of lake ecosystems

The management of lake ecosystems encompasses both the protection of lake-specific ecosystems (marchland, forests) and the protection of related biodiversity. In all six lakes for which one of these lake-related issues has been selected, extensive knowledge on lake environments is available, including characterisation of lake-specific ecosystems and inventories of species. A diversity of unique ecosystems is identified across our cases: e.g., 'wet grassland' of Lough Neagh, 'small soda lakes' of Lake Fertö-Neusiedl, 'coastal Mediterranean lagoon', 'Mediterranean salt steppe' and 'temporary ponds' on Étang de Berre.

Several European, international and national frameworks are referred to in order to protect these ecosystems:

- **Natura 2000 areas.** Natura 2000 is a network of nature protection areas in the EU. It defines two main types of areas: Special Areas of Conservation, designated under the Habitats Directive (adopted in 1992) and Special Protection Areas, designated under the Birds Directive (adopted in 1979). Natura 2000 areas are designated in all lake regions. However, enforcement of protection may vary as many sites still lacks management plans.
- **Ramsar sites.** The Ramsar Convention on Wetlands of International Importance Especially as Waterfowl Habitat is an international treaty for the conservation and sustainable use of wetlands (Ramsar, 2021). All lakes of the selection have parts of their water surface and shores designated as a "water surface of international importance", except for Étang de Berre (lagoon).
- **National protection frameworks** (e.g. National park). Several national protection frameworks are used around large lakes, including national parks, e.g. around Balaton: Balaton Uplands National Park, around Lake Fertö-Neusiedl (Neusiedler See-Seewinkel NP, Fertő-Hanság NP), or Prespa (Prespa NP in Greece, Prespa NP in Albania and Galičica in North Macedonia).

However, these various forms of protection do not prevent **conflicts between human activities and ecosystem protection**. Conflicts with agricultural activities are recorded in two cases: on Lough Neagh undergrazing, drainage and intensification of agricultural practices in the surrounding of the waterbody led to a

loss of wet grassland habitat for breeding waders, encroachment of invasive rush and scrub; while on Lake Fertö-Neusiedl, the overuse of groundwater for agricultural purposes accelerated the decline of small soda lakes. Conflicts with urban land use are also recorded and are reflected in the recent emphasis made on **shoreline protection** around large lakes (see cases of Lake Constance and Lough Neagh).

Fragmented/national approaches to ecosystem management still prevail around large cross-border lakes. Interests and political agendas may not be sufficiently aligned on the different sides of borders to allow for joint actions. Long-term management of Lake Fertö-Neusiedl's reed belt and the protection of small soda lakes are still largely overlooked by main actors around the lake. Landscape differences between the Austrian side (mostly marchland and soda lakes surrounded by crop production) and the Hungarian side (large reed belt) is not favourable to finding a ground for coordinated action. On Prespa Lake, the dynamics of cooperation on ecosystem protection between the three countries (North Macedonia then Yugoslavia, Albania, Greece) has long been hampered by diverging priorities assigned to designated areas: respectively protection of wetlands and biodiversity (GR), protection of forest ecosystems (MK), and protection of land and water ecosystems (AL). Diverging focus with regard to ecosystem protection may create some mismatch between riparian countries on the purpose of a common transboundary protection tool. A deepening of the cross-border dialogue through joint management frameworks is then needed to align perspectives and allow for coordinated actions.

1.1.3 Protection and valorisation of cultural and natural heritage

The protection and valorisation of cultural and natural heritage, as a lake-related policy area, share common features with the preservation of ecosystems. It was selected among the most prominent one for four lakes only: Balaton, Päijänne, Prespa and Lough Neagh. Based on this small sample of large lakes, it appears that the preservation of heritage is strongly relying on the combined **involvement of regional and local actors**. Around Lake Balaton, different actors have joined forces to preserve the natural and cultural heritage in a context of high residential pressure (see initiatives promoted individually or jointly by the Balaton Uplands National park, the Lake Balaton Development Council, and the Hungarian national rural network).

Beyond public authorities, the **involvement of citizen groups** is key for the successful long-term protection of heritage. On Lough Neagh, the perceived benefit to building on local's and visitor's appreciation of the landscape of the lake region has prompted the adoption of a "whole landscape approach" currently implemented via the Lough Neagh Landscape Partnership (2017-2022) a multi-stakeholder initiative and local funding programme, channelling funding into projects" (Lough Neagh Partnership Limited, 2017)..

For lakes that are fragmented between several countries and/or regions, creating and operating a **joint designated area** is a lever for a more integrated multi-level governance, especially with regards to protection of natural and cultural heritage (see for example the formalisation of a "Prespa park area" on Lake Prespa).

International conventions or regulations also provide dependable frameworks favourable to cooperation, as observed in Lake Päijänne where two separate projects were launched in the last decade: one for Lake Päijänne to join the UNESCO's World Network of Biosphere Reserves and the other for the Salpausselkä area to be granted the status of UNESCO Global Geopark. Both initiatives benefitted from the support of EU funds (respectively ERDF on the one hand and EAFRD and the LIFE programme on the other) and generated new forms of cooperation around the lake. Common statutory types of protection or designation may contribute to provide integrated frameworks for cooperation and leader to coordinated

, these do preclude fragmented parallel initiatives of preservation, especially in cross-border contexts, as observed around Lake Fertö-Neusiedl, where Natura 2000, Biosphere reserve and Ramsar sites around the lake are separately operated.

1.1.4 Economic development

Economic development issues are highlighted for half of the lakes through prominent lake-related issues. Two major types of situations are identified, where regional development is strongly connected to the lake:

First, several lake regions are facing demographic decline, ageing, and lack of residential attractiveness. This concerns lake regions that can somehow be considered as "inner peripheries" (ESPON, 2017): Lake Balaton, Lake Peipsi and Lake Päijänne. Around these lakes, regional and national redistributive measures and investment policies are called for supporting municipalities and local actors to create a more favourable economic context for businesses and inhabitants.

- through mainstream **regional programmes,** as observed for Lake Päijänne and the Estonian side of Lake Peipsi.
- through a **specific regional programme centred on the lake** as exemplified by the Balaton Priority Area Development (BPADP) Program (2021-2027) support to housing projects, human capital,community development and infrastructure for the special needs of an ageing society (silver economy).

Second, several lake regions are demographically dynamic regions that seek to maintain and renew their economic strength. This concerns lake regions in the surroundings of large metropolis(es): Lake Constance, Lake Geneva and Étang de Berre. Around these lakes, the main room for manoeuvre is found in an **intensification of lake-based cooperation** with original initiative found all over Europe:

- aroundLake Constance, in order to avoid skill shortages, institutional cooperation through the International Bodensee Conference have put the emphasis on regional innovation and knowledge transfer.
- Around Lake Geneva, Chambers of Commerce of the riparian regions (Genève, Vaud, Wallis, Ain, Haute-Savoie) united in the Leman Union of Chambers of Commerce have initiated an inventory of 18 regional “sectors of excellence” with the aim to foster cooperation within and between these sectors across the lake region.
- Around Étang de Berre, in a context of strong influence of the Marseille agglomeration, the challenge is to overcome the long-established image of the lake as a polluted and unattractive area. Actions taken by the GIPREB, a **multi-stakeholder cooperation body led by local and regional authorities**, with the support of the *lake contract*, aim at a comprehensive requalification of the lake through small-scale projects.

Regional programmes and intensification of lake-based cooperation are identified as the main levers for regional development around large lakes. The diversity of actors involved in the implementation of these programmes and cooperation is a key factor of their success in providing tailor-made solutions adapted to the specificities of lake regions.

Tourism and fisheries are two important activities that may provide long-term development opportunities for large lakes. They are explored in further detail in the next sections.

1.1.5 Tourism development

Tourism is regarded in almost all lake regions as an important lever for regional development. One of the two issues connected to tourism (“networking in the tourism industry” and “branding of the lake region”) was selected for eight of the 12 lakes.

Based on case studies, one can observe **different tourism profiles** among lake regions.

- A first category of lake regions are lakes with high tourism intensity, e.g., Lake Maggiore, Lake Balaton, and Lake Constance. These lakes have developed as well-identified tourism destinations with a diversified tourism offer both in terms of attractions (natural and cultural heritage, bathing and sailing infrastructures) and hospitality (accommodations, restaurants, catering services). Until the COVID-19 pandemic, these lakes were targeting international customers with high purchasing power to consolidate their position on the European touristic market.
- A second category of lake regions have a well-developed tourism basis but are still looking for a consistent model to promote the lake in an integrated way (e.g, Vänern, Geneva, Étang de Berre, Fertő-Neusiedler See). These lakes may face different issues in developing the lake as a destination: on Lake Vänern, riparian municipalities would like to strengthen the connections between different hotspots of tourism around the lake through a complete cycle path (the “Lake Vänern Grand Tour”); in Lake Geneva, the competition with other destinations in all riparian regions (rural tourism in Vaud Canton, business, diplomatic and city tourism in Geneva Canton, mountain tourism and winter sports in Haute-Savoie and Wallis) tends to overshadow the lake, and makes it a blindspot of official tourism promotion. On other lakes tourism is hampered by structural factors: proximity of heavy industries next to Étang de Berre, limited accessibility to the lake on the Hungarian side of Fertö-Neusiedler See and limited customer basis on the Austrian side.

- A third category of lake regions have a low tourism profile (Lough Neagh, Päijänne, Prespa, Peipsi). Although there seems to be an increasing awareness of the 'untapped potential' of tourism, the visibility of the lake as a tourism destination remains limited.

In recent years, increasing attention has been given to the development of **waterway tourism and lake-based recreational mobilities**. The connection of lakes to a far-reaching network of rivers and canals is a key asset in for both Lake Vänern and Lake Päijänne (more details in case study report). It directly relates to the need for a sustainable tourism offer to be developed around large lakes.

Promotion of tourism around large lakes is mostly implemented through a **fragmented approach**. This is due to the fact that tourism is promoted by tourism offices established by municipalities (as noticed e.g. around Lake Maggiore, Lake Päijänne, Étang de Berre), by regions (as noticed e.g. in Cantons around Lake Geneva) or in territories corresponding to historical / cultural provinces (as noticed around Lake Vänern). The absence of an integrated approach for the whole lake has been especially observed in cross-border lakes (e.g., Lake Peipsi Lake Fertö-Neusiedl) Actions implemented through the Balaton Priority Area Development Programme (2021-2027) are the only recorded case of a fully-fledged integrated approach of tourism development.

Other large lakes rely on a "small step" approach or peculiar cooperation initiatives led by private and/or non-governmental actors. The **small step approach** is well-illustrated by projects such as lake tour cycle paths (see Vänern Grand Tour cycle path mentioned above).

Cooperation projects in the field of tourism are in several cases the result of **the involvement of private service providers.** Three such initiatives were identified around large lakes: the 'Lago Maggiore Express' an integrated cross-border tour comprising rail and boat travel, the 'Neusiedlersee-Card' a card providing discounts for accommodation and other services on the Austrian side of the lake, the 'Léman sans frontière', an association of tourism actors and website providing a common umbrella for tourism services around Lake Geneva. These three initiatives are based on *ad hoc* business consortia pulling resources to provide a common product or a marketing innovation.

ERDF and EMFF funding is also mentioned on several occasions as actively supporting the setting up of cooperation initiatives involving both institutional, private and non-governmental actors. **Interreg programmes** are mobilised for (re)branding project around lakes. On Lake Maggiore, the Interreg Italy-Switzerland programme 2014-2020 provided funding for two projects that aim at improving tourism in the lake regions: AMALAKE (through lake branding) and SLOWMOVE (through green mobilities). Around cross-border lakes, Interreg programmes help to foster communities of tourism actors interested in building a common lake-centred destination. EMFF funding is also mobilised through Fisheries Local Action Group that aim at developing tourism around professional fishing activities (see below).

1.1.6 Fishery development

The long-term development of lake fisheries is based on two main issues: on the one hand, the long-term management of the resource through the regulation of fish catches, and, on the other hand, the support to fishery-based local development. Fishery development has been selected as a prominent lake-related issue in four cases: Lake Vänern, Lake Peipsi, Lake Päijänne and Étang de Berre.

Across the four cases, fishery appears as a vulnerable activity on large lakes for different reasons:

- Fish stocks are affected by ecological crises. On Étang de Berre, for instance, pollution episodes (due to discharge from industrial activities) and anoxic episodes that kill fauna and flora (last episodes in 2006 and 2018) have reduced catches by fishermen. It is also exposed to unsustainable fishing practices ("overfishing").
- Fisher revenues, as well as fishing volumes, are strongly affected by fluctuations of market prices. On Lake Vänern, for instance, vendace roe volumes strongly fluctuate from year to year in relation to market prices.
- In several lakes, the limited attractiveness of the professional fishing sector in the younger population, difficulties encountered when seeking to transfer fishing activities and in obtaining new fishing licenses threaten the long-term sustainability of the activity (see e.g. ageing of fishermen on lake Päijänne).

Across all four lakes, the relation of professional fisheries and recreational fishing is multi-faceted going from competition over scarce resources (see e.g. Lake Balaton) to synergies (see e.g. Lake Päijänne).

The management of fish stocks and local development of fisheries are addressed separately by dedicated institutional arrangements.

The management of fish stocks

In one-country lakes, the long-term management of fish stocks involves a combination of top-down and bottom-up processes, based on co-decision or consultation of fishing businesses and other interested parties, as observed on Lake Päijanne, where two "fisheries regions" are responsible for fish stock management or on Lake Vänern, where it is implemented based on the basis of a "joint management" principle (i.e large involvement of local and regional actors under the supervision of the deconcentrated state authorities).

In cross-border lakes, discussions on the management of fish resources are a component of high-level international negotiation processes. As a result, decision-making tends to be organised in a more technocratic and top-down manner. Ad-hoc intergovernmental commissions are responsible for setting authorised fish catches, as observed on Lake Peipus with the activities of the Intergovernmental Commission of Estonia and Russia for the Conservation and Exploitation of Fishing Resources established in 1994.

Fisheries and local development

To support endogenous development and to foster community-led development around large lakes, **Fisheries Local Action Groups** (FLAGs) are formed with support of the EMFF. FLAGs are active in 3 of the 12 lakes: Lake Päijänne, Lake Peipsi, Lake Vänern. Based on a partnership between fisheries actors and other local private and public stakeholders, FLAGs are mobilised for the development of the fishing value chain, the diversification of small fishery businesses, the transmission of fishing business to younger professionals, infrastructural works on fishing ports. FLAG strategies are prepared by local action groups active in the region together with the local fishing industry, owners of water, local educational establishments, and other organisations active in development activities.

1.1.7 Organizing transport flows

Transport development encompasses different relations to the lake, depending both on the lake topography and on the organization of functional inter-relations around it. Several such relations can be identified on each lake.

- At local scale, large lakes can represent an **obstacle** for transport connections. Transport needs to be organized through ferry connections or even bridges, to go from one shore to the other.
- At the scale of a functional urban area, the lake can represent **a set of shores to be served**. In this case, the lake is an element of the urban area's topography among others. The development of an express railway service in the Geneva metropolis, including connections between the northern and southern shores of the lake is not significantly different from other cross-border metropolitan transport services.
- At inter-regional or cross-border scale, the lake can represent a **transit area to be crossed**, both on land and on water (maritime traffic). The lake or its valley is then used as transport corridor, to connect distant places. Such a configuration is found, for instance, on the northern part of Lake Maggiore. The cross-border railway Domodossola-Locarno is part of the main transit corridor between the two Swiss Cantons of Ticino and Wallis and is used also for touristic purposes.

Institutional arrangements set up to organize transport around large lakes are based on the key involvement of national and regional authorities and public and private companies (service providers), either jointly or separately. It includes:

- An intermunicipal initiative elaborating and implementing a strategic framework for spatial planning and transport in an urban agglomeration (e.g. Mjøsa City cooperation – Mjøsbyen),
- An inter-regional business association promoting industrial interests in the field of transport and freight on the lake (e.g. Vänern Region Business Council),
- An international framework for the regulation of navigation on the lake (e.g. International Navigation Commission for Lake Constance (ISKB))

- Three public-private schemes aimed at providing services of general economic interest in the field of transport: Lemanis (Léman Express – providing railway transport service in the Geneva functional area); the Corsorzio dei Laghi (coordinating and jointly managing ferry services on Lake Maggiore); the Eastern Region Transport Association (providing cross-border transport services on the Austrian part of the lake region and international service to Sopron, Hungary).

1.1.8 Spatial planning

Spatial planning around large lakes is addressed at various territorial levels by municipalities, regions and states. Integrated planning perspectives around large lakes have seldom been elaborated. Spatial planning is a governance-driven issue in the sense that it gets legitimized by being addressed at lake-level by a governance structure. Such structures are found in three cases:

- Lake Balaton: Lake Balaton Development Council contributed to the implementation of the Balaton Development plan in the perimeter of the Lake Balaton Resort Area.
- Lake Constance: In 2017, the International Bodensee Conference adopted the Mission Statement (*Leitbild*) for Lake Constance. It provides a long-term perspective for cooperation in the lake region. In line with the *Leitbild*, the Regional Planning Commission for Lake Constance (ROK-B) is currently working together with the IBK Transport Commission on a 'target picture for space and transport' (*Zielbilds für Raum und Verkehr*).
- Lake Mjøsa: the Mjøsa City cooperation elaborated a strategic framework for spatial planning and transport for municipalities on the Eastern shore of the lake.

These actors all play a pivotal role to foster the development of common spatial visions or strategies in the lake regions. They contribute to the rescaling of interests for polycentric development in a perimeter built upon the lake. They are driven by the need for polycentric urban development (Constance, Mjøsa), a limitation of urban sprawl and soil-sealing (Balaton, Constance) or long-term transport planning (Constance, Mjøsa).

1.2 Transversal reflections on multi-level governance models in large lake regions

Multi-level governance around large lakes is based on a combination of hard policy frameworks, soft institutional arrangements and more punctual cooperation initiatives. Across the twelve cases that have been reviewed, 54 lake-based cooperation instances have been identified. These instances all contribute in one way or another to solving lake related issues.

1.2.1 Major cooperation patterns around large lakes

Major patterns stand-out across cases that represent different configuration of actors, with specific potentials for the resolution of lake-related issues.

Lake-centred territorial cooperation bodies support the elaboration of a long-term common vision for the lake region as a whole. Six such cooperation bodies were identified. The spectrum of actors involved in their boards and committees, as well as the kind of activities they are involved in strongly differ from one case to the other. However, given their broad multi-sectoral perspective, they constitute a main entry point for territorial actors seeking to establish and finance cooperation initiatives around the lake. They provide a visibility to the multi-level governance of the lakes. These can be found around Lake Balaton (Lake Balaton Development Council), Lake Vänern (Väner cooperation / Vänersamarbetet), Lake Constance (International Bodensee Conference (IBK) and the related Spatial Planning Commission for Bodensee ROK-B), Lough Neagh (Lough Neagh Landscape Partnership), Étang de Berre (Public interest group for the restoration of Étang de Berre / GIPREB), and Lake Geneva (Lake Geneva Council – Conseil du Léman).

Inter-municipal cooperation (or cooperation primarily led by municipalities) is common around large lakes and can play a key role with regards to local development initiatives and strategic planning on lake shores. For instance, in Lake Vänern, the Väner cooperation, an association of 13 municipalities, is active in promoting tourism through concrete projects (see above). On the Estonian side of Lake Peipsi, a group of 10 municipalities has been actively involved in the elaboration of a development strategy for Peipsi coastal area (2019-2030). In Lake Mjøsa, 10 municipalities from the north-eastern side of the lake, with the support

of the Innlandet County council, are contributing to the development of the spatial planning and transport strategy for the territory.

Distinct patterns are observed around cross-border lakes compared to one-country lake. Around cross-border lakes, the international dimension of the lake tends to draw focus on issues that specifically require a common decision-making framework for the management of the lake as a common, and on the difficulties to fund cross-border initiatives on the lake.

- The governance of cross-border lakes is primarily implemented through **international binding agreements**. For the 6 cross-border lakes covered by the study, 11 International binding agreements have been identified: 6 in the field of water management (monitoring and protection of water quality, regulation of water level), 2 in the field of regulation of fish stocks, 2 in the field of transport and spatial planning, and 1 for the formalisation of an international protected area. These agreements primarily compel national authorities of the riparian countries to cooperate. However, regional authorities may also be invited to participate, especially when they hold significant competences on the issue tackled by the agreement (see e.g. Lake Constance).
- With regard to funding instruments, cooperation around cross-border lakes substantially relies on **Interreg cross-border programmes** (Interreg A, IPA CBC, ENI CBC depending on the type of border). Looking at the keep.eu database that takes stock of all Interreg funded projects since 2000, lakes were the core focus of 18 projects in the 2007-2013 period and 32 projects in the 2014-2020 period[1]. Certain lakes stand out with a high capacity to be granted support from cross-border programmes. In the funding period 2014-2020, 13 projects were funded for Lake Constance or the Lake Constance region by the programme Alpenrhein – Bodensee – Hochrhein, for a total budget of EUR 14.3 million. The thematic scope ranges from tourism and protection of heritage to SME development and digitalisation. Four projects were funded on Lake Maggiore by the respective Italy-Switzerland CBC programme for a total budget of EUR 7.4 million[2].
- The governance of cross-border lakes is characterised by **cooperation centred on the lake with a scope limited to one country.** More frequently than in 'one-country' lakes, cooperation on cross-border lake is developed on a limited portion of the riparian area (belonging to one of the riparian countries). This is the case, for instance, on Lake Peipsi where both the inter-municipal cooperation at the root of the development strategy for Peipsi coastal area and the Development Association of Peipsi Fishery Area only cover the Estonian shore of the lake. Similarly, on Lake Fertö-Neusiedl, the 'Neusiedlersee Card', a discount cards for touristic services in the lake region only applies on the Austrian part of the lake region.

In one-country lakes, the embeddedness of lake-related issues in national regulatory frameworks, e.g. for water management, ecosystem protection or spatial planning opens up **main room for cooperation at the interface between regional and local level policymaking**. The main cooperation question around these lakes is: Could lake-related issues be solved more efficiently with the involvement of local and regional actors interested in the future of the lake? This explains the manifold configurations of actors identified around these lakes. The following patterns primarily apply to one-country lakes, although some examples may also be found in cross-border contexts.

- **Water basin management associations** are key players for the implementation of the EU Water Framework Directive (2000/60/EC). These associations usually gather a wide spectrum of authorities (from national to local level), private actors, and non-governmental organisations. Their governance and scope of intervention is defined by national regulations. Depending on the national context, they perform water monitoring activities (surveillance of water quality), set objectives for water quality, and inform the general public on water related issues. These associations can play a pivotal role to foster the multi-level dialogue between actors around large lakes. In Lake Vänern, the water management association has established well-functioning working habits for the coordination of actors around the lake. From 2013 the Lake Vänern Secretariat which coordinates the

[1] Based on a count of all projects with « lakes » in their full title.

[2] Two of those projects (AMALAKE and SLOWMOVE) are described in further detail in the case study report.

water management association also supervises the Joint Managing Group of Fisheries in charge of the regulation of fish resources. In Lake Päijänne, the River Basin management plan and regional programmes for River Kymijoki – Gulf of Finland provide the integrated framework for the management of the lake. The planning process follows a bottom-up approach, where the management plan is drafted and streamlined based on the regional programmes on water management for Central Finland and Häme.

- **Community-led development groups** are identified around several lakes. These are used as levers for bottom-up approaches to local development. It comprises Fisheries Local Action Groups (identified in Lake Peipsi, Lake Vänern, and Lake Päijänne) as well as other configurations of actors that may evolve on the basis of opportunities. In Lough Neagh for instance, the Lough Neagh Partnership Ltd, a non-profit company, was established in 2003, initially for the purpose of administering a rural development grant funding. It gathers the five district councils that surround the lough, the private sector, community sector and special interest groups (fishermen, sand traders, estate managers). In 2011, after few years of successful cooperation, the remit of LNP was extended, for it to undertake wider range of lake-related responsibilities including integrated management, marketing and development of activities relating to tourism, recreation, the environment, heritage and culture.
- **Multi-stakeholder thematic alliances** are efficient levers to support cooperation processes with a well-defined target. Several such alliances are put in place for (part of) the lake to be designated as a protected area or as an area of specific geo-environmental interest. The two above mentioned examples in Lake Päijanne (Lake Päijanne to join the UNESCO's World Network of Biosphere Reserves and the Salpausselkä area to join the UNESCO Global Geopark Network) are good example of such alliances.

Other types of **cooperation not led by territorial authorities** include:

- **Networks of NGOs**. Three networks of NGOs were identified: a network of women associations promoting environmental awareness, valorisation of natural and cultural assets of Lake Balaton ('Women for the Balaton'), a federation of associations set up to reflect the views of the NGO sector in consultations, acts a mediator and event manager for lake-based activities ('Association of Balaton Civil Organizations'), and a cross-border network of environmental NGOs ('PrespaNet'). Besides these networks, national or regional environmental NGOs (not specifically lake-focused) are active for the protection and the promotion of large lakes[3].
- Companies (private or public) may also contribute to the provision of services in lake regions. Besides their involvement in diverse consultative bodies in relation to e.g. water management, companies are taking part in **business consortia** that provide tourism services (see 'Lake Maggiore Express', 'Neusiedlersee Card', 'Léman sans frontière') and in **public-private schemes providing services of general economic interest** (see the 'Corsorzio dei Laghi' in Lake Maggiore, the 'Léman Express' on Lake Geneva).

1.2.2 Diversities of actors involved in lake-based cooperation

Overall, the diversity of organisations involved is reflected in Figure 3. National, regional and local authorities are dominant in territorial cooperation initiatives, followed by companies and NGOs. The "other" category includes several mentions to landowners that are associated to decision-making processes for shoreline management. Similarly, to other private actors, landowners tend to get a more structured representation of their interests in one country lakes than in cross-border lakes.

However, the relative propensity of public actors to get involved in instances is thematically differentiated (Table 2). While local authorities are overwhelmingly involved in instances that address tourism, regional and national authorities are well-represented in environmental policy areas (water management and ecosystem management), where NGOs also have strong positions.

[3] See : https://www.globalnature.org/en/living-lakes/europe

Companies are well-represented in organisations related to tourism and the provision of tourism services and in ecosystem management to report on their environmental impact on the lake or to contribute to management of fish resources.

Universities and research centres are participating in a limited number of cooperation initiatives (12 out of 54). However, even without being part of main committees, their role is acknowledged on several occasions in relation to the monitoring of water quality, the description of lake ecosystems, and the promotion of cultural and natural heritage.

Figure 3 Mentions of types of actors involved in cooperation instances across cases

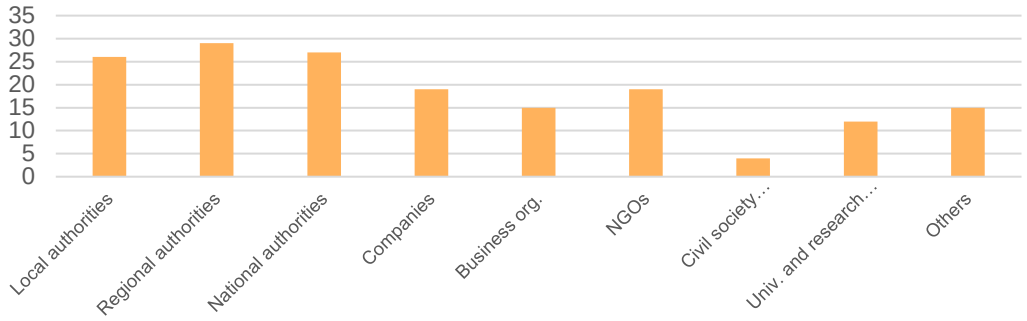


Table 2 Relative involvement of types of actors by policy area

	Water management	Ecosystem management	Agric. & Fisheries	Regional development	Tourism	Preservation of heritage	Transport	Spatial planning
Local authorities	10	15	8	13	20	15	6	4
Regional authorities	16	16	8	12	15	12	10	6
National authorities	16	17	10	4	9	7	6	6
Companies	7	10	5	5	12	7	5	2
Business organsiations	10	12	10	8	12	9	4	3
NGOs	15	14	9	9	11	13	4	5
Civil society representatives	3	3	1	1	3	3	0	0
Univ. and research	10	9	5	5	8	6	3	3
Other	9	8	5	6	7	7	4	7

Reading: Local authorities are involved in 10 cooperation instances that address water management. Each cooperation instance may address several policy areas. The table reflects the propensity of each type of actors to be associated to initiatives that address a specific policy area.

Conclusion

The observation of Lake Regions leads to the observation that they are generally very diverse. However, four themes or issues are recurring. These fields are all directly or indirectly linked to the water bodies:

- Water management and water quality
- Ecosystem preservation
- Tourism
- Fisheries

Insufficiently integrated approaches regarding any of these four issues have multiple ramifications. For example, water management and water quality is connected to urban planning, agricultural and industrial policy. Lakes therefore help to illustrate the importance of water policies for balanced and sustainable territorial development. This observation may constitute the basis for an analytical grid to improve the understanding

of how inadequate governance frameworks around lakes may limit perspectives for integrated territorial development.

In terms of governance, different profiles of multi-level governance emerge from this European review of large lakes. One-country lakes stand out with a focus on regional and local initiatives driven either by national frameworks or by bottom-up initiatives, while the governance of cross-border lakes is characterized by bi- or tri-lateral international agreements, recurring support from Interreg programmes, and a territorially fragmented approach to regional development.

- Nordic lakes (Lake Vänern, Lake Päijänne, Lake Mjøsa) stand out with well-articulated bottom-up mechanisms for river basin management and a growing concern for regional development in the vicinity of the lake.
- Lake Balaton, Étang de Berre and Lough Neagh stand out with the major position taken in the lake governance by cross-sectoral cooperation instance (respectively Lake Balaton Development Council, Joint association for Étang de Berre and Lough Neagh Partnership).
- Alpine lakes (Constance, Maggiore, Geneva) have a long track-record of functional cross-border integration. To varying extents, cooperation formats have been put in place to produce common integrated visions, operate cross-border services (transport), and trigger economic integration.
- With few exceptions, Fertö-Neusiedl, Prespa and Peipsi have more recent and limited cooperation in place. Major initiatives are focused on different types of shared environmental concerns (water management and fish stocks for Lake Peipsi, landscape and biodiversity protection for Lake Prespa, protection of natural heritage for Fertö-Neusiedl).

2 Territorial challenges and governance of three large lake regions: Balaton, Vänern, Constance

The aim of this chapter is to give a comparative overview of the three stakeholder regions of this Targeted Analysis: Lake Balaton, Lake Vänern, Lake Constance. It highlights the main findings, developed in more details in 'regional reports' (one per region - see Annexes). It focuses on major territorial challenges and aspects of multi-level governance around the three lakes. It highlights the added value and the limitations of a multi-level governance centred on large lakes.

The three lake regions provide a diversified sample of large lakes in Europe, from hydrological, socio-economic and governance point of view.

- Lake Balaton is a shallow lake in Central Europe, more precisely in Hungary. It has developed as a touristic and leisure area since the beginning the 20th century due to the pleasant temperature of the lake and the favourable climatic conditions. The touristic value of the Lake Balaton region is not only determined by the lake water quality and quantity, but also by the natural and built environment, long sandy beaches, traditional vineyards and recreational services built on local traditions (Dombi et al., 2018). However, Lake Balaton region faces challenges related to seasonality of activities and attractivity for year-round resident population. Another challenge is the increasing concentration of tourists (and newly built second homes) on the shoreline causing conflicts with local dwellers and with stakeholders managing the ecosystem. The spatial structure of Lake Balaton area is determined by the duality of riparian and background municipalities. The income indicators of the riparian area are higher for decades, but in background municipalities the increase is more hectic and uneven. Agriculture (wine grape and cereals) also plays a key role in the regional identity.
- Lake Vänern is a Scandinavian lake. While both riparian regions are Swedish, the water basin area extends into Norway. A significant proportion of surrounding municipalities are rural and sparsely populated areas. Manufacturing and agricultural activities are overrepresented in the lake region, which is both an inner periphery in the shadow of Gothenburg (southern part) and the centre of the Värmland region (around Karlstad, northern part). The lake itself hosts significant freight traffic, fishery and leisure activities with 18 leisure harbours (Sjöfart, n.d.). The lake region is undergoing a transition process to develop a more integrated approach to the use of its tourism potential.
- Lake Constance is a pre-Alpine lake bordering three countries (Austria, Germany and Switzerland). Cross-border governance has a long-standing tradition in the region. As a consequence, the management of water quality, fisheries and transport is regulated with intergovernmental agreements and cooperation. Besides, within the Lake Constance region cross-border commuting is a relevant phenomenon. The lake region is characterised by strong natural elements such as the Rhine river that flows through Lake Constance, the Alpine mountains in the South and the German middle mountain ranges in the North. The lake region is organised in a polycentric way with numerous medium-sized towns and rural areas. The region is economically innovative, based on a strong industry and a several universities. Agriculture (fruit, vegetables, wine grape, hop) also plays a key role in the regional identity. Furthermore, the region is an intensive tourist destination not only with regard to overnight tourism but also a high number of day trips (IGKB, n.d.; Scherer et al., 2016).

The three lake regions share common characteristics:

- They are shared by **different regions or countries** (Balaton between Somogy, Zala and Veszprém counties, Lake Vänern between Värmland and Västra Götaland, Lake Constance between Austria, Germany and Switzerland and their respective subunits: Länder, cantons, municipalities). This implies distinct levels of fragmentation that may represent both challenges and opportunities for the governance of the lake.
- They have been subject to the emergence or deepening of various forms of **cooperation initiatives in the last two decades**. In this regards, key cooperation bodies have been specifically active to

promote integrated spatial development around the lakes: Lake Balaton Development Council on Lake Balaton, IBK and ROK-B on Lake Constance, the Väner cooperation on Lake Vänern.

- The increased demand for second homes and the extension of urbanised and built-in areas, especially at the shorelines, causes more and more spatial development conflicts.

2.1 Environmental and socio-economic challenges in the three stakeholder regions

Besides some common points, large lake regions have diverse challenges and various policies affecting differently their development perspectives. Hence, different policy areas were analysed for the three lake regions. The comparative results of policy-relevant indicators are shown. Table 3 provide for a synthetic comparison of major challenges affecting each lake (region). It is based on a systematic review of policy-relevant indicators (see 'Regional reports')

Table 3 Challenges affecting lakes and lake regions, by policy area

Lake regions / Policy areas	Lake Vänern	Lake Constance	Lake Balaton
Water Quality	Overfertilization is some bays and in waters flowing into the Kattegat and Skagerrak seas.	Maintain water quality. Rising water temperature could have effects on layering and mixture of the water.	Risk of imbalance of nutrient due to climate change effects.
Water Quantity	Water level regulation with conflicting interests of actors (transport, energy, leisure, nature protection, flood protection…)	Low water levels as effect of climate change (with potential consequences on shipping)	Low water levels as effect of climate change (with potential consequences on bathing, sport shipping, and on water quality (algae growth) as well)
Ecosystem	Open landscapes around lake threatened by excessive regulation of water levels. Circulation of fish species to spawning and rearing areas limited by dams.	Presence of invasive species Ecological status on the shoreline and shallow water zone to be improved. Renaturation of the shorelines prevented by high land prices.	Loss of reed (due to building activities) Deteriorating state of reed (due the warm winters when absence of ice prevents from harvesting).
Demography	Concentration of population in main towns and cities. Ageing population	Demographic growth. Ageing population.	Decreasing population in smaller municipalities. Ageing population. Seasonality in population and employment (tourism has a significant share in the economy).
Tourism	Lack of awareness of Vänern's assets.	Touristic pressure especially at hotspots resulting in traffic jams and overcrowded parking lots and high pressure on ecosystems. Balancing winter and summer tourist numbers.	Short seasonal tourism period. Touristic pressure especially at hotspots resulting in conflicts with local dwellers and high pressure on ecosystem.

		Dependency on German tourists.	
Fishing	Insufficient monitoring of fish stocks, leading to a decreasing number of licenses. Few young fishers. Preservation of sweet-water salmon and trout populations. High dioxin levels in whitefish.	Decrease of fish stocks due to different developments, e.g. improvement of water quality, non-endemic sticklebacks as competitors of other fish species (consequences: decrease of number of commercial fishers and unmet demand for local fishes). Non-indigenous fish species.	Decrease of fish stocks (due to professional and sport fishing) No cross-sectoral agreement on sustainable fishing. Non-indigenous fish species (which has impact both on the ecosystem and the fish production).
Agriculture	Limit overfertilization.	High land use pressure challenging agricultural areas;Adaption of agriculture to climate change	Aging of family farmers.
Spatial planning	Shoreline protection, e.g. in response to demand for more secondary homes and extension of urban areas. Flood protection. Urban-rural polarisation.	Cross-border planning; Various land use demands. Urbanisation. Poor connectivity between protected areas. Polycentric metropolitan functions not that 'visible' as in other metropolitan regions. Transport connections within the region and to surrounding metropolitan regions.	Shoreline protection, e.g. in response to demand for more secondary homes and extension of urban areas. Fragmented settlement structure. Transport connections within the region.
Shipping	Century-old water locks on Göta river / Trollhätte canal need to be rebuilt. Construction of new bridge ('Hisingsbron') in Gothenburg may limit freight traffic in direction of Lake Vänern	Connection between ferry lines and public transport on land. Use of alternative driven vehicles.	Increase of new alternative driven (electricity, hydrogen) private boats.

Many of main issues and challenges in the three lake regions unsurprisingly relate to water. Different dimension may be distinguished:

- Water quality is important both from the point of view biodiversity and as a complex ecosystem service for humans (Ecosystem services in the EU — European Environment Agency, n.d.).
- Waters are the living environments of a number of species, which may have adapted to seasonal variations in water levels or migrate between zones. Human interventions may impact these living environments.
- Waters host a range of human activities, some of which have diverging interests: passenger transport, freight transport, different leisure activities (e.g. boating, swimming, nature observation),

more or less massive tourism which, depending on the practices can have a variable ecological footprint.

- The water flow may be used for electricity generation (e,g, in Göta river, emissary of Lake Vänern) (see Göta Älvs Vattenvårdförbund, 2015). With the transition to renewable energies, hydropower is increasingly important as a regulating factor. Contrary to wind and solar energy, hydropower production levels can be controlled.
- Water bodies are the recipients of rainwater that – in case of missing rainwater draining system – can wash pollutants into the water.
- Water bodies can also be a threat in a situation of flooding.
- The provision of drinking water is quite important.

The three case studies demonstrate the extent to which spatial planning and regional development policies are interlinked with policies addressing this wide range of water-related issues and possibilities. While freshwater is present across European, these interlinkages occupy a more prominent position in large lake regions. They can therefore function as exemplars of how spatial planning and regional development policies can best incorporate diverse human impacts of waters and water bodies and use water resources in a sustainable way.

Water levels and water regimes (i.e. water flows through the lake) raise quite different types of issues depending on the considered lake region. While Lake Balaton – as a shallow water lake – has to face a higher risk of excessive evaporation due to climate change (that also causes quality challenges), Vänern has to minimise risks of flooding and – at the same time – provide enough water for electricity production and freight transport on water. The challenge for Lake Constance is the rising water temperature that could have effects on layering and mixture of the water.
Levels of protection of the three lake regions vary. Internationally and nationally designated areas cover 40% of the Lake Balaton region (40% including the lake body), 18% of the Lake Constance Region and just over 8% of Lake Vänern Region (Natura 2000 data, 2019). These variable extents of protected areas are also a reflection of the extent of human pressures on natural environments around these three lakes. The major variations between relative importance of main types of land use (agriculture, forests, built-up areas) between lake regions (see

Map 2) also justify different approaches to nature protection (Corine Land Cover data, 2018). However, a shared concern in all lake regions is protection against invasive species. Additionally, the protection of riparian areas is a shared aim and important issue to protect the ecosystem along the shorelines and increase the resilience of the lakes against impacts of climate change .Although, as the EU as whole, Lake regions experience negative natural change, – they benefit from positive net migration rates. These rates are slightly positive in the case of Balaton (Dombi et al., 2020), moderately positive in the case of Vänern (Region Värmland, 2020) and significantly positive at Lake Constance. They pay testimony to the attractiveness of lake regions as living and working environments and have tended to increase in recent years. However, in-migration is not evenly distributed within the Lake Region. Major settlements and urbanised areas are privileged destinations for new lake region dwellers. Ageing occurs in parallel in all three lake regions. This leads to increased dependency ratios and necessitates an adaptation of social and health service provision.

In terms of economic performance, all three lake regions evolve in the ‘shadow’ of surrounding major metropolitan regions (e.g. Zürich for Lake Constance, Gothenburg for Lake Vänern, Budapest for Lake Balaton). These metropolitan regions attract commuters from parts of the lake region. Leading cities located at the lake shoreline (Karlstad, Siófok) appear less prosperous when compared to these surrounding metropolitan regions. Balaton and Vänern lake regions could even, be described as ‘inner peripheries’ (ESPON, 2017) of respectively Hungary and Sweden. The ambition to enhance social and economic development requires careful planning to take proper account of vulnerable lake ecosystems.

Energy production is a particularly important issue in Lake Vänern region. Hydropower occurs on Göta river and, at a smaller scale, in different tributary river. It is one of the dimensions to be taken into account in water level regulation. As operator of the Vargön dam, Vattenfall effectively regulates the level of the lake. Hydropower production also has a major impact on connectivity between biotopes, sometimes making it impossible for fish populations to reach spawning areas (Kvävehalten i Vänern är för hög, n.d.). Windfarm development on and around the lake has also occurred and has generated major controversies. In the future,

pressures to increase renewable energy production in lake regions may increase as part of efforts to reduce greenhouse gas emissions.

All considered lake regions are rich in natural and cultural heritage and host tourism activities. However, their characteristics are quite different. While they are all summer tourism destinations, the Alpine part of the lake Constance region also attracts tourists in winter. Lake Constance itself attracts people for leisure activities in general not just for touristic activities (Scherer et al., 2016). The same holds true for spa destinations around Lake Balaton. These are particularly well-developed in western parts of the lake. Close to the Lake Balaton, the city of Veszprém has an attractive role (based on its cultural heritage) as well. Cultural attractions and heritage mainly attract tourists in bad weather, almost complementing the 'services' provided by the lake. This character can be strengthened with the title of European Capital of Culture due in 2023 (Baranyai et al., 2018). Lake Vänern actively seeks to develop 'soft' and 'integrative' types of tourism, with the inauguration of a cycle path running around the entire lake in 2022. Cycle paths is a component of ecotourism development and sustainable regional development. However, the development of cycling tourism can cause conflicts. In Lake Balaton, the current trail of the cycling route is dangerous due to sloping, busy intersections. When a plan was elaborated to build a new secured cycle path, local dwellers opposed the plan, arguing that the cycle path would push the settlement's only promenade off the coast, endanger beachgoers and damage the forest that the path was supposed to cross. The project Lake Balaton Bike Road did not receive the support from the local community (see e.g. Szepezden is pirosat kapott a Balatoni Bringakör (2021)). These recent developments take on-board the need for the development of a sustainable tourism offer around large lakes.

While few people are employed as fishers in considered large lake regions, fisheries are important components of efforts to use available resources. Activities such as food processing, food tourism and fishing tourism are developed in connection with fishing. Fish stocks vary continuously, and fishers (or central government in the case of Lake Balaton) adapt to these variations in all three lake regions. In Lake Balaton, fishing volumes have been decreasing in recent years, hence fishery has been suspended (Cégünkről - Balatoni Halgazdálkodás, n.d.). In Lake Vänern, total value of catches has tended to increase, but with significant evolutions in the species composition. Short food supply chains for fish products are currently being developed. In Lake Constance fishing volumes sharply decreased which had repercussions on fishing businesses (Baer and Blank, 2020).

The nature and extent of agricultural activities in large lake regions depend on climate and soil conditions that are connected to lake proximity. Climate conditions are for example favourable to wine production both around Lake Balaton and Lake Constance. However, all lake regions are confronted to the challenge of limiting emissions of agricultural pollutants (e.g., nutrients, fertilizers, pesticide) to lake waters and the nearby ecosystems. European Union Green Deal ambitions to reduce the use of pesticides and fertilisers by 2030 are therefore particularly relevant for lake regions (Farm to Fork Strategy, 2020).

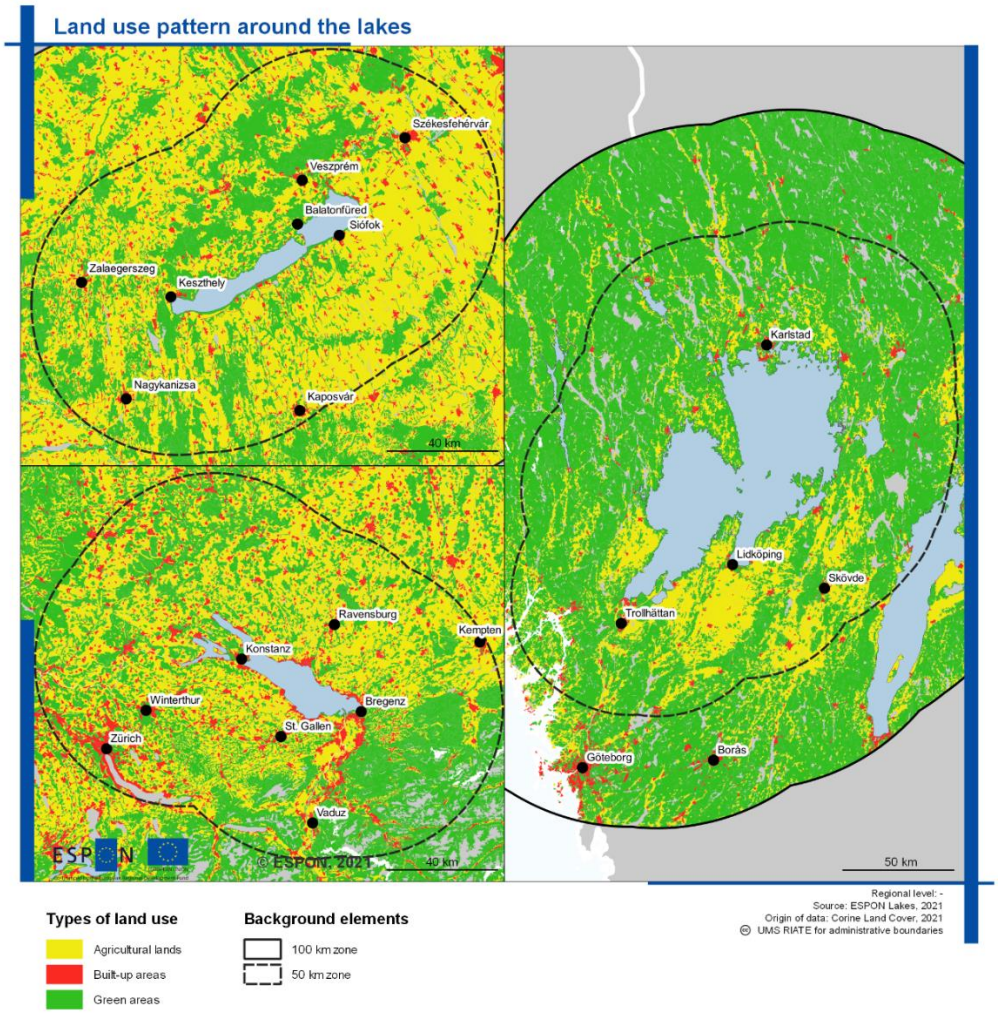
Another possible threat to sustainable development in large lake regions comes from land use pressures from urban sprawl around main agglomerations and increasing demand for secondary houses. Shoreline areas are particularly exposed to these types of pressures. Urbanisation and extension of built-in areas have affected all three considered lake regions in the past decades, with different intensities. Shoreline protection has long tradition around the three considered lakes. Institutions in charge of nature protection and local authorities sometimes have different perspectives on this issue. While municipalities consider it important to preserve access to areas for bathing and the enjoyment of shoreline natural environments, they may also wish to use these particularly attractive areas more fully. High land prices may prevent shoreline renaturation initiatives. Conflict of interest between the different agents of the lakes sometimes lead authorities to introduce more supple shoreline protection arrangements.

Maritime freight transport can be a major issue in large lake regions. Lake Vänern proponents of such transport consider that fiscal and regulatory framework conditions are not adapted to their activity. They observe that, while freight transport volume taken as a whole increases, the relative importance of inland waterways decreases. While national authorities promote inland waterways as an environment friendly alternative to road transport, sectoral authorities do not take concrete measures that would be required to make it competitive[4]. There are various hazards in the potential increase of shipping on the lakes that

[4] Interview Johan Källsson, Väner Business Council

might harm the ecosystems. In Lake Constance an international agreement regulates the use of the lake for shipping. The agreement contains rules that prescribe how to behave on the lake, who is authorized to drive the vessels and necessary equipment of the vessels, e.g. strong regulations of pollutant emissions of ship´s engines are in place.

Map 2 Typical land use patterns around the lakes



Lake regions are particularly exposed to climate change. For instance, it affects water levels of Lake Vänern and Lake Balaton and water temperature in the case of Lake Balaton and Lake Constance. In Lake Vänern and Lake Balaton too, it makes it more difficult to foresee precipitation volumes and regulate water levels accordingly. Planners at Lake Vänern fear that management of water levels will become increasingly difficult, as water inflow from tributaries may become much larger than the capacity of the lake emissary. Risks of flooding concern not only the lake, but also downstream areas including parts of the metropolitan region of Gothenburg. This risk is accentuated by rising sea levels. (County administrative Board of Västra Götaland et al., 2018).

Climate change is also a challenge for stakeholders. Climate strategies have been made on regional (and local) levels in all the cases for adaptation, however, more effort on improving resilience is needed. For instance, the agriculture sector (around the lakes) – due to the uneven precipitation – is confronted to flash-flood, rainwater drainage problems and the challenge of irrigation at the same time (Climate Strategy of Lake Balaton / Balaton Kiemelt Klímastratégia, 2019; Eklund et al., 2018). Climate change is also bringing with it the emergence of new harmful species that are also threatening wine grape and fruit production (*Balaton Limnological Institute*, n.d.; Invasive Alien Species of Union, 2019; IGKB, 2020). Therefore, the adaptability and resilience of the actors around the lake need to be strengthened in order to successfully address the uncertainties of climate change.

2.2 Comparative review of main governance aspects

Territorial governance systems may be approached through a set of five dimensions (ESPON TANGO, 2013): co-ordinating action of actors and institutions, integrating policy sectors, mobilising stakeholder participation, being adaptive to changing contexts, realising place-based / territorial specificities and impacts. The three regional reports have explored in detail these dimensions. They provide a complete of overview of multi-level governance in place for the three stakeholder lake regions. This section provides an overview of most salient transversal observations that may be drawn from the regional reports.

2.2.1 Territorial governance frameworks

Large lakes are shared between several municipalities, regions and countries. The concrete consequences of this political-administrative fragmentation between different regions are manifold: different components of a lake surrounding may have followed different socio-economic pathways (as between northern and southern shores of lake Constance), different regional development programmes are applicable around the lakes (see Lake Balaton and Lake Vänern).

Additional dividing lines are also observed on and around the three lakes. These lines correspond to sector-specific spatial delineation that affect the management of the water body and of the lake region. In Lake Vänern, tourism is promoted by agencies located at the level of historical provinces (i.e., Dalsland, Väter-Götland, Värmland). In Lake Balaton, water management is implemented by water directorates: three territorial directorates (Western-, South-, Middle Transdanubian Water Management Directorates) are responsible for the maintenance of the inflowing waters and the related water management planning, while the Middle-Transdanubian directorate is solely responsible for the water management of the Lake (Balaton).

Figure 4 Territorial fragmentation around the three lakes

Lake Balaton	NUTS0	Hungary		
	NUTS1/2	*Central Transdanubia*	*Western Transdanubia*	*Southern Transdanubia*
	NUTS3	Veszprém	Zala	Somogy
	LAU	25 mun.	4 mun.	16 mun.

Lake Vänern	NUTS0	Sweden	
	NUTS1/2	*North Middle Sweden*	*West Sweden*
	NUTS3	Värmland County	Västra Götaland County
	LAU	4 mun.	9 muni.

Lake Constance	NUTS0	Germany						Austria	
	NUTS1/2	Baden-Württemberg				Bavaria		Vorarlberg	
	NUTS3	Konstanz	Bodensee-kreis	Ravensburg	Sigmaringen	Lindau (Bodensee)	Oberallgäu	Rheintal-Bodensee	Bludenz-Bregenzer-wald
	NUTS0	Schweiz						Liechten-stein	
	NUTS1/2								
	NUTS3	Zurich	Schaff-hausen	Appenzell Ausser-rhoden	Appenzell Inner-rhoden	St. Gallen	Thurgau		

In order to jointly tackle lake-related issues (see Chapter 1), cooperation and institutional arrangement have been established across the lake. These cooperation and arrangement gather different types of actors, with “leaders” and “followers”.

In **Lake Balaton**, the multi-level governance is based on a three-tier structure. Sectoral management and sectoral planning are usually organized under a central budgetary body (e.g. Middle Transdanubian Water Management Directorates, Balaton-Upland National Park Directorate) with independent territorial competence, the superior body of which is a national body, agency or ministry. The regional planning has three

levels. Spatial development plans are prepared at national, regional and local levels. Additionally, on medium-tier, cross-boundary (cross-county) regional development and planning is allowed (and in some case forced by the central government).

On the *pan-lake* level Lake Balaton Development Council (established in 2000) is the key actor of the region establishing dialogue between territorial actors. The aim of this institution is to determine the directions for development of the area and support the elaboration of development plans and projects in the Lake Balaton Resort Area (LBRA). (LBRA consists of 180 settlements around the lake.) However, LBDC does not have financial resources and administrative and management competencies for financing developments. Regional and sectoral development resource allocation and competence are fragmented, belong to several actors. To bridge this fragmentation the LBDC performs the technical, practical and administrative tasks of establishing collaborations, and for that, it allocates small resources. In addition to the sectoral and territorial cooperation, LBDC also operates a territorial monitoring system, which is intended to support the future integrated development of the region, supplemented by other monitoring systems (e.g. water quality monitoring) operated in the region. On pan-lake level cross-sectoral cooperation is sometimes based on informal personal relationships (e.g. water management vs. ecosystem management) that need to be improved.

In **Lake Vänern**, cooperation is organised by multiple parallel organisations and networks. Each of them focuses on a specific set of themes and issues. Some are not-for-profit associations (e,g. Väner Water Management association, Lake Vänern Archipelago Biosphere Reserve), others are so-called 'economic associations' (e.g. Väner Cooperation, Leisure Harbours of Lake Vänern) or informal networks with no legal personality (e.g. Väner Council, Väner Business Council).

On the *pan-lake* level, the Väner cooperation, driven by the 13 Väner municipalities, is the key potential proponent of an integrated development perspectives. However, decisions on such a more integrated approach remain to be made. Lessons have been learnt from a regionally driven attempt to launch a wide cooperation process around Lake Vänern, which did not live up to expectations. Since it was created, this association focused on concrete initiatives within specific fields, where consensus between cooperation partners could be easily reached: tourism development, regional branding, regional event management (organisation of the 'Väner week' and Väner assembly').

In **Lake Constance**, the cooperation landscape is characterised by an enormous institutional thickness: pan-lake initiatives are accompanied by domestic and cross-border initiatives on different scales and in different perimeters. The impressive number of approx. 500 cross-border cooperating organisations and 5.000 regional politicians illustrate this situation (Zumbusch and Scherer, 2015). Cooperation around the lake is very structured from a sectoral and cross-sectoral point of view.

On the *pan-lake level*, International Lake Constance Conference (IBK) is the key actor of the region. It was established in 1972 and is based on a cooperation on the level of the 'heads of government' which represents the level of regional governments (federal states in AT and DE and cantons in CH) and in Liechtenstein the national level. Although initially focused on environmental and water-related topics, it has now expanded towards diverse thematic fields. Seven commissions are in charge of deepening the thematic work in the following areas: Education, Science, and rRsearch; Culture; Environment; Transport; Economy; Health and Social affairs; Public Relations. The Spatial Planning Commission (ROK-B) is a partner entity, working in close relation with IBK, in a slightly larger perimeter. It was established in 2001 with the objective to foster integrated spatial development around the lake. In recent, its work was focused on the development of the DACH+ monitoring tool (Interreg IV project) and the development of a "target image of space and transport". The cooperation landscape is completed with organisations that bring together political actors and deal with a broad range of topics: the Parliamentary Conference (IPBK) and the City Network (ISB); the Interreg A programme Alpine Rhine – Lake Constance – High Rhine; the Lake Constance Council, and Denkraum Bodensee (think tank). Lake management is organised in across-border way through the parallel work of the following sectoral international commissions: the International Water Protection Commission Lake Constance (IGKB); the International Lake Constance Fishery Commission (IBKF) and the International Shipping Commission Lake Constance (ISKB). Several cooperation deal with further sectoral issues including: the Internationale Bodensee Tourismus GmbH that represent tourism organisations and the Lake Constance Foundation, an NGO that serves as umbrella organisation for nature conservation associations.

2.2.2 Strengths and weaknesses of the respective regional governance

Regional reports describe major patterns of cooperation in the three lake regions and highlights the relative strengths and weaknesses of multi-level governance framework.

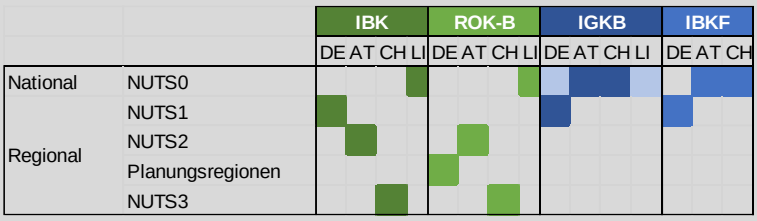
In all three lake regions, the existence of an inter-territorial organisation promoting joint development perspectives is a strong asset: LBDC around Lake Balaton, Vänern cooperation around Lake Vänern, and IBK and ROK-B around Lake Constance. These reflect the well-established dialogue between territorial actors around each lake: horizontal dialogue between municipalities in Lake Balaton and Lake Vänern, and vertical between regions and countries in Lake Constance. To different extents, all these cooperation formats can capitalise on **recent achievements** that strengthen the horizontal cohesion between actors around the lake: e.g., Balaton Priority Area Long-Term Development Concept (2014-2030) or Balaton Regional Climate Strategy (2019-2030) for the Lake Balaton Development council; well-positioned lake branding for Lake Vänern; IBK mission statement (towards 2030 with priorities for the period 2018-2022), and the recent 'Zielbild Raum und Verkehr' (target image of space and transport) coordinated by ROK-B and the IBK-Transport Commission.

In Lake Balaton, the strong commitment of civil society organisations to awareness-raising on the need to protect its natural and cultural assets is also a key asset. Two associations act as umbrella / network organisation: the 'Association of Balaton Civil Organizations' that organises events or conciliation meetings on lake-related issues and the 'Women for the Balaton Association' that promotes environmental awareness around the lake to the general public.

In Lake Constance, cross-border cooperation practices are well-established and are exemplified as a model for other territories in Europe. First, riparian regions have a long history of cooperation on lake related topics (water management, fisheries, shipping). Specifically on these topics, the cooperation system works on the basis of an effective vertical coordination between common decisions or guidelines adopted at lake region level and implementation of measures at national / regional / local level. This vertical coordination is rooted in an adequate representation of federal actors in cooperation instances (see Textbox 1). However, this "institutional thickness" requires intensive coordination processes due to complex governance structures even if the focus of key institutions is predominantly on public actors. Some voices in the region are in favour of a stronger involvement of NGOs within the framework of the IBK. Such an involvement is realized in other cooperation formats like the Alpine Convention. In any case, including NGOs within cross-border cooperation formats makes the governance structure even more complex. The report on Lake Constance describes how major organisations intertwined one with others around the lake, through several partners, agreements, cross-participation in boards or assemblies.

Textbox 1 Multi-level involvement in major soft cooperation instances (Lake Constance)

Around Lake Constance, Switzerland, Germany and Austria are federal states. In this context, lake-related policy areas may be under the responsibility of different territorial jurisdictions around the lake. Creating cooperation frameworks that take stock of these national differences has been prerequisite for setting up efficient cooperation around Lake Constance. The following figure summarizes the territorial level (in the NUTS classification) of the partners involved in major soft cooperation instances around Lake Constance. It shows the complexity of cooperation patterns to tackle various issues: government cooperation (IBK), spatial planning (ROK-B), water protection (IGBK) and fisheries (IBKF). These examples reflect the diversity of territoriality involved in lake related cooperation (Chilla et al., 2012).



The well-established scientific observation of the lake is reported as a strength and key asset for both water management and evidence-based regional development, in both Lake Constance and Lake Balaton. In Lake Constance, universities and research centres are involved in innovative research to monitor changes affecting the lake. Regular monitoring is done in cooperation between institutions of the different countries or regions (e.g., monitoring of chemical, physical and biological state reported in the 'green reports' of the Water Protection Commission) as well as further research projects. The project Seewandel, for instance explores the impact of stressors (e.g., the reduction of nutrients, climate change or non-indigenous species) on ecosystem and biodiversity of the lake as well as the human utilisation of the lake (Seewandel, n.d.). In Lake Balaton - in addition to traditional geographical research (since 1891), which explores the geological features

of the area (Kocsis, 2011) - Balaton Limnological Institute (BLI) has been the citadel of Lake Balaton limnology and innovation research on water quality protection (*Balaton Limnological Institute*, n.d.). BLI operates two types of monitoring system: beside the basic monitoring system that provide biological and chemical data, project-based monitoring seeks provide answers to current challenges. The reactivity of research communities is a factor of resilience to adapt human activities to the context of climate change.

Table 4 Strengths and weaknesses of regional governance at lake regions

	Lake Vänern	Lake Constance	Lake Balaton
Governance Strengths	A well-established horizontal dialogue and cooperation between municipal actors Well-established, regular events (e.g. Lake Vänern week and assembly) A joint website bringing together key actors Strengthening of 'Lake Vänern' identity in recent years	Century long tradition in CBC cooperation => institutional thickness Established structures for lake-related topics (water management, fisheries, shipping) Well established vertical dialogue in lake management between common decisions or guidelines adopted at lake region level and implementation of measures at national / regional / local level. Good connection with Interreg, national and regional funding streams Tradition of scientific research of the Lake (including innovative research tackling lake-related issues) High interest in cooperation around Lake Balaton by the national governments	Place-based development council and agency for the Lake since 2000 High involvement and representation of civil society Tradition of scientific research of the Lake (including innovative research tackling lake-related issues) Well-established horizontal dialogue and cooperation between actors, coordinated by LBDC High interest in cooperation around Lake Balaton by the national government
Governance Weaknesses	Two riparian regions that relate to the lake region in different ways Multiple instances of cooperation dialogue with incomplete coordination Insufficient commitment of municipal and regional actors to provide stable and sufficient resources for coordination activities. Lack of interest on key national authorities in Lake region cooperation (e.g. Swedish Agency for Marine and Water Management) Limited interest in cooperation around Lake Vänern by the national government	Cross-border character hampers the use of binding concepts and instruments on the lake-region level Intensive coordination processes due to complex governance structures (e.g., multi-level mismatch) No strong connection between spatial planning and water management.	Limited financial means available for lake-based cooperation from the government. Low level of use / connection to direct EU funds (e.g. Interreg). Contradiction between spatial development plans of riparian territories. Sectoral overlaps between territorial actors (e.g. in water quality measurement) Dominance of individual interests of some municipalities

Access to funding for territorial cooperation around the lakes may be problematic. In Lake Balaton, the limited access to funding for place-based cooperation is seen as an obstacle for further bottom-up actions. Since 2016, resources to support large tourism investments have been concentrated in the hands of MTÜ (Hungarian Tourism Agency - centralised state organisation). Meanwhile major infrastructural investments are financed by state budget organisations or by the Integrated Territorial Programmes of counties. In Lake Vänern, insufficient commitment of municipal and regional actors does not allow to provide stable and sufficient resources for coordination activities at pan-lake level. In lake Constance, European, national and regional funding streams are well-aligned with the objectives of the lake-based cooperation. The Interreg programme Alpine Rhine – Lake Constance – High Rhine provides significant resources to cooperation projects in the lake region.

The lack of interest of national authorities in lake-based cooperation is perceived by the regional actors that we interviewed as a limiting factor. In lake Balaton MTÜ (Hungarian Tourism Agency) paid little attention to the consultations related to the renewal of the Balaton Development Strategy. In lake Vänern, interviewed local actors consider that the Swedish government and the Swedish Agency for Marine and Water Management have shown little interest in the cooperation around the lake.

2.2.3 Integrative vs. confrontative topics

In view of promoting further efforts towards integrated development, some lake-based issues are more integrative or have confrontative potential.

Across the three lakes, some topics are mentioned as strong levers for cooperation. They correspond to management of the lake as a "common", with clear perspectives of "win-win" solutions:

- **Protection of waters and ecosystems** has historically triggered early inter-territorial cooperation around the three large lakes. In lake Constance, the first agreement on fishery was signed in 1893. In Lake Balaton, Balaton Uplands National Park (and the Directorate) was established in 1997 in order to protect the natural values and to apply traditional landscape management around the lake (https://www.bfnp.hu, n.d.). In lake Vänern, the institutional arrangement found for river basin management (so-called "joint management", see chapter 1) is seen as an appropriate mechanism to combine involvement of local and regional stakeholders (bottom-up dimension) and efficient decision-making (top-down dimension).
- **Tourism development** is an issue with high potential for consensus. It is connected to the wider topic of **attractivity**, not only for tourist but also for new permanent and non-permanent residents. Across the three lake regions, the creation of a lake brand has contributed to bring actors together. In lake Constance, the lake region is marketed under the motto "the Vier-Länder region" that was developed and launched in 2011 as part of an Interreg project. In Lake Balaton, the unified Balaton brand is under development by the MTÜ (Hungarian Tourism Agency). (There is a significant amount of financial resource for the project, a public discourse procedure has already taken place, but nothing has been seen about the project and the activities related to the project since then.) It is expected to bring together the current settlement and micro-regional based fragmented tourism marketing activities In Lake Vänern, the creation of lake Vänern brand in 2018, with an associated brand platform and visual identity[5] is one of the recent achievements of the Väner cooperation. Although these topics may generate consensus among a certain range of sectoral actors, they may also be part of wider tensions with other development objectives, or the use of the name / brand itself may give rise to conflict. For example, in the case of Lake Balaton, the word "Balaton" is used by several entities, for instance by a chocolate factory as well as a local television, but the conditions of use are not clarified, and efforts and negotiation attempts to do so have been on the agenda for many years.

Confrontative topics correspond to issues where the management of limited resources require trade-offs between sectoral interests. Across cases, some topics are identified as recurring conflicting issues.

[5] https://www.lakevanern.se/wp-content/uploads/2020/05/vanern-varumarkesplattform-och-visuell-identitet-180129_low.pdf

- Balancing between economic growth and environmental protection may lead to regional contradictions. In Lake Constance and Lake Balaton, spatial planning tensions are identified with regards to land use when urban development interferes with the protection of specific ecosystems, or with regards to shoreline management, when the construction of new landing stages could impede ecological continuity. The development of infrastructure for intensive tourism may be promoted with no account taken of the limited carrying capacity of the lake surroundings (ESPON TOURISM, 2020)
- Regulation of waterway transport across the lake requires to find a balance between different activities and interests. In Lake Vänern, businesses interested in the development of maritime transport on the lake (the Väner Business Council) regret that national taxation policies are not favourable to inland waterway transport and that the EU regulation on waterway transport is only partially implemented. Besides, waterway transport on the lake is hampered by conflicting views over the use of the Göta canal between the Västra Götaland region and Lake Vänern harbours and shipping companies. In Lake Balaton, different usage of the lake are in conflict: the increasing number of private boats with electrical and hybrid engines as well as “water taxi” are conflicting with other sailing activities and disrupting the ecosystem (Megosztom, n.d.). Besides, the phenomenon of 'not in my backyard' (NIMBY) hampers the dredging and deposition of lake bottom (mud) which would serve to maintain water quality.
- The promotion or preservation of professional fisheries is also mentioned as a confrontative topic. On Lake Constance, in the last decade, the improvement of wastewater management and the correlative breakdown in nutrient discharge into the lake, has had enormous impacts on the volume of fish catches and the economic profitability of fishing businesses. On Lake Balaton fishery, higher fish mortality (due to the use of large-scale chemicals and their leaching), adverse changes in water quality and fish fauna have increasingly affected the lake’s native fish stocks. Due to the decline in fish stocks and diversity, professional fishing on Lake Balaton was finally discontinued from December 2013.

Table 5 Shared integrative and confrontative topics

	Lake Vänern	Lake Constance	Lake Balaton
Integrative topics	Attractivity (Väner region as an integrated tourism destination) Freight transport on the lake (Joint) water quality management	Attractivity both for tourism and new residents Water management Spatial planning and transport	Attractivity (lake branding in initial phase) Spatial planning and public transport development
Confrontative topics	Waterway transport Water level management	Shoreline management (ecological continuity vs leisure) Land use planning (urban / tourism development vs. protection of ecosystems)	Fishing (sportfishing vs. fishery) Waterway transport (boating vs. sailing) Economic growth vs. environmental protection Shoreline management (real estate owners vs. municipalities) The legal basis of the use of the name “Balaton” Tourism planning

Looking at how lake-related issues are more or less consensual or conflicting around the lakes is an important starting point in the perspective of strengthening cooperation in the three lake regions. The next chapter draws on these transversal conclusions to propose participative methodologies towards the elaboration of future options for lake-based integrated development.

2.3 Conclusion: Nexus model for large lake regions

As a result of previous analysis, and across the diversity of lake regions, some key features, and related challenges and opportunities can be highlighted. The following graph (Figure 5) gives an overview of typical issues lake regions are confronted to in the form of a NEXUS model[6].

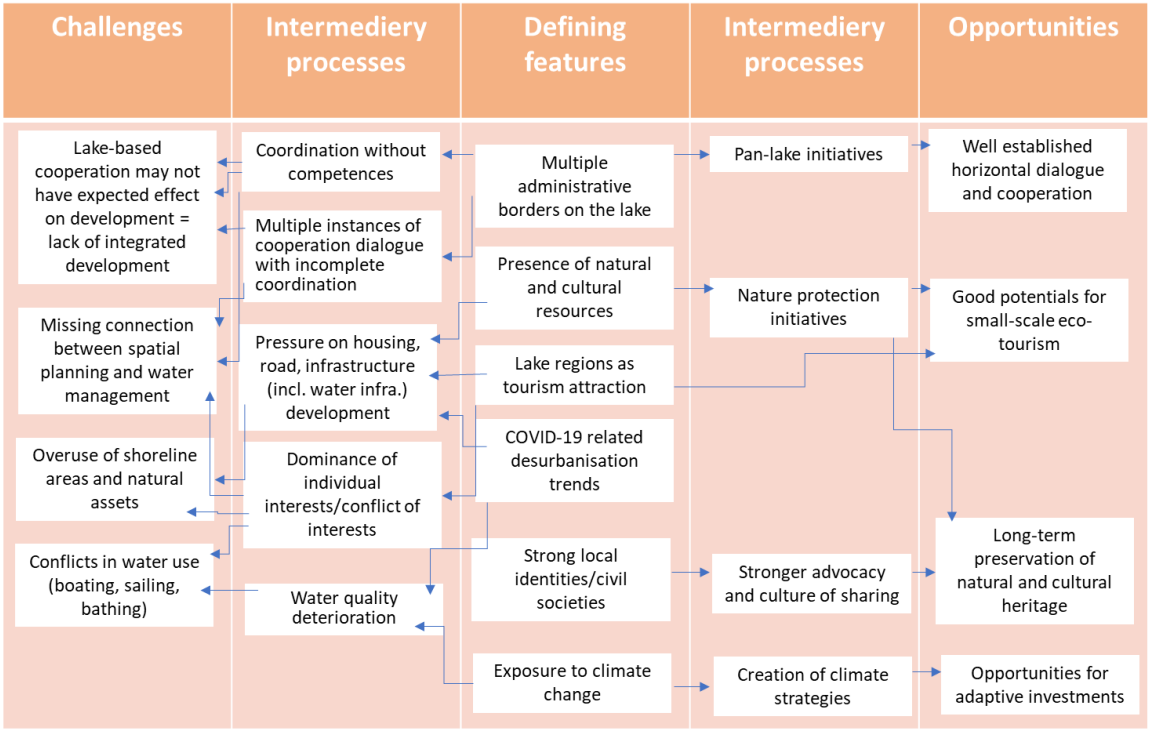
Multiple political-administrative frameworks on the lake generate fragmented decision-making that can be solved through diverse cooperation frameworks. Although a lake is a favorable context for establishing horizontal cooperation practices (each riparian entity having equal rights and obligations), the absence of competence at the level of the lake and the multiplicity of overlapping cooperation instances may challenge integrated management of the lake. This is observed in the field of regional development, as well as with regards to the relative disconnection between the two spheres of spatial planning and water management.

The presence of natural and cultural resources and the emergence of large lakes as tourism attractions creates opportunities for the establishment of long-term conservation practices and for economic activities such as small-scale eco-tourism that fits with current trend towards “slow tourism” and “domestic tourism”. However, it also creates a pressure on housing, on infrastructure that may lead to the overuse of shoreline areas and natural assets and conflicts in the use of water. COVID-19 related counterurbanisation (e.g. with the development of countryside home offices) could further emphasize these challenges.

The strong civil local identities associated with the lake and the strong civil societies of riparian regions are a lever to build the new “sharing society” that would lead to the careful use of local resources and the preservation of landscape and heritage around the lakes.

Finally, the exposure to climate change is a direct threat to water quality of most large lake (through various processes). Although it may further exacerbate conflicts for water usage, this could allow lake regions to become test beds for innovative adaptive investments.

Figure 5 Nexus model for large lake regions



[6] Inspired by environmental analysis, the NEXUS model allows to approach typical combinations of pertinent co-factors, with numerous parallel dimensions. It was formerly used in ESPON GEOSPECS and ESPON TeDi projects tp synthesise the main social, economic and environmental causal processes in mountain, island and sparsely populated regions.

3 Bringing integrated planning one step forward: Balaton, Vänern, Constance

Stakeholders from the three regions have expressed their interest in contributing to an integrated development of their lake region. Integrated development brings together the different sectoral policy concerns, including environmental, economic and social interests. It moreover applies a systematic multi-level approach, e.g. considers the municipal, regional, national, European and – where relevant – the cross-border dimension. In doing so, it includes all kinds of actors, beyond public authorities, e.g. from the economic and environmental sectors, NGOs and research institutions. Integrated development requires sound place-based perspectives, i.e. strategic ideas that pave the way towards sustainable long-term developments. It is based on the specific situations of the regions.

This chapter of the report provides recommendations and guidelines for managing lake regions in a more integrated way. It is built on the results of the analyses focused on stakeholder regions (cf. Chapter 2 and Annexes on regional reports), and on the inputs from a stakeholder dialogue organised in each region.

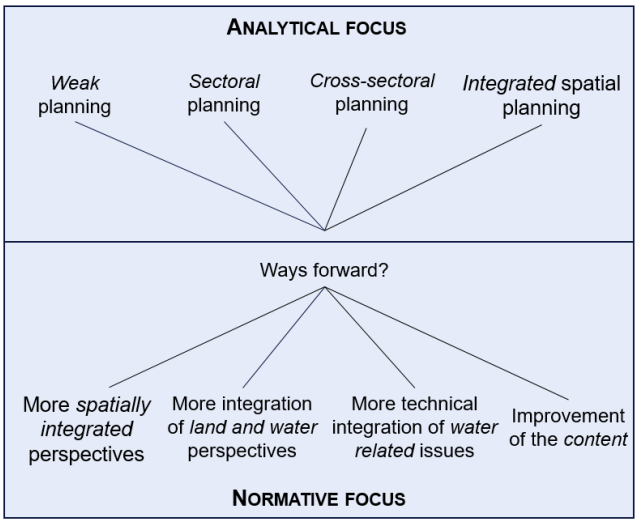
3.1 Methodological framework

The regional reports have shown the specificities and parallels of the three stakeholder regions, both in terms territorial development and governance issues. The need for integrated actions is discussed among regional stakeholders in differing intensity:

- In the case of **Lake Balaton**, concepts are in place promoting integrated development but the fragmentation on the administrative side as well as few resources on the level of the lake region are still an issue.
- In the case of **Lake Constance**, a current process develops a spatial development perspective for the region. The participative process focuses on interlinkages between land development and lake management.
- In the case of **Lake Vänern**, integrated development was brought to the agenda in recent years but the discussions on integrated approaches are still in the beginning.

In order to take into account these starting points, ESPON LAKES defines regional processes, adapted to the situation of each lake region. Figure 6 illustrates the common framework. The illustration of the simplified red thread allows to have a common structure but at the same time to be flexible for place-based needs.

Figure 6 Red thread of Task 3



The first part of the red thread (**Analytical focus**) is meant to summarise the situation of governance and territorial integration in the regions with the characterisation of planning processes. The framework differentiates four categories, unfolding a gradient from 'weak planning' to 'integrated spatial planning'. The objective is to subsume the regions' situation to one (or more) of these categories that make up an obviously simplified heuristic:

- **Weak planning** means that spatial planning processes are not very intensive, planning documents do not have a strong binding capacity and/ or do not have a strategic ambition.
- **Sectoral planning** means planning processes and documents are in place, in particular in one or more particular sectors like e.g. environment, transport infrastructure etc. However, the integration of this sectoral perspective into a larger picture is not really in the focus.
- **Cross-sectoral planning** means that the sectoral procedures and perspectives are numerous in the region and they refer to each other to a certain extent. However, integration is limited with regard to the spatial development perspective and with regard to gaps throughout the multi-level governance.
- **Integrated spatial planning** means that planning documents, institutions, and procedures are integrated in a comprehensive sense. The spatial planning and development perspective takes a coordinative role with regard to sectoral regulations. Moreover, the horizontal dimension (crossing administrative or even national borders) and the vertical dimension of multi-level governance are addressed in a systematic way.

The given options might be combined or complemented in each case study. The objective is to identify shortfalls and potentials.

The second part (**Normative focus**) is developed as orientation for the participative process. It intends to specify and concretise future options. These options focus on different aspects as next steps to deepen integrated development in the lake regions:

- **More spatially integrated perspectives**: This category highlights the need of a more integrated sectoral cooperation and planning within the region.
- **More integration of land and water perspectives**: This category highlights the link between lake management and territorial perspectives.
- **More technical integration of water related issues**: This category refers to the different aspects of lake management.
- **Improvement of the content**: This category reflects that strategies and concepts are already available but that there is scope for incremental improvements, e.g. implementation could be strengthened, more up-to-date information can be included etc.

The project does not aim at providing a comprehensive strategy for integrated development of each lake region, as it runs in parallel with other regional processes. But it can provide "building-blocks" for future development, while addressing shortfalls of current processes. Therefore, the following dimensions are in the focus of reflection:

- **Topics:** What are important issues of spatial integrated development in the lake regions? As the analytical summaries of the report have shown, more water related issues, general governance questions, cross-sectoral integration etc. can be important temporal priorities, depending on the state of play and the political agenda.
- **Instruments**: What instruments are relevant for spatial integrated development in lake regions? This refers to a) *Legal instruments* of differing binding character, ranging from spatial planning to sectoral policies; planning documents and concepts b) *Incentives and support tools*, in particular funding programmes from different levels c) *Soft instruments*, in particular cooperation formats and networks but also strategy processes or agenda setting.
- **Processes**: What activities pave the way towards a more integrated development? It is important to link the available instruments and the political setting with possible next steps and a time frame

('roadmap'). The orientation towards implementation can involve rather technical measures ('who does what by when') or more general questions ('do we need new ressources/institutions' etc.).

For all three cases, the approach builds on the following main elements:

1. A **background document for each lake region** elaborated as basis for the participative process: These documents contain synthesized graphic elements (**SWOT** and **mapshot**) and describe shortly the starting points of the regions. This includes the questions: How is spatial integrated development addressed in the region? What are currently relevant processes and issues? The background documents of the three regions of Lake Balaton, Lake Constance and Lake Vänern are part of the regional reports.
2. A **participatory process** organised within each lake region: the process was adopted in a tailor-way manner whilst following a common overall structure. The participatory processes include ***two rounds*** that allowed to have feedback loops (see Table 6). The first round was meant to develop perspectives and the second round to validate them. *Semi-structured interviews* were conducted in parallel in order to accompany the process. The table illustrates the focus of the participatory rounds in the case study regions. The details of each specific methodological framework can be found in the regional reports.

Table 6: Overview of the participatory process in each lake region

	Lake Balaton	Lake Constance	Lake Vänern
Preparation	Interview and participation at the meeting of Lake Balaton Development Council	Interviews	Interviews
Round 1	**Workshop** (online) [22 participants]	**Focus group** with key stakeholders of integrated spatial development [expert discussion with 3 participants]	**Web survey** [70 responses]
Round 2	**Survey** for validation of workshop results and further information [6 participants]	**Interviews** with sectoral stakeholders and experts on spatial development. [15 participants]	**Focus group** to discuss the survey results and possible paths for further regional involvement in issues of relevance for Lake Vänern [8 participants]

3.2 Cross-case comparison: future development options for a better integrated development of lake regions

3.2.1 Background: the territorial and governance situation

Lake regions have common ground as they are characterized by a water body. However, the location at or around a lake is only one characteristic of a region and leaves scope for a high diversity of patterns, developments paths and political priorities. The three case study regions of the LAKE project illustrate the high diversity of lake regions in their very different characteristic and situations.

i) Regional structures:

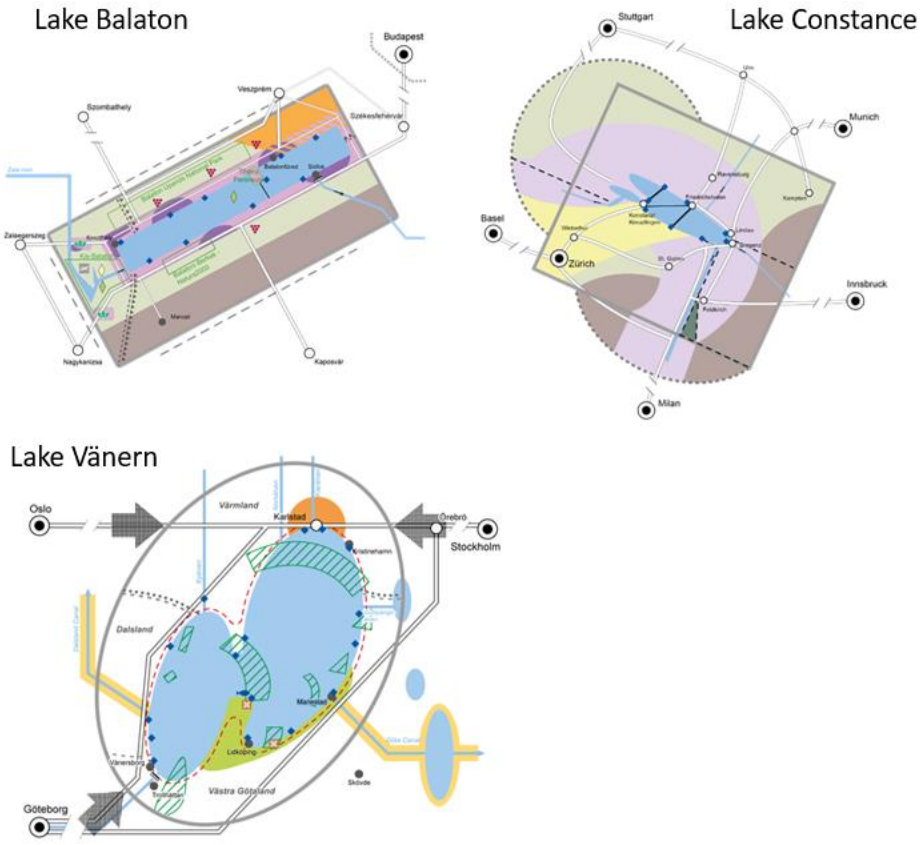
As established in previous chapters, different situations are found.

- Lake Balaton is a strong tourism region that has to balance the economic needs and limits of sustainability.
- Lake Constance is a strong and rather densely populated area that is characterised by its particular cross-border character, linking four nation states. The socio-economic successes and dynamics come along with often conflicting land-use demands.
- Lake Vänern is an inner periphery that only starts to be conceived as a region of its own and as an object of spatial development.

The overall challenge is to develop place-based approaches that are built on the respective strengths and addresses the challenges on the ground.

Figure 7 provides a synthetic overview of the territorial setting of the three lake regions.

Figure 7: Mapshots of Lake Balaton, Lake Constance and Lake Vänern



ii) Cooperation challenges

The lake is not only an important element for territorial development, but it also is a challenge for administrative and political geometries: in all cases, the functional lake region comprises different spatial units, separated by the lake and by territorial boundaries. In the Balaton and Vänern cases, this addresses domestic regionalisation, and in the Constance case, national borders come into play. This situation has to be addressed with good governance solutions that are also based on functioning discursive processes. In all regions, the current situation comes along with particular challenges and strengths:

- In the Balaton case, the relation between the lake region and the central administration is in a dynamic phase. Debates on resources, mandates, and priorities in the touristic region characterise ongoing discussions. The development council plays an important role in this context.
- The Lake Constance region is a forerunner of cross-border cooperation on the European scale, and the successes in water quality improvement and other policy arenas are impressive. Despite the institutional thickness, the cross-border dimension remains a challenge. The high socio-economic dynamic comes along with difficult land-use dynamics that have to be balanced whilst having binding instruments only on the domestic level.
- The Vänern case shows a series of potentials for the further development of cooperation betwen riparian municipalities and regions. Cooperation has so far been mainly project-based and at the local level. The challenge is to organise the transition to a more stable cooperation format, ideally with active regional support, e.g. as part of the implementation of recently adopted regional development strategies ("RUS").

iii) Integrated development in lake regions

All lake regions acknowledge the need for sustainable spatial development. At the same time, they all face clear challenges. The debate on mandates and resources is currently in the focus of the Balaton region; the cross-border dimension and the concretisation of spatial perspectives are important in the Constance case; and the establishment of a continuous development process is the main topic of the Vänern region.

The differing regional structures and challenges vary around large lakes, and there is certainly no one-size-fits-all approach towards integrated development but instead a need for specific, place-based approaches.

An integrated spatial development strategy has numerous dimensions that have to be considered, and their relevance differs over time and plays a different role in each region. The potential relevance of the following dimensions is obvious:

- Cross-sectoral integration (tourism, environment, settlement etc.)
- Multi-level governance (municipal, regional level)
- Horizontal integration (cross-border, intermunicipal etc.)

3.2.2 Results from the participatory process

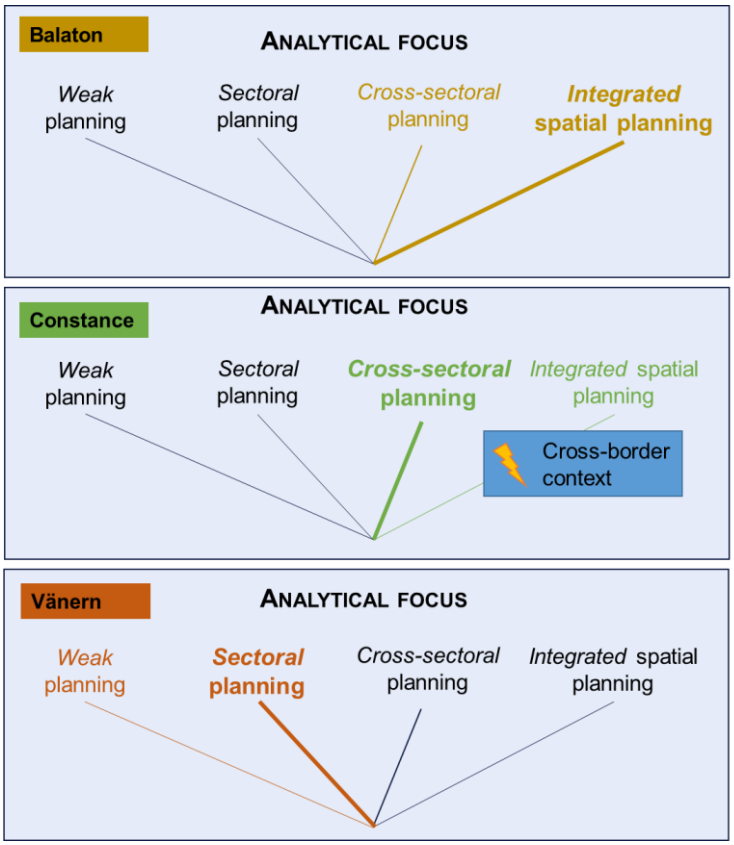
3.2.2.1 Analytical insights

The results from the case study analyses can be presented in a condensed manner (see Figure 8). Obviously, the situation in Vänern is very different from other two examples. As the spatial development process only started recently, sectoral planning plays the most important role whereas spatial planning is rather in the background. Regional strategic documents tend to ignore the lake. Sectoral planning is well-established for some sectors and emerging for other sectors.

Both in the Balaton and Lake Constance region, cross-sectoral and integrated spatial planning plays the key role at the moment. In the case of Balaton, numerous sectoral perspectives that refer to each other, integration of sectoral aspects to the spatial development perspective. The integration of sectoral perspectives is located on the regional level (coordination by LBDC).

In the case of Lake Constance, the cross-border context is of major importance. Under the umbrella institution of the IBK, the relevant policies have a systematic framework also in the cross-border functioning. However, spatial planning is only now to become a more prominent policy. Numerous sectoral perspectives refer to each other. Despite a high number of integrated concepts on domestic level, a planning competence does not exist on the lake region level. The framework concept including spatial and transport development are currently under development.

Figure 8: The current situation of spatial development



3.2.2.2 Challenges towards more integrated spatial development

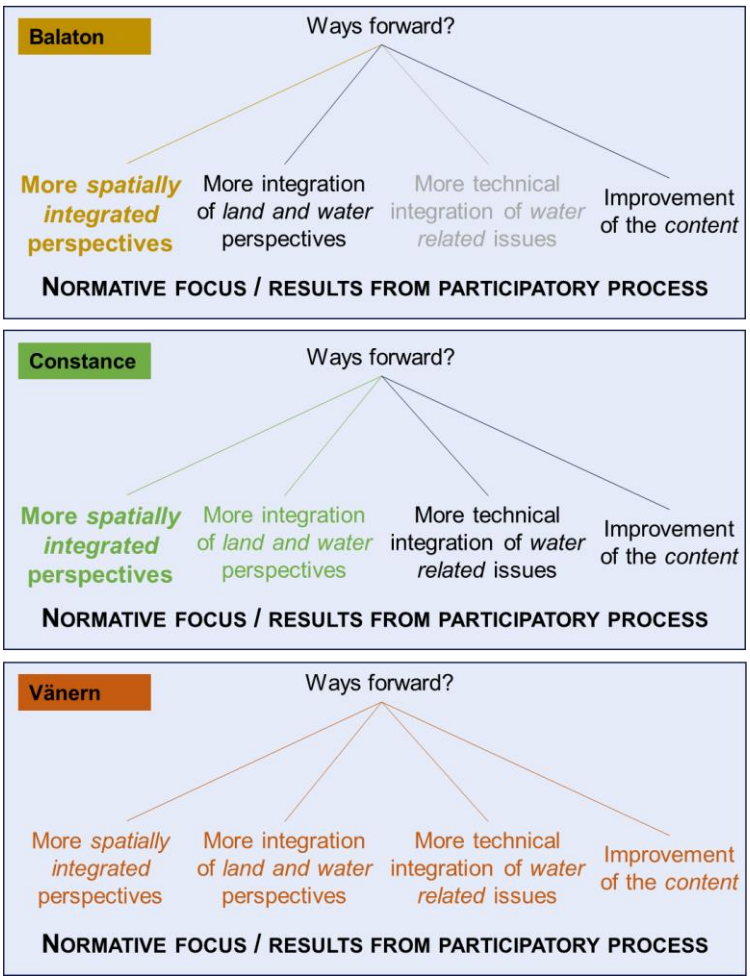
In each region, the current situation is the result of decades of development policies, and this is embedded in complex governance contexts. Nevertheless, there is certainly scope for improvement and further developments in the three regions. The dynamic in the regions differs, and so do the challenges along the way.

The challenges in Balaton region comprise a) sectoral overlapping and fragmentation, b) sectoral top-down communication and decision-making and c) lack of financial resources on lake region level. Addressing these challenges seems important in order to reach a more intense integrated spatial development perspective. This would come along with more spatially integrated perspectives, especially with regards to governance and funding.

In the Lake Constance case, addressing the border-related mismatches continues to be in the focus. Ensuring the consistency of planning objectives and procedures across national borders remains a challenge, despite decades of cooperation experience. Moreover, the land-lake interactions bear a potential for further development. This is true in particular for the functional dynamics across the shore line.

The lake Vänern region has potentials in many aspects, given the early stage of cooperation and development structures. The situation is also hampered by the fact that the involved regions Västra Götaland and Värmland belong to different ESIF support areas, each having an own main sectoral interest (respectively maritime economy and forestry).

Figure 9: Future perspectives of spatial development



3.2.3 The instrumental perspective

When it comes to the further development of lake regions, numerous tools and activities bear different potential. Table 7 provides an overview of these tools and activities. The **regional reports** go more into detail for each case, and here the crosscutting aspects are highlighted (see in particular the pillar on the very right and the bottom row).

The different contexts of the case study regions are highly important for the question of development options, and they come along with differing foci of the political debate.

- In the Balaton region, the contemporary debate on the strengthening of the role of the lake region comes along with rather fundamental reflections on competences and resources.
- In the Constance region, the incremental development of spatial development is in the focus, in particular with regard to the cross-border dimension. The continuity and strengthening of cross-border cooperation are important elements.
- In the Vänern region, the focus is rather on sectoral and technical elements of regional development. The strengthening of water related issues and tourism is in the foreground, whereas approaches towards a more integrated development do not reach consensus at the moment.

Table 7: The instrumental perspective

How to read the table: Each point mentioned in the table reflects one of the main take-aways of the participatory process, that could be introduced as follows: “According to stakeholders involved in the participative process, integrated development of the lake region could benefit from …”

	Balaton	Constance	Vänern	Cross-case comparison
Legal	• Upgrade of the legal and administrative competences for Lake Balaton Development Council (e.g. chief architect) • Water management legislation on unified treatment and management of the lake and the inflows • Regulations to prohibit the construction of new buildings on the shoreline	• Incremental development of domestic regulations, in particular with regard to land-lake interactions in domestic planning documents • Better inclusion of cross-border dimension in planning and development documents	• Clarification of long-term water regulation strategies based on the new water judgement / regulation of water levels (2033) • New regulations for inland waterway transport (current regulation is designed for maritime transport)	Place-based approaches lead to **very different focus/ role** of legal instruments in the three cases: • Mandate debate in Balaton • Integration of land-lake and cross-border dimension in Constance • Sectoral focus in Vänern
Financial tools	• Involvement of Lake Balaton Development Council into EU fund programming, as e.g. intermediate body • Adequate documentation of funding possibilities offered by the EU cohesion policy to lake regions	• Continuation of close cooperation with INTERREG A programme Alpine Rhine - Lake Constance - High Rhine • Making use of INTERREG B programme Alpine Space	• Regional support in the framework of the implementation of regional development strategies • Taxation of inland waterway traffic to support the development of this more environmentally friendly mode of transportation. • More intense use of European structural and investment funds	**Common** focus on **continuation** and **development** of funding options as important basis for development • **Alignment** of funding opportunities with regional strategies important
Soft instruments	• More local participation with regard to economic investments/touristic accommodation development • Creation of Balaton Brand, strengthening of tourism destination management (TDM)	• further elaboration of cross-border planning perspectives based on framework concept on spatial development and transport • Cross-sectoral exchange formats to address land-lake interactions	• Stabilisation of Vänern cooperation, e.g. through the establishment of a foundation or agreement of focus group. • Continued dialogue within the Lake Vänern Council on water level regulation solutions • Effective coordination and division of roles and responsibilities between tourism promotion organisations around the lake. • Making effective use of the landscape observatory as a platform for dialogue (www.lovg.se)	**Key role** for soft instruments due to political geometries
‚cross-instrumental direction‘	**Efforts for further resources** and competences on lake region level	**Incremental spatial development** with a focus on continuity and strengthening of cross-border cooperation, potential for land-lake relations	**Strengthening of sectoral development** as a precondition towards a more integrated development	

From the perspective of a cross-case comparison, the situation is as follows:

- **Legal** instruments: All three lake regions are not institutionalised as territorial authorities that would dispose of legislative competence. They are specific objects of water related regulations, and they are object to general legislation. They all have their own governance in place that can influence regulative systems to a different degree. It is important to note that the political geometry shows frictions in all three cases as the lake regions show frictions and borders of the involved perimeters (two ESIF areas in the Vänern case; several national affiliations in the Lake Constance case). The participatory process focused on different aspects in the legal dimension. In the Balaton area, the fostering of mandates on the lake level is in the foreground; in Lake Constance, a strengthened focus on land-lake-relations has been debated, against the background of continuing cross-border development; and in Vänern, the focus was on water related regulations.
- **Financial** instruments: Financial support plays an important role in all regions, even if the focus differs. Continuous and improved funding opportunities and alignment of European and domestic strategies bears potential in all three cases. In Balaton, the question of EU funding for lake regions was an important concern, in the Constance case, the cross-border INTERREG resources play a key role, and in Vänern, several funding sources have been discussed with regard to the still young development discourse.
- **Soft** (discursive) instruments: Non-binding and communication based instruments play a key role in all regions. This is also due to the fact that political geometries do not always fit lake related issues, which does not allow for simple top-down strategies but call for intense dialogues and co-operation processes. In the Balaton case, marketing issues and the involvement of the civil society have been stressed; in the Constance region, the relevance of cross-border strategies (including land-lake relations) have been debated, based on the need for regular exchange formats; and in Vänern, the continuity and the fostering of exchange formats were in the foreground.

If we synthesize and simplify the situation for each region, we can state the following:

- The Balaton approach can be captured as rather “efforts for further resources and mandates”, focusing on the capabilities for development.
- The Constance example can be seen as “incremental spatial development” strategy that puts continuity and the importance of cross-border cooperation in the foreground,
- The Vänern region currently focuses on “sectoral and technical development” in which water related and tourism issues play a key role.

4 Framework concept for an integrated development of European large lakes

Stakeholders from this Targeted Analysis have highlighted the lack of a common policy document that actors from European lake regions could rely on in order to coherently work towards integrated development of large lakes. It was therefore requested from the Service Provider to compile its recommendations for integrated development into a *framework concept*. The framework concept makes the outcome from the analysis on European lake regions and field work in the three stakeholder regions available to decision makers and practitioners at all administrative levels, from local to EU. It furthermore illustrates the diversity of large lake regions and, hence, facilitate exchange and learning about this diversity in Europe.

The framework concept is available from the ESPON programme webpage (espon.eu/lakes, under the title: "Annex 3 Framework concept: towards integrated development in large lake regions").

This chapter first describes how the framework concept intends to be a vector for the dissemination of project results and recommendations (section 1), then what the main messages are (section 2) and finally how the document was elaborated (section 3).

4.1 Objectives of the framework concept

Long-term objectives of the framework concept are twofold:

- The framework concept shall strengthen the overall visibility of, and raise awareness for, large lake regions in Europe, especially among national and EU decision makers.
- The framework concept shall facilitate cooperation around large lakes and contribute to developing shared identities, especially among local and regional players in large lake regions.

The framework concept is a source of information, inspiration and orientation about ongoing activities and future perspectives in large lake regions. In contrast to most other products of this research project, the framework concept is not a scientific document but has a strong policy focus. It reduces scientific complexity for the sake of higher understandability and better communicability.

The framework concept emphasizes the need for more integrated territorial approaches, more integrated policies, more integrated networking strategies. In particular, this implies to think of necessary connections between policy spheres that usually work separately (in "silos") or even compete for resources: water management and regional development, tourism and landscape conservation, agriculture and water control.

The framework concept encompasses three dimensions identified as essential for the future of lake regions: governance, funds and knowledge. These are questioned in a multi-scalar perspective: at the scale of the lake region where cross-sectoral policy frameworks, allocation of EU funds and capacity building could be streamlined and at the scale of inter-lake network where best governance practices, funding opportunities, and research outputs could be structured and disseminated.

In this regard, the main output of the framework concept is a set of 12 "policy options" for large lake regions that stakeholders from lake regions could decide to implement on their own, based on a cooperation centred on a specific lake or in a inter-lake perspective. A strong emphasis is put on the European dimension, i.e. the connection to existing EU policies (esp. Cohesion Policy) EU funding sources (esp. European Structural and Investment Funds – ESIF) and EU on-going processes and programmes (Territorial Agenda 2030, Interreg Europe).

Three main target groups of the framework concept include:

- Stakeholders from lake regions interested in intensifying cooperation around the lake, attracting/benefitting from EU funds.
- National authorities in charge of planning for regional development instruments, and of establishing frameworks for e.g. water policy, tourism policy or transport policy.
- European policy makers in charge of regional policy (DG REGIO), environmental policy (DG ENV) or transport policy (DG MOVE; Connecting Europe Facility) and interested in how large lakes could

contribute to the delivery of EU policies, as well as European elected representatives concerned by the future of large lakes or involved in advocacy for areas with geographic specificities.

4.2 Main messages

The framework concept consists of three main parts, each of which addresses a specific guiding question.

Chapter I – what are large lake regions?

Large lake regions have diverse challenges and potential affecting their development perspectives. They also share certain specificities. Chapter 1 provides a definition of what large lakes are through the diversity of policy issues that they are confronted to.

- Large lakes are first described as "**pools of resources**" where bio-physical assets (water, fish stocks, landscapes) and socio-cultural assets (cultural heritage and identities) require specific management measures and trade-offs.
- Large lakes are then considered from their broader inclusion in interregional and international circulations, as "**connected places**". Accessibility from and to surrounding metropolises is a key factor when considering housing dynamics and access to services of general interest around large lakes. Inclusion in international value chains and innovation are important assets for the vitality of the regional labour market.
- Large lakes are finally presented as "**fragile ecosystems**". The manifold interests expressed around large lakes put a significant pressure on lake-based ecosystems and biodiversity. Spatial planning may support the resolution of contradictions between the development of human settlements and activities on the one hand and the preservation of water quality, ecosystems and biodiversity on the other. The lack of adequate planning and governance around large lakes may lead to an overuse of, and cause damage to, material and symbolic resources associated with the lake.

Chapter II - what governance arrangements are in place to deliver lake-related policies?

Policies and management efforts around large lake are often facing the political-administrative fragmentation of the lake. Large lakes are in many cases shared between several countries (e.g. Constance, Peipsi, Prespa, Maggiore, Geneva, Fertő-Neusiedl) or several regions (e.g. Vänern, Mjøsa, Päijänne). This fragmentation may lead to inconsistent policies applied around the lake. Different solutions from light cooperation initiatives to harder governance framework have been put in place to deliver policies for the lakes and their regions. Good practices can be identified with regards to the elaboration of a common lake vision, the recognition and valorisation of regional specificities, or for community-led local development.

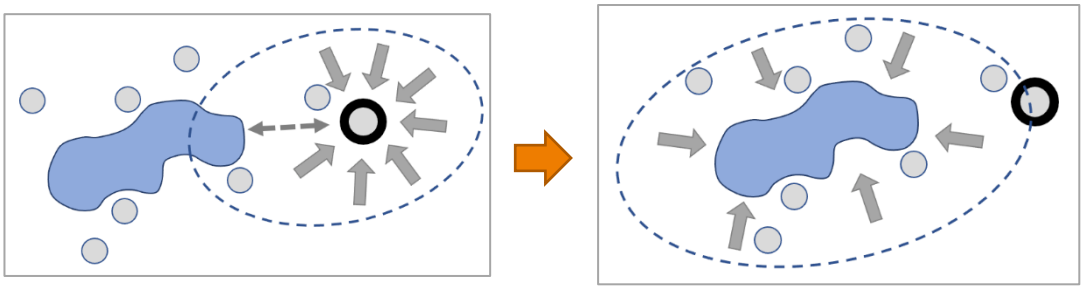
- **Lake-centred cooperation bodies** distinctly support the elaboration of long-term common visions for a lake region as a whole. Hence, they contribute to an integrated perspective on the lake region.
- **Intermunicipal cooperation initiatives** are common around large lakes. They can play a key role with regards to local development initiatives and strategic planning on lake shores
- **Vertical cooperation between local and regional actors** is important in many policy fields. Often, national regulatory frameworks oblige them to cooperate or open room for strengthening the integration between regional and local policy making.
- **Bottom-up cooperation initiatives such as community-led local development groups** can bring together local stakeholders and conjointly develop and implement small-scale actions benefitting local communities and businesses (see e.g. for the fishery sector).
- **Grassroot multi-stakeholder alliances** that work on single topics can be efficient levers to support exploratory cooperation processes with a well-defined target, such as supporting the lake or parts of it to be designated as a protected area.
- **Network of NGOs** are efficient bring together like-minded associations, create a critical mass in view of raising awareness for the natural and cultural heritage of a lake or to organise events for lake-based activities.
- **Business consortia** cooperate with public players to provide services of general interest such as public transport services on and around lakes.

However large lakes potential for balanced spatial planning is often not well considered across investigated cases. This is why two shifts in perspective are needed with regards to how the lake is considered by regional actors: from considering the lake as a ***subordinate* to *centre of attention*** and from the lake as a ***barrier* to *catalyst*** of regional cooperation.

Figure 10 Shifts in perspective for large lakes

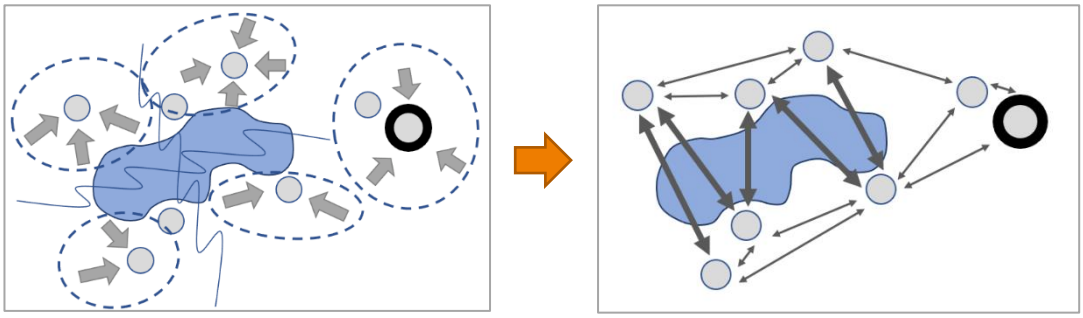
From lakes as **subordinate**

To lakes as **centres of attention**



From lakes as **barriers**

To lakes as **catalysts**

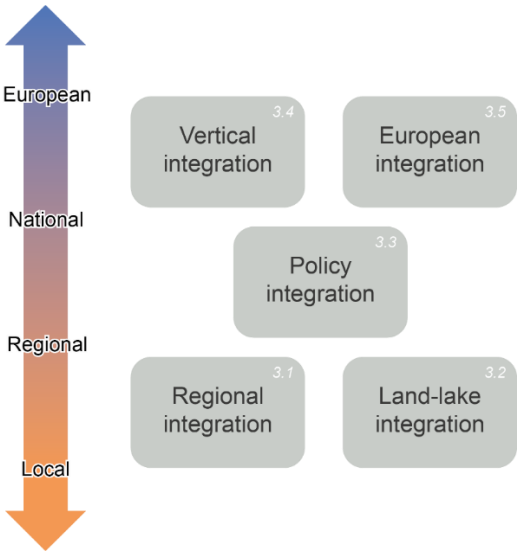


Chapter III – how can policies better promote integrated development in large lake regions?

To achieve these shifts in perspective and work towards integrated development of lake regions, a multi-scalar policy approach is needed from the micro-level of the lake to the EU level. Five access points for better integration were identified (see Figure 11). They cover different facets and perspectives of integration between players, places and policies:

- **Regional integration – EU place-based policies and investments in lake region.** The first access point refers to the integration of the lake and adjacent areas, mainly regions and municipalities through the support of European Structural and Investment Funds and related instruments.
- **Land-lake integration – where land meets water.** Zooming further into the lake, the interface of lake-based and land-based activities along the shoreline also needs to be considered.
- **Policy integration – cooperation between sector players.** Various players rely on the lake for their activities. The variety of needs might however lead to conflicting interests and high pressure on the lake and its adjacent areas. This implies a need for cooperation between the representatives of these interests and relevant policy sectors.
- **Vertical integration – lakes in overarching policies.** Going beyond the immediate context, Vertical integration reflects that large lake regions are embedded in multi-level governance systems from local to EU level.
- **European integration – communities of European lakes.** At a wider scale, the joint interests of large lake regions in Europe should be identified and utilised for community building. European integration refers to the representation of interests of lake regions at EU level and European communities of learning, exchange, and capacity building.

Figure 11 Integrated approach: from local level to European level



Twelve policy options have been identified in relation to these access points. A quick overview of these is provided in Table 8. For each of these policy options, the framework concept provides three subsections: "**What it is about?**" that describes the needs and opportunities for stakeholders to get involved in action; "**How to start**?" that provide concrete steps that could be taken in order to implement the policy option. And "**Practical examples**" that feature similar initiatives taken in other context or material (study, reports, test case) that stakeholders can take inspiration from.

Table 8 Overview of policy options

Dimension	Denomination	Short description
Regional integration	Use EU funding to promote sustainable development	Sustainable development is an important policy objective in large lake regions. Lake regions should make use of EU Cohesion policy funding and the 'Next Generation EU' recovery instrument to support connectivity, SME competitiveness and environmental protection.
	Increase the use of integrated tools with EU Cohesion Policy	Specific tools such as Integrated Territorial Investments (ITI), CLLD and other territorial strategies have proved effective in supporting sustainable development in various territorial contexts. Using these tools around large lakes could meet expectations from local stakeholders to be involved in implementing EU funds.
	Support cooperation beyond national borders	European territorial cooperation can support the implementation of projects in cross-border lake regions (Interreg A) as well as provide resources for lake-related transnational projects. Applying the European Grouping of Territorial Cooperation instrument (EGTC) and the European cross-border mechanism (ECBM) could support services of general interest in lake regions.
Land-lake integration	Promote integrated land-lake management	Bridging the frequent gap between terrestrial planning and lake-based planning requires assessing critical land-lake interactions related to social, economic and ecosystem-based activities. The principle of Integrated Coastal Zone Management (ICZM) applied in coastal regions and the ecosystem approach could both promote integration.
Policy integration	Strengthen the role of spatial planning in policy coordination	The limited availability of land around large lakes requires cross-sectoral trade-offs. Preparing a spatial plan for a lake region could trigger interactions between policy sectors and prospective thinking.

	Capitalise on integrated river basin management practices	EU large lakes are part of wider river basins whose activities are monitored through river basin management plans. Lake regions should capitalise on communities responsible for these plans to implement sustainable development beyond a strict understanding of water management.
	Establish and support lake-centred economic clusters	Economic clusters can help cooperation along territorial value chains. They can create additional value from lake resources, and the lake can be a catalyst (a common reference) to strengthen sectoral interactions.
Vertical integration	Link large lake regions to the Territorial Agenda 2030	The Territorial Agenda 2030 is a European strategic policy document for spatial planning and territorial development. A new pilot action with a focus on lake regions could be developed and launched with the next round of Territorial Agenda 2030 pilot actions. This would highlight the specificity of large lake regions in Europe and support place-based solutions in them.
	Illustrate contributions to policy goals	Highlighting the contribution of lake regions to EU or global policy goals would help to position lake regions in broader policy discourses. Two examples are the UN Sustainable Development Goals and Territorial Agenda 2030. This could be done by screening local and regional strategies, communication and a monitoring system for these regions.
	Empower local and regional players through capacity building	Policy integration and strengthening the position of lake regions in EU policies entails new requirements, especially for local and regional authorities. These include ensuring capacity to implement EU policies. In addition, different programmes and arenas could be mobilised by lake regions such as the EU Policy Learning Platform, Technical Assistance and Information Exchange (TAIEX), the Smart Specialisation Platform and the EC Urban Development Network.
European integration	Raise a voice in Brussels	Having a unique voice in the EU policy debate could help lake regions to promote their interests in EU institutions. These regions could establish an association and set up a contact point, secretariat or office in Brussels. Such an association would provide a network for exchanging experiences, support lake-related events and be a contact point for EU expertise.
	Promote European exchange and learning	Exchange arenas and dialogue platforms can bring together local or regional development practitioners. An online platform for integrated lake development, working on joint projects and ensuring visibility at major EU events could raise interest and keep the discussion alive on the future of lake regions.

4.3 Elaboration process: expert-based and participative inputs

The framework concept was elaborated on the basis of desk research, expert knowledge and judgment and a participative process that involved stakeholders from the three stakeholder regions of this Targeted Analysis.

A first draft of the framework concept has been produced:

- The first two parts of the framework concept were conceived as a **synthesis of LAKES analytical tasks**: the exploration of the 12 case studies on governance and cooperation in large lake regions, as well as the territorial analysis for the three stakeholder regions.
- The third part of the framework concept is based on **expert knowledge and practice** from the project team in Cohesion Policy, territories with geographic specificities and European capacity building.

The content of the framework concept was then discussed at a horizontal workshop that gathered stakeholders from the three lake regions (Balaton, Vänern, Constance). This workshop was organised on the 24th of September 2021 and allowed for structured exchanges focusing on the policy options.

Text box 2 Main inputs of the horizontal workshop

At the workshop, a set of policy options has been discussed individually. In general, no major concern was raised in relation any of the 12 policy options at this point. The following inputs from stakeholders were reflected in the final framework concept.

In relation to policy option ("Make use of EU funding to promote sustainable development"), stakeholders highlighted obstacles associated with the mobilisation of EU funds in lake regions. These obstacles are related to the lack of consideration of lake specific issues by distant national or regional programme authorities, to administrative fragmentation that require additional coordination efforts (e.g. in cases where multiple programmes apply around a lake) and to the difficulties to mobilise actors like NGOs for projects that are based on co-funding.

In relation to policy option ("Promote integrated land-lake management"), it was noted that integrating land and lake planning would make it easier to design and implement policies for activities that occur on land and on water, such as tourism. It would also allow for a broader reflection on the carrying capacity of lake regions for different activities. Finally, it would be part of a broader effort to break sectoral policy silos around large lakes. This aim could be pursued through a "holistic" management plan working both as a strategic and legally binding document. In Sweden, coastal regions benefit from such cross-regional management plan with a legally binding value. It was also noted such a policy option could be supported by an organisation dedicated to interests of lake regions.

In relation to the policy option ("Capitalise on integrated river basin management practices"), it was noted that practices associated with integrated river basin management (IRBM, implementing the WFD) differ from one country to the other. The policy option therefore applies for lake regions embedded in countries where river basin management is already developed into a participatory tool, with funding stream dedicated to implementation. Besides, such a cooperation could take the form of network of actors that willingly engage in discussions on their (current and future) usage of the lake water, with the involvement of sectoral/private actors, NGOs, community representatives, etc. The Lake Vänern Water Council is mentioned as an example of good practice.

With regards to policy options that involve inter-lake cooperation (at European level or below), the policy option "Link large lake to the Territorial Agenda 2030" has received the most interest from the participants, who pointed the both the added value of relating lake strategies to the TA2030 to give visibility to the strategies, and the possibility to initiate a pilot action on specificities of regional development in large lake regions in the framework of the TA2030. Besides, the participants agreed on opportunities associated with the setting-up and online platform (dedicated to lakes and lake regions) that would

- Be a focal point for a European network of stakeholders interested in the future of large lakes, with expert knowledge provided.
- Allow to organise project capitalisation and capacity building for large lake regions.
- Give more visibility to large lakes in the EU policy debate.

5 Detailed overview of (territorial) data gathered and actions carried out to overcome data shortcomings

In this research, data with different characteristics (spatial, temporal, methodological), from different data sources were collected. During the standardization of these data, experts faced various challenges. This chapter shows these challenges and the answers given to them.

The collection of the **socio-economic data** is based on different databases: European databases (ESPON Database, Eurostat), national databases (the three lake regions overlap with six countries in total), and local databases (e.g. Statistik Bodensee for Lake Constance) Data compilation had to overcome:

- Time gaps and discrepancies.
- Heterogeneous territorial levels;
- Missing stock data (pre-processed data available only)
- Change in territorial units;
- Methodological differences between national datasets;
- Data breakdown in time, related to either 1. Methodological change in time; 2. Effect of Census;
- Different unit of measures:

To address all of these challenges, experts have developed a number of methods:

Expanding the time frame: The time frame for most socio-economic data was the period 2009-2019. For this period, all available data were downloaded from each region (at the most detailed territorial level available). The obtained data were then mapped in the latest state available in the given lake region - and in some cases the change over time was also presented.

Multi-level data collection: Where it was possible, experts collected LAU-level data. In cases where it was not (Lake Constance mostly), data were collected at NUTS 3 level. If needed, multi-level solution was used during the mapping also.

In addition, for some specific problems, we used the following solutions:

In the case of GDP data, experts **standardized the different units of measurement** (EUR, SEK, CHF, HUF): based on the exchange rates typical for the given year (also used by Eurostat), data in different currencies were converted to million Purchasing Power Standard (PPS).

In the case of the indicator of **population change**, several factors were problematic at the same time: the 2011 census resulted in a data breakdown in the case of Lake Constance and Lake Balaton; the time frame of data availability was not the same in each lake regions; territorial units changed over time (formation of new settlements). As a solution, experts examined the population change in the period 2012-2019, which (apart from the lack of data in some settlements) gave the most complete view to compare the lake regions.

Methodological problems have been encountered in several cases with regard to **employment and enterprise-structure data**. In these cases, experts used the data which were the most similar to each other. Thus, because in Lake Constance region, the employment data were only available by place of work, experts mapped and analysed this data for all lake regions; but the indicator of employment by place of living were also downloaded for the settlements around Lake Vänern and Lake Balaton.

In the case of **Tourist accommodations**, experts used a specific methodology. The location of hotels, youth hostels, motels, camping and caravan sites have been originated from Open Street Map (using the Quick OSM plugin). Having downloaded these datasets in 100 km buffer zone of the three lake regions, the data then underwent verification, simplification and aggregation. Finally, both the GRID map layer and the concentration layer were created based on this.

The **transportation elements** were collected and used in a separate way. Road network was drawn based on OpenStreetMap (and particularly by Diva-GIS). The main navigation routes are from local datasets (websites, images) which were the basis of our own-created shp-files. During the data collection further data were also collected (stops on the route, summer and winter frequency) by the local experts.

Table 9 Overview of data collected

Output	Basic data	Data Sources			Source of geog. layers	Years
		Balaton	Constance	Vänern		
Chemical status of the water bodies	**Status based on concentration of chemical pollutants**	WISE Water Framework Directive Database			-	2010, 2016
Organic pollution from urban waste water, industry and agriculture	**Amount of organic pollution from urban waste water, industry and agriculture**	WISE Water Framework Directive Database			-	2010, 2016
Ecological status of the water bodies	**Status of Biological elements, Hydromorphology, General physical & chemical conditions, Specific pollutants**	WISE Water Framework Directive Database			-	2010, 2016
Bathing water quality	**Bathing water quality**	EEA				2019
Areas under national protection	**Areas under national protection**	EEA				2020
Protected under international conventions (Natura 2000 area Biosphere reserve areas+RAMSAR)	**Natura 2000 area**	EEA + UNESCO+RAMSAR Convention				2012-2020
	Biosphere reserve areas					
	RAMSAR areas					
Fraction of Vegetation Cover	**Fraction of Vegetation Cover**	Copernicus – FCover Database				1999-2020
Employment rate in the 15-64 age	**Number of employments in 15-64 age**	National statistical offices[7]			Eurostat	2009-2019
	15-64 years old population					
Number and rate of SMEs	**Number of SMEs**				Eurostat	2009-2019
	Total population					
Number and rate of micro-enterprises	**Number of micro-enterprises**				Eurostat	2009-2019
	Total population					
Evolution of population	**Total population on 1st January**				Eurostat	2009-2019
Indices of age structure	**Total population**				Eurostat	2009-2019
	0-14, 15-65, 65+ years old population					
Population potential	**-**	ESPON GEOSPECS				2017
Number of nights spent by tourist (overnight stays), per inhabitants	**Number of nights spent by tourist in tourist accommodations**	National statistical offices; Statistik Bodensee			Eurostat	2009-2019
	Total population					
Touristic accommodation capacities	**Number of touristic accommodations**	OpenStreetMap				2020
Share and change of green space area	**Green space area**	Copernicus – CLC				2012, 2018
	Change of green space area					
	Total land area					
Share and change of built-up area	**Built-up areas**	Copernicus – CLC				2012, 2018
	Change of built-up areas					
	Total land area					
Main navigation routes on the lake	**Main navigation routes on the lake**	Local websites	Local websites	Swedish transport administration	Own edition	2020
Employment in agriculture, forestry and fishing	**Number of employments in agriculture**	National statistical offices, Statistik Bodensee			Eurostat	2009-2019
	Total number of employments					
Area of agricultural subsectors	**Agricultural areas**	Copernicus – CLC				2012, 2018
	Change of agricultural areas					
	Total land area					
Regional cultural heritage items	**Qualitative description of regional cultural heritages**	Qualitative description in the Template for Task 2.3 Data Collection			-	-
GDP (and Local GDP)	**GDP (in million PPS)**	KSH	Eurostat	SCB	Eurostat	2009-2019
	Total mid-year population					
GVA by economic sectors	**GVA of each economic sector**	Eurostat				2009-2019
	Total GVA in the region					

[7] **National statistical offices:**
Hungary: KSH - Központi Statisztikai Hivatal (Hungarian Central Statistical Office)
Sweden: SCB - Statistiska centralbyrån (Statistics Sweden)
Germany: Statistische Ämter des Bundes und der Länder (Statistical offices of the Federation and the States)
Austria: Statistik Austria (Statistics Austria)
Switzerland: BfS – Bundesamt für Statistik (Federal Statistical Office)
Liechtenstein: AS – Amt für Statistik Liechtenstein (Office of Statistics)

References

Baer J and Blank (2020) Bericht zur IBKF 2020. Die Fischerei im Bondesee-Obersee im Jahr 2019. Gesamtbericht. Landwirtschaftliches Zentrum Baden-Württemberg F (ed.). Available at: http://www.ibkf.org/wp-content/uploads/2020/10/IBKF_Gesamtbericht_Fangjahr2019_korr.pdf.

Balaton Limnological Institute (n.d.) Balaton Limnological Institute. Available at: https://www.bli.ecolres.hu/en (accessed 29 March 2021).

Baranyai Z, Csite A, Józsa T, et al. (2018) Veszprém 2023 - European Capital of Culture Bid book. Veszprém-Balaton 2023 Zrt.

Cégünkről - Balatoni Halgazdálkodás (n.d.). Available at: https://balatonihal.hu/Cegunkrol/Strategia (accessed 1 April 2021).

Chilla T, Evrard E and Schulz C (2012) On the Territoriality of Cross-Border Cooperation: “Institutional Mapping” in a Multi-Level Context. *European Planning Studies* 20(6): 961–980. DOI: 10.1080/09654313.2012.673563.

Climate Strategy of Lake Balaton / Balaton Kiemelt Klímastratégia (2019).

Corine Land Cover data (2018) EEA. Available at: https://land.copernicus.eu/pan-european/corine-land-cover.

County administrative Board of Västra Götaland, County administrative board for Värmland, and Väner cooperation (2018) *Pressinbjudan - Nytt samarbete för hållbar Vänermiljö*.

Debarbieux B (2019) *Social Imaginaries of Space: Concepts and Cases*. Edward Elgar Publishing.

Dombi G, Fekete K, Oláh M, et al. (2018) *A Balaton Kiemelt Üdülőkörzet 2017. évre vonatkozó területi monitoring jelentése*.

Dombi G, Fekete K, Oláh M, et al. (2020) *A Balaton Kiemelt Üdülőkörzet 2019. évre vonatkozó területi monitoring jelentése*.

Ecosystem services in the EU — European Environment Agency (n.d.). Available at: https://www.eea.europa.eu/themes/biodiversity/where-we-stand/ecosystem-services-in-the-eu (accessed 14 April 2021).

Eklund A, Stensen K, Ghasem A, et al. (2018) *Sveriges stora sjöar idag och i framtiden Klimatets påverkan på Vänern, Vättern, Mälaren och Hjälmaren. Kunskapssammanställning februari 2018. / Sweden’s large lakes today and in the future The climate’s impact on Lake Vänern, Lake Vättern, Lake Mälaren and Lake Hjälmaren. Knowledge compilation February 2018.* Swedish Meteorological and Hydrological Institute.

ESPON (2013) *ESPON TANGO - Territorial Approaches for New Governance*. Main Report.

ESPON (2017) *PROFECY - Processes, Features and Cycles of Inner Peripheries in Europe*. Final Report. Luxembourg: ESPON EGTC.

ESPON (2020) *TOURISM - Carrying capacity methodologyfor tourism*. November.

Farm to Fork Strategy (2020). Available at: https://eur-lex.europa.eu/legal-content/EN/TXT/HTML/?uri=CELEX:52020DC0381&from=EN.

Göta Älvs Vattenvårdförbund (2015) *Fakta om Göta älv - en beskrivning av Göta äl och dess arvinningsområde neströms Vänern*. Available at: https://www.gotaalvvvf.org/faktaomgota-alv.4.101b298612d0e33932680001774.html.

Haughton G, Allmendinger P, Counsell D, et al. (2009) *The New Spatial Planning: Territorial Management with Soft Spaces and Fuzzy Boundaries*. Routledge.

https://www.bfnp.hu (n.d.). Available at: https://www.bfnp.hu.

IGKB IG für den B (2020) *Limnologischer Zustand des Bodensees*. 43. Available at: https://www.igkb.org/fileadmin/user_upload/dokumente/publikationen/gruene_berichte/43_gb43gesamtbericht.pdf.

IGKB IG für den B (n.d.) igkb - Internationale Gewässerschutzkommission für den Bodensee. Available at: https://www.igkb.org/start/.

Invasive Alien Species of Union (2019) European Commission. Available at: https://ec.europa.eu/environment/nature/invasivealien/list/index_en.htm.

Kocsis K (2011) Balaton in the Geographical Education and Research / A Balaton a földrajzi oktatásban és kutatásban. In: *Geographers for the Balaton / Geográfusok a Balatonért*. Geogrpahia Pannonica Nova 11. Pécs: IDResearch Ltd. / Publikon Ltd., pp. 7–17.

Kvävehalten i Vänern är för hög (n.d.). Available at: http://extra.lansstyrelsen.se/vanern/Sv/fakta-om-vanern/vanerfragor/Pages/kvavehalten.aspx.

Lough Neagh Partnership Limited (2017) *Lough Neagh Strategic Plan 2017-2022*. Magherafelt: Lough Neagh Partnership. Available at: https://www.loughneaghpartnership.org/wp-content/uploads/2017/10/FINAL-LOUGH-NEAGH-MANAGEMENT-STRATEGY.pdf (accessed 27 January 2021).

Lyche Solheim A, Globevnik L, Austnes K, et al. (2019) A new broad typology for rivers and lakes in Europe: Development and application for large-scale environmental assessments. *Science of The Total Environment* 697: 134043. DOI: 10.1016/j.scitotenv.2019.134043.

Mäntykoski A, Nylander E, Ahokas T, et al. (2020) Vaikuta vesiin. Ehdotus Kymijoen-Suomenlahden vesienhoitoalueen vesienhoitosuunnitelmaksi vuosiksi 2022–2027. Uudenmaan elinkeino-, liikenne- ja ympäristökeskus, Etelä-Savon elinkeino-, liikenne- ja ympäristökeskus, Hämeen elinkeino-, liikenne- ja ympäristökeskus, Kaakkois-Suomen elinkeino-, liikenne- ja ympäristökeskus, Keski-Suomen elinkeino-, liikenne- ja ympäristökeskus, Pohjois-Savon elinkeino-, liikenne- ja ympäristökeskus. Available at: https://www.ymparisto.fi/fi-fi/vesi/vesiensuojelu/vesienhoidon_suunnittelu_ja_yhteistyo/vesienhoitoalueet/KymijokiSuomenlahti/Osallistuminen_vesienhoitoon.

Megosztom 2020 06 10 18:50:49 | Frissítve: 2020 06 11 13:20:16 (n.d.) Motorhasználat a Balatonon: mi számít szabályosnak? Available at: https://vitorlazasmagazin.hu/az-ugyved-valaszol/motorhasznalat-a-balatonon-mi-szamit-szabalyosnak-24998/ (accessed 13 April 2021).

Ministry of Environment, Energy and climate change and Special Secretariat for water (2012) *Development of the River Basin Management Plans of the River Basins of West Macedonia and Central Macedonia River Basin Districts according to the Specificaitons of the WFD 2000/60/EC, applying the Greek Law 3199/2003 and the Greek PD 51/2007. WP 1.16 Report on the Upstream Countries Actions in the Transboundary Prespa Lakes Basin. River BAsin of West Macedonia (GR09*=. 31 October.

Natura 2000 data (2019) EEA. Available at: https://www.eea.europa.eu/data-and-maps/data/natura-11.

Ramsar (2021) The Convention on Wetlands and its mission. Available at: https://www.ramsar.org/about/the-convention-on-wetlands-and-its-mission (accessed 12 April 2021).

Region Värmland (2020) *Värmlandsstrategin 2040 - Remissförslag*.

Scherer R, Dörre L, Droege P, et al. (2016) *Bodensee 2030 - ein Blick in die Zukunft der Region*. Available at: http://www.zukunft-bodensee.eu/pageflip/html5.html#/1.

Seewandel (n.d.). Available at: https://seewandel.org/.

Sjöfart (n.d.). Available at: https://www.lakevanern.se/livet-vid-vanern/sjofart/.

telex (2021) Szepezden is pirosat kapott a Balatoni Bringakör. Available at: https://telex.hu/belfold/2021/04/12/szepezden-is-pirosat-kapott-a-balatoni-bringakor (accessed 13 April 2021).

Vänern water management association (2016) *Fem skäl att satsa på Vänern, Vattenvårdsplan – kampanjer 2016-2021*.

Zumbusch K and Scherer R (2015) Cross-Border Governance: Balancing Formalized and Less Formalized Co-Operations. *Social Sciences* 4(3): 499–519. DOI: 10.3390/socsci4030499.

Co-financed by the European Regional Development Fund

Inspire Policy Making with Territorial Evidence

ESPON 2020

ESPON EGTC
4 rue Erasme, L-1468 Luxembourg
Grand Duchy of Luxembourg
Phone: +352 20 600 280
Email: info@espon.eu
www.espon.eu

The ESPON EGTC is the Single Beneficiary of the ESPON 2020 Cooperation Programme. The Single Operation within the programme is implemented by the ESPON EGTC and co-financed by the European Regional Development Fund, the EU Member States and the Partner States, Iceland, Liechtenstein, Norway and Switzerland.