Interreg
North Sea

Co-funded by
the European Union

TREASURE

VLIZ

Multi-level governance and policies for successful plastic pollution mitigation in the Living Lab Nieuwpoort

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Aim of the Policy and Governance report for Living Lab Nieuwpoort

The primary aim of the "Governance & Policy" pillar is to enhance multi-level governance and foster effective cooperation among stakeholders along water systems and in the North Sea region to prevent plastic pollution. This aim is underpinned by the goal of improving policies at different levels, from local to international, to implement comprehensive and coordinated actions to prevent and reduce plastic waste.

Specifically for the Living Lab Nieuwpoort, we want to focus on developing new insights and knowledge in three thematic approaches, based on the priorities for our living lab:

- ❖ *Policy and regulation: Visualizing the policy framework for environmental monitoring related to plastics across different policy levels, highlighting relevant targets, responsible authorities, and associated regulations.*
- ❖ *Collaborative structures: Examining the collaboration between different policy frameworks and policy levels (e.g. NUTS levels), including the official structures in place to optimize the flow of information.*
- ❖ *State of affairs: Assessing policymakers' perceptions and experiences with this policy framework and its implementation.*

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1   Introduction

1.1   TREASURE project and context

In the Interreg North Sea TREASURE project 15 partners from North Sea countries, namely Denmark, Germany, the Netherlands, Belgium, and France, are jointly tackling the problem of plastic pollution flux from inland waterways towards the North Sea. It had been generally assumed that a significant amount of plastic litter enters the sea via rivers and inland waterways. However, recent research suggests that only a proportion of plastic litter that enters terrestrial (e.g. riverbanks) and aquatic compartments of river systems also readily reaches the sea (van Emmerik et al., 2022; Everaert et al., 2022; Kaandorp et al., 2023). As a result, some river systems, and in particular tidal estuaries, can act as accumulation areas of plastic, with significant impact at ecosystem level and in economic activities, leisure-related or for example navigation impairment. These accumulation areas can further serve as reservoirs, that during extreme events, such as heavy rains, can release a large number of litter debris to nearby coastal areas (van Emmerik et al., 2023; van Emmerik, 2024). Led by the University of Oldenburg, the TREASURE project consortium aims to map the plastic flux and suggest actions and solutions to reduce the outflow of plastic litter from rivers and inland waters into the North Sea. An integrated cross-sectoral approach to identify, eliminate, and reduce this riverine litter is thus expected to make an important contribution to solving the plastic problem.

To contribute to the mitigation of the plastic flux, the TREASURE project addresses four interrelated dimensions (pillars):

- ❖ **Data Collection & Analysis** – using well established and new methods with the aim of increasing knowledge on nature, composition and sources of litter, and comparing and harmonizing approaches.
- ❖ **Plastic Waste Removal** – applying different techniques to remove waste from rivers, to gain knowledge on the effectiveness of different solutions under different conditions (e.g., environment or type of pollution).
- ❖ **Prevention & Behavior Change** – raising awareness and educating specific target groups in business (e.g. tourism), government (municipalities, regions) and the general public (e.g. school children) about the need and opportunities to reduce plastic pollution in their respective capacities and processes.
- ❖ **Governance & Policy** – improving cross-sectoral governance for effective collaboration and joint action among stakeholders in functional areas and water systems (river basins, estuaries, metropolitan areas, …). Improve policies at different levels (local, regional, (trans)national) for effective waste prevention in rivers by combining (binding) legislation and informal policy frameworks.

The core of the project consists of Living Labs, open innovation areas where solutions are tested in real communities via public-private cooperation actions, at different river-sea interfaces, representing different areas typical of the North Sea region (e.g., estuary, urban water system, port, coast): Nieuwpoort (BE), Dutch Deltas (NL), French Ports (FR), Plastic-free SIA (DE), Westcoast Watersheds (DK). In the Living Labs of TREASURE, we will test representative solutions to prevent and remove plastic pollution in real-life scenarios.

1.2   Living Lab Nieuwpoort

Nieuwpoort is a town and seaside resort on the Belgian coast, home to one of the largest marinas in Europe, with more than two thousand leisure boats. Nieuwpoort is important due to its historical significance, particularly its role in the Battle of Nieuwpoort (2 July 1600), its maritime and commercial importance, its tourism industry, and its cultural heritage. These factors have contributed to its enduring relevance in the region (Home | Visit Nieuwpoort (visit-nieuwpoort.be)).

The focus area of the Living Lab in Nieuwpoort is the *Ganzepoot* ('goose foot') water system, a series of locks and spillways in the estuary of the Yser River (*Figure 1*)[1], which plays a crucial role in managing water levels and tidal flow in the Nieuwpoort harbour area/ estuary and the adjoining Yser River. This system helps regulate the water levels to prevent flooding, while enabling boat and vessels traffic circulation. It comprises a lock complex in the inner port area: six waterways meet here, connecting the Yser estuary and the North Sea. Each waterway is controlled by a hydraulic structure on the east side of the complex, which provides drainage for part of the inland polders via spillways. In each, shipping connection for inland vessels is provided through a lock (Sluizencomplex De Ganzepoot | De Kust).

The Ganzepoot.
A) Noordzee, B) Ijzer, C) Kanaal Plassendale-Nieuwpoort
1) Overlaat van het Nieuwbedelf, 2) Gravensas, 3) Springsas, 4) Iepersas,
5) Noordvaart, 6) Veurnesas
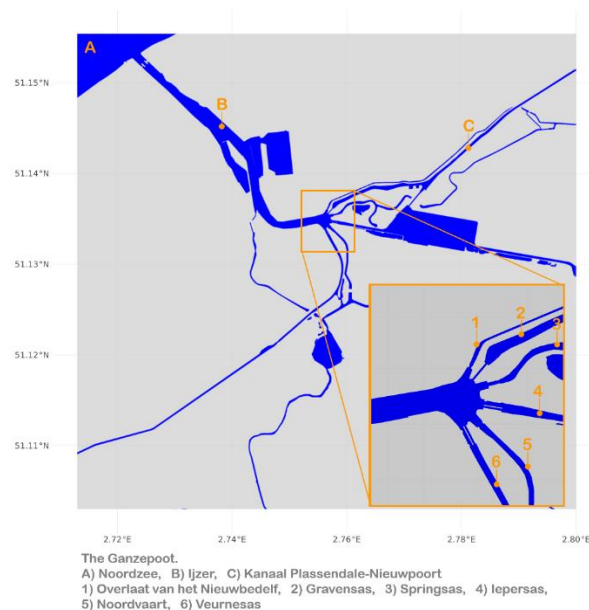
Figure 1: Water system (Ganzepoot) in Nieuwoort (map by Claudia Meneses).

The partners of the Living Lab Nieuwpoort are VLIZ, IMDC, multi-NV, ULCO and Herbosch-Kiere as subcontractor, with support of the Province of West-Flanders (Annex I). This living lab collaborates closely with a Strategic Advisory Board, which is also described in Annex I. The intended activities within this living lab are described in detail in the action plan (Devriese et al., 2024).

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[1] It is called the *Ganzepoot* because of the resemblance of the water system to the foot of a goose.

2 Aim

The overall objective of the pillar "Governance & policy" is to improve multi-level governance for effective cooperation by actors along water systems and the North Sea and improve policies at different levels for plastic waste prevention. For this purpose, each Living Lab will conduct stakeholder interviews in which various issues will be questioned in the context of governance and policy.

Specifically for the Living Lab Nieuwpoort, we want to focus on developing new insights and knowledge in three thematic approaches, based on the priorities for our living lab:

❖ **Policy and regulation**: Visualizing the policy framework for environmental monitoring related to plastics across different policy levels, highlighting relevant targets, responsible authorities, and associated regulations.
  o **PRIORITY: Effectiveness of Environmental Legislation:** Focus on the effectiveness of environmental legislation concerning litter, including local implementation of mitigation measures and achieving environmental targets.
❖ **Collaborative structures**: Examining the collaboration between different policy frameworks and policy levels (e.g. NUTS levels), including the official structures in place to optimize the flow of information.
  o **PRIORITY: Communication and Coordination between Policy Levels:** Explore and improve the structures for consultation and communication between different policy levels, particularly regarding environmental policy on litter.
  o
❖ **State of affairs**: Assessing policymakers' perceptions and experiences with this policy framework and its implementation.
  o **PRIORITY: Identifying Barriers and Strengths to Local Implementation:** Define and address the barriers/strengths faced in the local implementation of measures and actions aimed at reducing litter.

3 Methodology

3.1 Design of the study

A longlist of interview questions was compiled with the partners from the Pillar Governance (Internal Document). This list was divided into 'Governance' and 'Policy' sections, with the option to address the answers through either interviews or desktop studies.

❖ **Governance:** responsibilities and competences, missing links, barriers for collaboration, costs for removal, recommendations for policy, etc.
❖ **Policy:** key regulations, sector-specific regulations, implementation and enforcement of legislation, effectiveness of policies, recommendations for improvement, etc.

Since this list covers a very large number of topics and consequently became too long for many stakeholders, it was tested by the Rotterdam University of Applied Sciences (RUAS) and subdivided based on relevance. RUAS had undertaken interviews (October 2024) using all the questions of the Long Pillar List. Based on the

findings of this research, it is possible to indicate which questions are relevant and which are less relevant, or even irrelevant. By using the 'traffic light method' (green-orange-red), it is easy to show how this list can be shortened (Annex II).

The original list of questions and the subdivision based on relevance were taken by VLIZ into their own analysis for the Living Lab Nieuwpoort, taking into account the objectives and priorities of this living lab (as also described above). In general, the key topics and questions are categorised within three thematic sections:

- ❖ **Policy and regulation**: Visualizing the policy framework for environmental monitoring related to plastics across different policy levels, highlighting relevant targets, responsible authorities, and associated regulations.
- ❖ **Collaborative structures**: Examining the collaboration between different policy frameworks and policy levels (e.g. NUTS levels), including the official structures in place to optimize the flow of information.
- ❖ **State of affairs**: Assessing policymakers' perceptions and experiences with this policy framework and its implementation.

The goal is to provide as much indication as possible here of whether the questions will be addressed through a desktop study, stakeholder identification, or included in an interview. In addition, it will be indicated which questions will not be addressed within the scope of the Living Lab Nieuwpoort, and which additional questions we recommend as necessary. A mixed method approach using data triangulation based on data from the semi-structured interviews and data from the desktop study (incl. stakeholder identification) will be executed.

Both parts of the exercise (desktop study and interviews) will map the landscape according to the Nomenclature of territorial units for statistics (NUTS-levels). The territorial division used in this task will be as follows:

- NUTS 0: national level
- NUTS 1: regional level – For Belgium: regions
- NUTS 2: subregional level – For Belgium: provinces
- NUTS 3: department level- For Belgium: districts
- LAU- Local administrative unit: city or municipality – e.g. city council of Nieuwpoort
- LL: Specific area: Living Lab zone – e.g. Ganzepoot water system for Living Lab Nieuwpoort

3.2   Selection of interview questions for Living Lab Nieuwpoort

Based on longlist of questions established by the members of the Pillar on Governance and Policy and the traffic light categorisation (Annex II), a selection of questions per thematic sections (Policy and regulation; Collaborative structures; State of affairs) are listed in Annex III. For clarity, below the final questions are listed in Dutch and English (see also Annex IV).

Final selection of questions (Dutch):

A) Beleid

1. Is er beleid (bijvoorbeeld strategieën, actieplannen, incentives) die een grote invloed heeft op de vermindering van plastic in Living Lab Nieuwpoort?
2. Heeft de Single Use Plastic Directive een significante impact gehad op het verminderen van plastic afval in het milieu?

> INDIEN JA-2.b: Wat is volgens u een best practice van de implementatie van de SUP Directive?

3. Wat is volgens u de meest relevante beleidsactie of het meest relevante beleidsdoel met betrekking tot zwerfvuil in het Living Lab-gebied?
4. Is er een monitoringsmechanisme aanwezig om de voortgang richting de beleidsdoelen te volgen?
5. Is er een evaluatiemechanisme aanwezig om de effectiviteit van de beleidsmaatregelen te beoordelen?
6. Zijn er mismatches of hiaten tussen de bevoegdheden en verantwoordelijkheden binnen het beleid voor plastic afval in uw gebied?
7. Wat ziet u als mogelijke oplossingen voor de genoemde beleidsbarrières/mismatches?

B) Samenwerkingsstructuren

1. Zijn er officiële kennis- of communicatiemechanismen rond het thema marien zwerfvuil?

> INDIEN JA - 1.b: Welke stakeholdergroepen zijn betrokken binnen dit communicatieplatform?

2. Welke stakeholdergroepen ervaart u als het moeilijkst te bereiken?
3. Hoe belangrijk vindt u de betrokkenheid van de industrie bij het verminderen van zwerfvuil?
4. Hoe werkt de communicatie tussen de verschillende NUTS-niveaus in de praktijk?
5. Wat zijn volgens u de zwaktes van deze samenwerking in uw Living Lab?
6. Wat zijn volgens u de sterktes van deze samenwerking in het Living Lab?

C) Stand van zaken

1. Wat zijn de belangrijkste sectoren om u op te richten met betrekking tot zwerfvuil in het Living Labgebied?
2. Wat zijn volgens u de belangrijkste barrières/uitdagingen om de vermindering van zwerfvuil te versterken?
3. Ziet u plastic afval als een urgent probleem?
4. Werkt u samen met vrijwilligers (of NGO's) om zwerfvuil in uw gebied op te ruimen?

> INDIEN JA- 4.b: Hoe denkt u over de betrokkenheid van vrijwilligers bij het schoonhouden van het milieu waarvoor u verantwoordelijk bent

Final selection of questions (English):

A) Policy and regulation

1. Is there any regulation (e.g. strategies, action plans, incentives) that has a big influence on the reduction of plastic in *Living lab Nieuwpoort*?
2. Has the Single Use Plastic Directive caused a significant impact regarding plastic litter in the environment?

> IF YES- 2.b: What is a best practice of the implementation of the SUP Directive?

3. What is to your opinion the most relevant policy action or goal in terms of litter for the Living Lab area?
4. Is there a monitoring mechanism in place to follow-up the progress towards achieving the policy goals in place?

5. Is there an evaluation mechanism in place to evaluate the effectiveness of the policy measures?
6. Are there any mismatches or gaps between the competences and responsibilities within the plastic litter policy in your area?
7. What do you see as possible solutions for the mentioned policy barriers/ mismatches?

B) Collaborative structures
1. Are there any official knowledge or communication mechanisms in place around the topic of marine litter?
    > IF YES – 1.b: Which stakeholder groups are involved within this communication platform/exchange?
2. What stakeholder groups do you experience as most difficult to reach?
3. What's the importance of the involvement of industry for the reduction of litter according to you?
4. How does the communication between the different NUTS-levels work in practice?
5. What are the weaknesses of this collaboration in your Living Lab?
6. What are the strengths of this collaboration in the Living Lab?

C) State of affairs
1. What are the most important sectors to focus on related to littering in the Living Lab area?
2. What are the main barriers/challenges for enhancing the implementation of the reduction of litter according to you?
3. Do you recognize plastic litter as an urgent problem?
4. Do you work with volunteers (or NGOs) to remove litter from the environment in your area?
    > IF YES – 4.b: How do you feel about involving volunteers to keep the environment you are responsible for clean?

3.3   Stakeholder identification

An overview of the main authorities, along with their responsibilities in the context of the living lab Nieuwpoort is presented in table 2. This stakeholder identification is based on the framework provided by De Buyser et al. (2024), which details the water management structure of the Yser estuary across the different levels of governance. For this report, the scope was expanded through a desktop study to include additional authorities beyond water management, incorporating, for example local waste management stakeholders. For each authority the corresponding management responsibilities, their operational area, administrative level and corresponding NUTS level were gathered and compiled in a comprehensive table. This identification is the blueprint for the selection of key stakeholders to participate in the interviews and ensures all NUTS levels and responsibilities within LLN water system or covered for the topic of marine litter.

3.4   Mixed method approach: triangulation

A mixed method approach using data triangulation, where literature and interview results are repeatedly revisited to lead to coherent recommendations, is implemented (Robson & McCartan, 2017). This approach compiles insights based on 1) the experience of Living Lab area experts regarding marine litter and 2) expert knowledge of the TREASURE partner (VLIZ for Living Lab Nieuwpoort) used to develop stepping stones to enhance the governance on plastic litter. Semi-structured expert interviews were combined with internal desktop study and these two sources of information were able to complement each other. However, there

may be thematic sections where the interviews and desktop study did not overlap. The results clearly connect to the source of the mentioned information and insights.

3.4.1 Desktop study

During the desktop study, the experts on marine litter of the TREASURE consortium will collect public information relevant to this task, e.g. through websites, legislation, public documents and expert insights. This desktop overview will provide the first orientating step into the policy documents and collaborative structures of importance for the living labs. This knowledge base will then be further enriched by the insights that are gathered during the interviewing phase, taking a deep dive into the governance structures, implementation and communication pathways. For Living Lab Nieuwpoort (BE case), VLIZ is the responsible partner for this task.

The policy mapping on environmental pollution from the Source to Seas – Zero Pollution 2030 project (SOS-Zeropol2030) (Devriese et al., 2023) for global, regional sea conventions and EU legislation is used as a foundation. For BE federal and Flemish legislation, action plans and policy documents from the national and Flemish working groups are used as a starting point for further elaboration (Devriese et al., 2023b).

3.4.2 Expert Interviews

The insights and information collected through the desktop study will be further enriched by interviewing the key stakeholders of the specific Living Labs. These expert interviews will have a semi-structured approach. This implies that the same questions and topics will be covered in each interview, yet the order of the questions can change between every interview. This data collection method ensures reciprocity between interviewers and participants, which provides the opportunity to ask unforeseen follow-up questions (Kallio et al., 2016). A targeted interview approach will be applied during the conduct of the interviews. The interviewing process will start off by interviewing the NUTS-2 level since this could be seen as the liaison between the other levels. During the stakeholder identification process (see 3.3), eight authorities/operators were identified as the most relevant within Living Lab Nieuwpoort based on their influence, expertise, and involvement in marine litter governance. These selected stakeholders were invited to participate in the study, resulting in **six stakeholders agreeing to take part**, covering the NUTS levels relevant for Living Lab Nieuwpoort. These interviews will be conducted between **January 2025 and February 2025** by VLIZ. The interviews will take place online on MS Teams and last approximately between **45min and 1h**. To ensure a sound analysis of the interviews and a correct interpretation of the answers, the conversation will be recorded to allow transcription and coding. **Therefore, the interviewee is asked to sign a consent form before the interview takes place.** The respondent's personal information will collected, processed and managed within General Data Protection Regulation (GDPR) and other relevant international privacy regulations.

The data collected by interviewing the experts of each Living Lab will be analysed using qualitative data analysis (Mortelmans, 2013), which is based on the Grounded Theory by Strauss & Corbin (1990). Here the responses of the interviews are organized and structured by (partly) transcribing the interviews. The relevant data will then be divided into smaller parts (labels or codes). This will allow us to find relationships

between different codes and cluster them together for theory building purposes. The coding process, as defined by Strauss & Corbin (1990) is applied in a three-stage approach:

1. **Open coding:** The data is broken up into labels or codes. These codes correspond with actions, events, characteristics, … identified in the interview transcripts.
2. **Axial coding:** The established codes are compared with each other and clustered into coherent categories and possibly subcategories.
3. **Selective coding:** Here, one or several categories are given a central role. The other categories are placed around these crucial ones to produce theories, concepts or storylines.

To avoid interrupting the flow of the report, some of the results are presented below. The coding of the interviews started from the thematic sections defined earlier (see 3.1), this corresponds to the selective codes during the analysis. The axial codes are shown in Figure 2 linked to the respective core category to which they belong. This framework provides a structured overview of the key topics emerging from the interviews, supporting the analytical interpretation of the findings later in the results section.
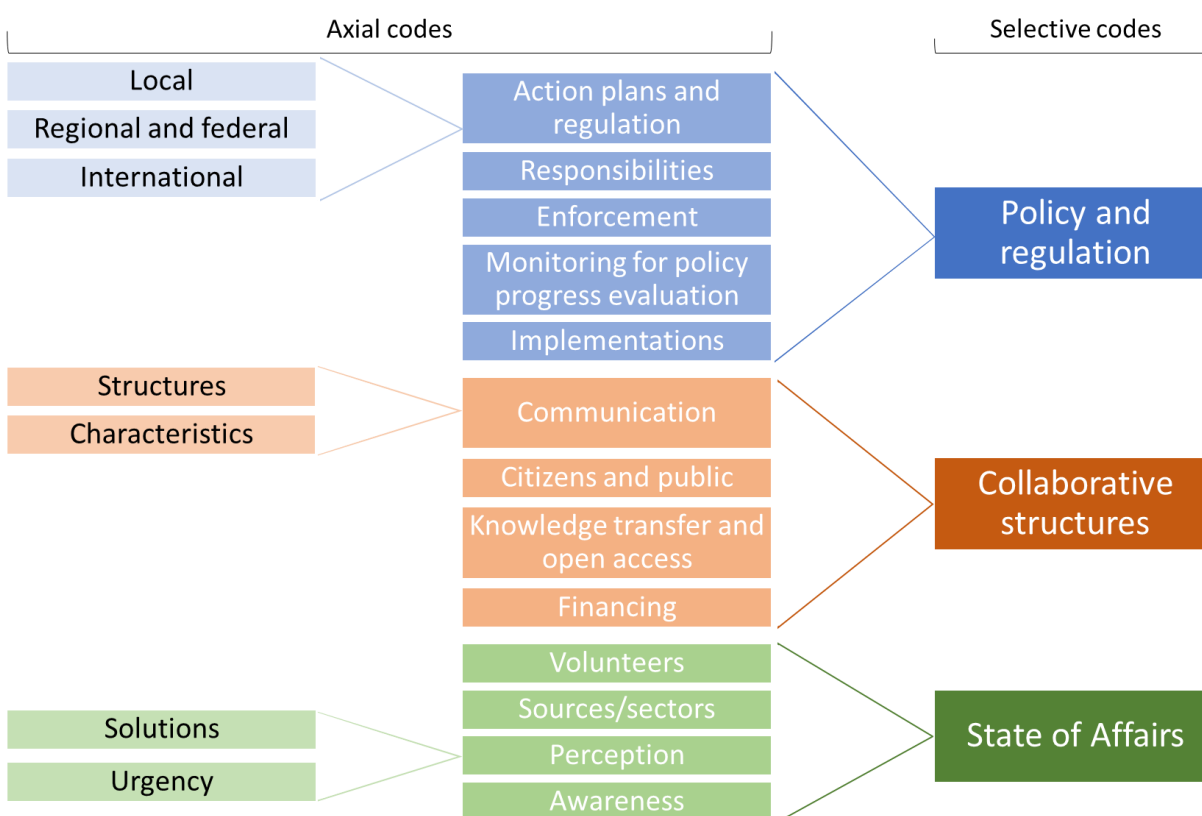
Figure 2: code tree derived from the qualitative analysis of the interview data

3.5   Evaluation of best practices, needs and opportunities

This report will structure the key insights into marine litter management into three core categories: **Best Practices and Strengths, Key Needs, Barriers and Challenges, and Opportunities for Future Improvements**. These categories provide a comprehensive framework for evaluating current efforts, identifying gaps, and

exploring potential enhancements. Additionally, they align closely with the **SWOT** (Strengths, Weaknesses, Opportunities, and Threats) **analysis framework** (Minsky & Aron, 2021), see Table 1 for a comprehensive overview.

The **Best Practices and Strengths** section highlights Belgium's coordinated approach to marine litter management, its effective integration of European and international policies, and the strong collaboration across governance levels. The **Key Needs, Barriers, and Challenges** section outlines both internal limitations, such as governance fragmentation and data gaps, and external obstacles, including policy misalignment and difficulties in implementing international frameworks. Finally, the **Opportunities for Future Improvements** section explores ways to enhance public engagement, strengthen cross-sector collaboration, and shift the focus toward prevention rather than removal.

By structuring the analysis in this way, the report ensures a balanced and strategic assessment of Belgium's marine litter management efforts, aligning with the principles of a SWOT analysis while maintaining a clear thematic focus.

Table 1: Alignment between implemented evaluation categories and a SWOT-analysis (Minsky & Aron, 2021)

Core category	SWOT category	Description
Best Practices and Strengths	Strengths	Highlights what Belgium is doing well, including its coordinated approach, legislative integration, and community involvement.
Key Needs, Barriers, and Challenges	Weaknesses & Threats	Reflecting elements related to internal weaknesses and external threats.
Opportunities for Future Improvements	Opportunities	Aligns perfectly, as this section focuses on potential enhancements, such as better communication, stronger governance, and improved litter prevention strategies.

4 Results

4.1 Stakeholder overview

As described in De Buyser et al. (2024), the Yser Estuary, spanning about three kilometres, extends from the North Sea to the *De Ganzepoot* lock complex (Provoost T. 1997), which connects the harbour channel with six waterways. The estuary hosts three yacht clubs: the Royal Yacht Club Nieuwpoort (K.Y.C.N.), the Flemish Yacht Club Nieuwpoort (V.Y.) and the Air Force Sailing Club ("Jachthavens aan de Vlaamse Kust" 2018). Additionally, the Flemish Natura 2000 area "*Duingebieden inclusief IJzermonding en Zwin*"encompasses the Yser estuary, with the marine Natura 2000 area "Flemish Banks" at its mouth (figure 3).
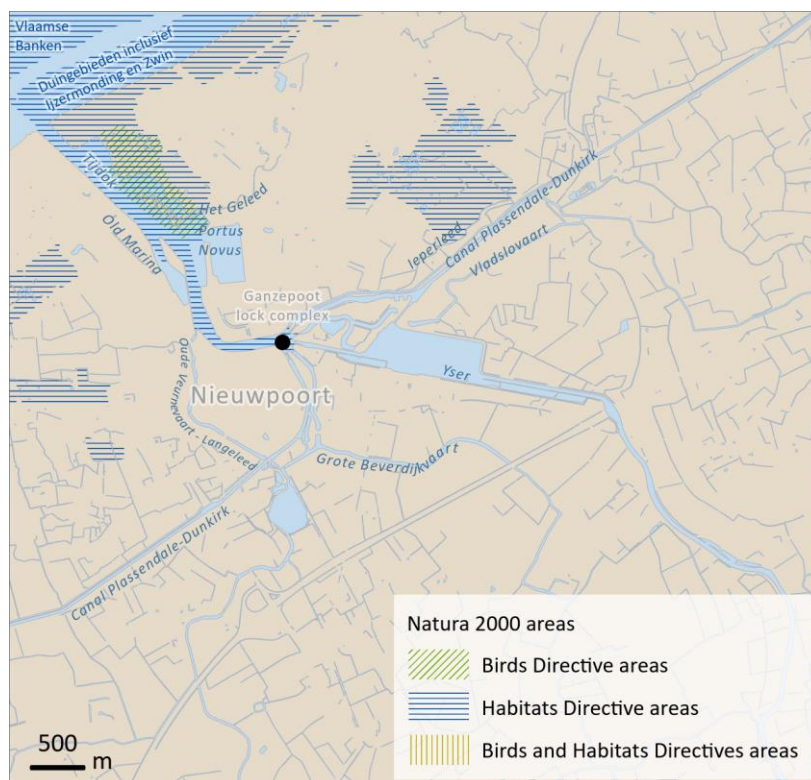
Figure 3: An overview of the Yser estuary and the Natura 2000 sites present (from De Buyser et al., 2024)

Beyond the baseline, the Marine Environment division (FPS Public Health, Food Chain Safety, and Environment) oversees water management, including Natura 2000 objectives for the "Flemish Banks" area. The Yser estuary's water management is a Flemish responsibility (figure 4):

- The river mouth up to the *Ganzepoot*, is managed by the Maritime Services and Coast Agency (MDK), as well as the marinas, with the local yacht clubs as co-managers.
- The further course of the Yser, the Plassendale-Dunkirk Canal and *Vlasdlovaart* are managed by *Vlaamse Waterweg nv,* West Region division.
- The *Grote Beverdijkvaart* is managed by Flanders environment agency (VMM) in Ostend.
- The Ieperleed, together with the waterways that flow into the Yser before the sluice complex fall under the jurisdiction of the province of West Flanders ("Werkingsgebieden" - www.vlaamsewaterweg.be; "IJzerbekken"- www.sgbp.integraalwaterbeleid.be).
- The Flemish Nature Reserve Yser Estuary is managed by the Agency for Nature and Forest (ANB), which works with MDK and Ministry of Defence (Natuurbeheerplan IJzermonding En Kamp Lombardsijde, 2023).
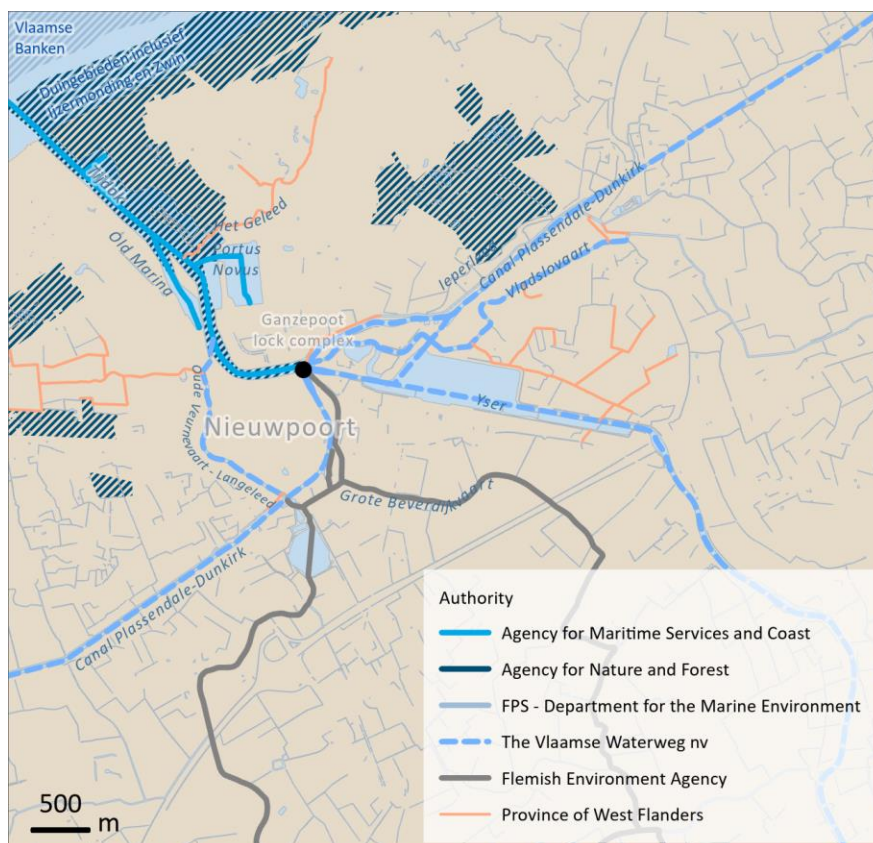
Figure 4: A mapping of the most important authorities for the Yser estuary (from De Buyser et al., 2024)

Table 2 offers a comprehensive overview of all relevant authorities involved in both water and waste management in the area. It highlights stakeholders directly managing the water system, as well as those handling broader waste management efforts. This provides an integrated view of the local waste and water management approach. Stakeholders that are selected for an interview are highlighted in green.

Table 2: An overview of the relevant authorities involved in the local water and waste management in Nieuwpoort.

NUT S level	Administrative level	Authority	Operational area	Management responsibilities
NUTS 0	National	**FPS Health, Food Chain Safety and Environment – Marine Environment division**	Belgian part of the North Sea starting at the baseline	- Marine management (including marine spatial planning) - Protection and restoration of Natura 2000 site - Environmental monitoring requirements
NUTS 0	National	**Ministry of Defence**	Lombardsijde Camp	- Naval and ground forces defence Camp Lombardsijde, owned by the Ministry of Defense, is managed by the Agency for Nature and Forests (ANB) through a cooperation protocol.

NUT S level	Administrative level	Authority	Operational area	Management responsibilities
NUTS 1	Regional	**Agency for Maritime Services and Coast (MDK) – Coastal division**	Beach, dunes and marinas	- Coastal management: maintenance of coastal infrastructure, detection of unexploded ordnance, maintenance of green areas in dune regions, watersport zones, concession agreements for beach clubs. - Management of coastal marinas in Nieuwpoort, Ostend, Blankenberge, and Zeebrugge: maintenance dredging, removal of floating debris. - Hydrographic surveys of the sea and Scheldt: supporting maritime transport.
NUTS 1	Regional	**Maritime Rescue and Coordination Centre (MRCC)**	Belgian Exclusive Economic Zone (EEZ)	- The first point of contact for incidents at sea - Coordinates Search and Rescue (SAR) operations, medical evacuations, and marine pollutant removal -Monitors emergency shipping frequencies and ensures maritime safety - Registers, reports, and evaluates SAR and related actions
NUTS 1	Regional	**Vlaamse Waterweg nv - West Region division**	Yser, the Plassendale-Dunkirk Canal, *Vladsovaart* - Navigable waterways	- Integral maintenance and management of navigable waterways, including the verge vegetation - Construction and maintenance of bridges and locks - contracting an external company to clean up floating litter in and along all navigable waterways (www.seru.be).
NUTS 1	Regional	**Flemish Environment Agency (VMM) - Ostend**	*Grote Beverdijkvaart* - Non-navigable waterways Category 1 -	- Maintenance of the watercourse of category 1, including the bed of the watercourse
NUTS 1	Regional	**OVAM**	Flanders	- Responsible for waste management and soil remediation (Legislation e.g. port reception facilities) - Awareness campaigns
NUTS 1	Regional	**ANB**	SPA "Dune Areas including Yser Estuary and Zwin" - Nature area of Flanders	-Management of public nature areas (including water) - Management of public inland fishery
NUTS 2	Subregional	**Province of West-Flanders**	*Ieperleed* - Non-navigable waterways Category 2 -	- Maintenance of the watercourse of category 2 waterways, including the bed of the watercourse. - Spatial planning of beaches and dikes - Integrated coastal management
NUTS 2		**Streekhuis Kust**	West Flanders	- Awareness campaigns
NUTS 2		**Westtoer**	West Flanders	- Creating sustainable tourism in the West Flanders region

NUT S level	Administrative level	Authority	Operational area	Management responsibilities
NUTS 3	Department	**Afval-intercommunale Veurne en Ommeland**	12 municipalities, including Nieuwpoort	- Raising awareness about waste prevention, recycling and litter prevention - Organization of selective waste collection and disposal - Waste processing: composting of organic waste
LAU	Local	**City council of Nieuwpoort**	City-owned land	-Local waste and sewer management - Structuring the beaches within the framework provided by the province - Touristic beach use (concession passed on from MDK) - Spatial planning initiatives linked to the spatial framework (PRUP strand en dijk) involving beaches and dykes - Maintenance of the watercourse of category 3 waterways, including the bed of the watercourse - Collaborates with *Mooimakers* to provide proper tools for voluntary cleanup activities
LL	Specific	**The Royal Yacht Club Nieuwpoort (K.Y.C.N.) in the Old Marina, the Flemish Yacht Club Nieuwpoort (V.Y.)**	Port area of the marinas	- Infrastructure management - Transport logistics - Safety and security - Waste management

4.2 Stakeholders' perceptions and governance structures

4.2.1 Policy and governance

a) Action plans, strategies, regulations and legislation

The 'EU policy ambition' report provides an overview of the relevant, global, international and EU legislation in the context of marine litter (Devriese et al., 2023). The policy brief describing the marine litter landscape in Belgium provides information on BE federal and Flemish legislation, action plans and policy documents (Devriese et al., 2023b). Table 3 provides an overview of the key policy documents in the context of marine litter. Currently, the key environmental targets for litter or microplastics are:

- ❖ Objective 9: by 2025, reduce the inflow of plastic litter from Flanders into the marine environment by 75%.
- ❖ ZPAP key target: by 2030, reduce by 50% plastic litter at sea.
- ❖ ZPAP key target: by 2030, reduce by 30% microplastics released into the environment.
- ❖ MSFD: Properties and quantities of marine litter do not cause harm to the coastal and marine environment.

Table 3: Key policy documents in the context of marine litter

Key EU legislation	❖ EU Green Deal and its Zero Pollution Action Plan (ZPAP) and Circular Economy Action Plan ❖ Environmental directives: Water Framework Directive (WFD) and Marine Strategy Framework Directive (MSFD, and the Programme of Measures PoM) ❖ Single Use Plastic Directive (SUP) and the Plastics Implementation Plan (PIP). ❖ Waste Framework Directive ❖ Directive on Port Reception Facilities (PRF)
Global legislation	❖ Upcoming Plastics Treaty (INC)
Regional Sea Convention strategies	❖ OSPAR Regional Action Plan (RAP) for marine litter (M2) ❖ North-East Atlantic Environment Strategy 2030 (NEAE 2030)
National or regional policy documents	❖ Federal action plan on marine litter ❖ Flemish integral action plan on marine litter ❖ Plastics implementation plan ❖ Flemish plastic pact
Local strategies	❖ Cooperation agreements with diverse organisations or companies

The list of key policy documents in Table 3 was further validated through the interviews, which provided interesting additions and insights. The interviews indicated that on a local legislative level there's a clear focus on **preventative, recycling and cleaning actions** that prevent littering. Also, there are **local material plans**. Yet, all these strongly differ among different municipalities, meaning that there is certainly not the same level of commitment to litter for all coastal municipalities.

On the regional level (Flanders) it was indicated that there are several action plans in place. These are mainly seen as conversions of EU-regulations into regional legislation. The EU **Single Use Plastics Directive** (SUP) translated into the **Plastics Implementation Plan**, the **Packaging Plan** and an **extended manufacturer's responsibility**. Another conversion that was mentioned during the interviews was **the Flemish litter management plans for port reception facilities.**

The federal legislation that was highlighted during the interviews were a **Belgian/federal action plan on litter**, although the content is only seen by the interviewees as supporting actions. This federal plan is a result of the conversion of OSPAR regulation.

The international regulation that was relevant for Living Lab Nieuwpoort was (as mentioned before because of the conversions into regional and federal legislation) the **SUP Directive** and the **OSPAR Convention.**

❖ With regards to **SUP,** all interviewees indicated that it's too early to notice big changes because of its implementation, although many believed that the distribution of plastic litter has changed as there are less bags and straws. Yet, some interviewees stated that they believe in its potential given

the specificity as the directive targets certain litter objects on an individual level, which creates opportunities for the future.

❖ Regarding **OSPAR**, there are different views as some interviewees indicated it as positive that the Convention stresses riverine influx of litter, while others indicated the need for more riverine actions. Yet, there is consensus that OSPAR raised awareness on the topic of litter.

Lastly, the **Marine Strategy Framework Directive (MSFD)** and **the Water Framework Directive (WFD)** were also shortly mentioned during the interviews. Mainly the discrepancy between the two legislative documents as they are based on different descriptors and the perceived limited impact of the WFD were referred to by the interviewees.

In general, in terms of spatial coverage, the WFD and MSFD both apply in coastal and territorial waters, although the application of the WFD in territorial waters is limited to the chemical status of the water. For coastal waters, the MSFD only covers the aspects not addressed by the WFD (e.g. marine litter) (Devriese et al., 2023). Besides, the water system of Living Lab Nieuwpoort is located in the transition zone between marine and inland waters (figure 5). The OSPAR Convention recognises the freshwater limit as the inland boundary (between the sea and inland waters) for the marine area, unlike other policy instruments that adopt the baseline as the boundary between marine and inland waters (cf. UNCLOS and EU policy e.g. WFD, MSFD). This means that the OSPAR Convention adopts a broader marine area, including the estuaries and transition waters.
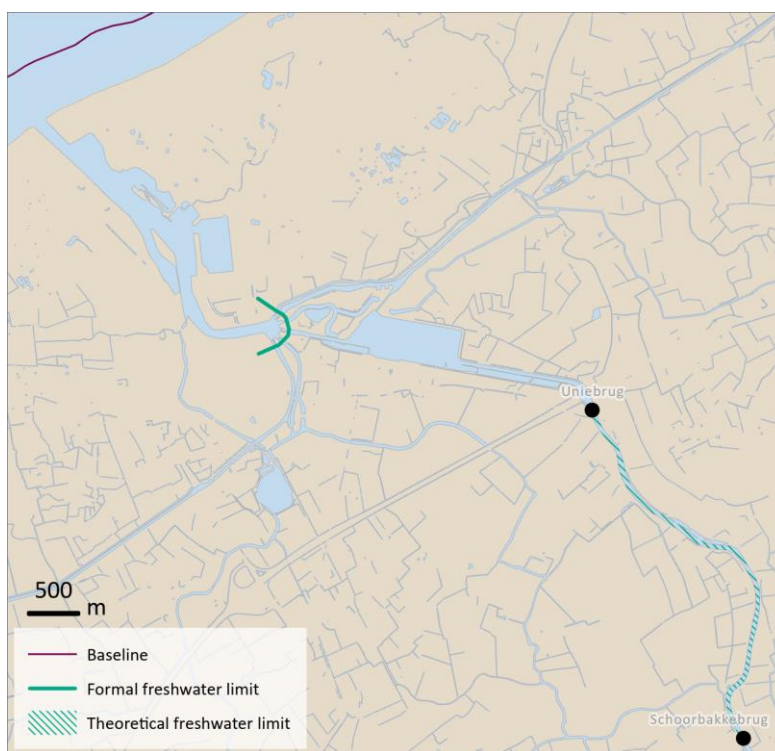

Figure 5: Formal and theoretical freshwater limit at the Yser estuary (from De Buyser et al., 2024)

b) Responsibilities

The stakeholder overview (see 4.1) highlighted the authorities involved in local water and waste management in Nieuwpoort (Table 2). This overview demonstrates the complexity of how responsibilities are distributed across various NUTS levels concerning the transitional water system of Nieuwpoort. Several issues around responsibilities in (marine) litter governance were indicated by the interviewees.

❖ Firstly, it's clear that there's a **notable fragmentation of responsibilities** within Living Lab Nieuwpoort. This translates into an absence of uniformity and a lack of overview of the actors involved. The big number of responsible actors makes it difficult to obtain effective solutions. According to most interviewees, this is inherently due to the Belgian state structure and ultimately leads to ambiguity in order to resolve issues on litter. An example that was given is that within Living Lab Nieuwpoort, many different actors are responsible for a part of the water system. **Because of the moving character of litter, the responsible authority changes as it reaches another part of the water system**.

❖ Secondly, recent **competence shifts** were highlighted as an important cause for why it is difficult to identify the right responsible organization or actor within litter governance. As there is no clear overview of these shifts, and as highlighted above it's already hard to identify the responsible actor, this complicates the possible implementation of solutions for identified barriers or challenges within the topic of litter.

❖ The last thing cited regarding responsibilities was the fact that litter management is usually **part of a broader set of duties.** This makes it difficult to bring litter forward for responsible actors as a priority issue.

c) Enforcement

It was addressed that **enforcement is the desired policy action for many interviewees** at this stage of the problem. To this end, the interviewees would especially like the focus to be on tackling the sources of the problem. Within Living Lab Nieuwpoort, **agriculture, construction and tourism** are perceived as crucial for this purpose. Additionally, some interviewees also stressed the importance of very local enforcement.

d) Monitoring data for environmental assessments and policy development

In Belgium, monitoring obligations related to marine litter are primarily framed within the context of the MSFD and OSPAR requirements. Within OSPAR, for example, beach litter is monitored, as well as plastic particles found in the stomachs of stranded Fulmars. The monitoring of seafloor litter is guided by ICES, with OSPAR providing regional assessments (e.g., OSPAR QSR). These reports are also incorporated into MSFD reporting, where additional items such as floating debris or microplastics can be included. To date, microplastics and riverine litter have not been included in the current WFD cycle for freshwater environments. Recently, an OSPAR riverine expert group was established. Additionally, numerous research projects (incl. citizen science actions) focused on observations of microplastics and marine/beach litter make a substantial contribution to knowledge-building in Belgium (Devriese et al., 2023b). Access to credible environmental data is fundamental for designing effective policy targets and measures (Devriese et al., 2023).

The importance of plastic monitoring was stressed by all interviewees. In fact, **monitoring is seen as a necessary step in developing better policy measures**. However, it does appear that the current monitoring

framework receives a fair amount of criticism. It was indicated by some that they feel there is an absence of monitoring, others notice this only through sample testing. Others then added that monitoring is, according to them, carried out, but without concrete criteria, and that monitoring focuses only on macro-plastics and micro-plastics are only considered ad hoc. It was further added that monitoring, if conducted, takes place within policy frameworks. The SUP imposes annual monitoring, as well as monitoring that is imposed from the Flemish action plans. However, these do not use the same categories. There also appears to be a great deal of experience built up within beach litter monitoring through the implementation of MSFD.

e) Implementations

In terms of implementation, it was pointed out that it is often **difficult to implement international and regional policies since they propose a one-fits-all solution** and no adjustments are made to the local or specific context. According to the interviewees, removal activities are often mandated. However, the **cost of removal is perceived to be very high**, and they would prefer to see avoidance actions implemented. A pragmatic implementation that several interviewees do favour is the **installation of plastic catchers**. Given that this passively removes much of the macro-litter, this is seen as the preferred way to perform removal activities.

The growing interest in systems to capture plastic has led to an extensive study in Belgium on all existing collection systems and applications as part of the PLUXIN project (Moulaert et al., 2021; Leone et al., 2023). The TREASURE project also takes this into account and will organize a demonstration in Nieuwpoort, where a newly developed plastic catcher will be showcased. The Horizon Europe project INSPIRE focuses on solutions to tackle riverine litter.

4.2.2   Collaborative structures

a) Communication

Table 4 provides an overview of key working groups and expert groups in the context of marine and riverine litter. Belgium is represented in EU, global, and regional working groups (e.g. by national delegation or individual experts), and there are also working groups organized by various administrative levels for the different NUTS levels. In this regard, the province (NUTS2) makes significant efforts to act as a liaison between the NUTS levels and strengthen the flow of information.

Table 4: Key working groups and expert groups related to marine and riverine litter.

EU expert groups	❖ EU Technical group on marine litter (TGML)
Global expert groups	❖ Scientists' Coalition (Plastics Treaty) ❖ Intergovernmental Negotiating Committee on Plastic (INC – Plastics Treaty)
ICES and OSPAR expert groups	❖ OSPAR Riverine Litter ❖ OSPAR RAP working group ❖ ICES working group on marine litter (WGML)

National or regional expert groups	❖ National working group on marine litter (via FPS) ❖ Flemish steering group on marine litter (via OVAM) ❖ Plastics consultation platform (via OVAM) ❖ Governmental platform (CCIM/CCIEP Plastics) ❖ Coastal working group related to coastal litter (via OVAM)
Local expert groups	❖ Meeting of coastal mayors ❖ Stakeholder consultations (in context of ongoing policy efforts)

The interviewees mentioned numerous communicative structures that touch upon the subject of marine litter. The first one is the **federal working group**. This body mainly deals with the content of the federal action plan. It was also mentioned that the cooperation was strongly strengthened during the Belgian Presidency of the Council of the European Union in 2024. A second structure is the **Flemish steering group on marine litter** which is primarily concerned with the implementation of the Flemish integral action plan on marine litter. Additionally, at the Flemish level, we also find cooperation with the lower NUTS levels under the **Mooimakers initiative**. For the interviewees, this initiative has a crucial liaison role in connecting the lower NUTS levels with higher levels. There is also a **coastal working group** to which the 10 Belgian coastal municipalities belong, but also NGOs and higher policy levels. This structure works around certain themes linked to the coastal ecosystem, of which litter is a sub-theme. Aso the mandatory **stakeholder consultation with port reception facilities** was referred to as a relevant structure, as litter is often one of the topics that are brought up in this context. Lastly, several more informal and ad hoc collaborations were highlighted, such as cross-regional consultations between political cabinets, inter-industrial structures and ad hoc cooperation on emerging problems (such as PFAS).

In addition to communicative structures, many characteristics of communication were also discussed during the interviews. As a first characteristic, the interviewees mentioned **that communication between policy and research is dominant**, making it harder for the lower NUTS levels to engage with higher levels. Secondly, it was highlighted that there is a **need for a single point of contact.** Given the strong fragmentation in responsibilities, there's a lack of clarity on who to reach out to, which could be resolved by an overarching actor in place. Next, the interviewees mentioned **the lack of strategic and targeted communication from higher NUTS levels,** which makes the flow of information slow and suboptimal. Thus, according to the interviewees, there's a need for more context-specific outreach adjusted to the needs of the lower NUTS levels. Also, they pointed out that **some sectors are hard to reach due to their difficult structures**, especially fisheries and agriculture were mentioned as hard to contact. Lastly, it was pointed out that the big number of working groups and collaborative structures foster collaboration and creates a community on the topic of litter.

b) Citizens and public

The involvement of citizens was shortly touched upon by the interviewees. They mostly stated **that citizens are hard to reach**, making them weakly represented in collaborations around litter. *(See also further under 2.1.2 – State of affairs, Volunteers).*

This indicates that, from the perspective of the authorities, it is not easy to reach or engage the public. It should be emphasized that no NGOs were contacted for interviews in the context of the Living Lab Nieuwpoort. However, these civil society organizations are actively involved as part of the advisory board

of the Living Lab Nieuwpoort. These organizations focus extensively on awareness-raising and promoting collaboration in citizen-led initiatives.

c) Knowledge transfer and open access

The importance of knowledge, data and open access has come forward in order to come to adequate solutions for tackling litter. This is where policy plays a crucial role, according to the interviewees. **Policymakers should act as knowledge broker**, supporting open access of data and promote knowledge exchange between users and researchers. The **need for context-specific knowledge for adequate implementation of solutions** was emphasized, yet interviewees indicated that this context-specific knowledge is frequently absent. As a result, there is a lack of specific measures and actions.

To consolidate the marine litter landscape and current knowledge in Belgium, VLIZ publishes policy-informing notes (e.g., Devriese et al., 2023b). These notes expose, amongst others, the current knowledge gaps. Various databases provide open marine litter and microplastic data, such as EMODnet Chemistry (EU level), ICES DATRAS and DOME databases (regional seas level), the Marine Data Archive (MDA) of VLIZ, and the Belgian Marine Data Centre (BMDC) of RBINS.

d) Financing

An additional characteristic of the collaborative structure is the **lack of sufficient financial mechanisms** to support effective plastic litter management. Financial tools, such as taxes, subsidies, or extended producer responsibility (EPR) schemes, remain either ineffective or absent. Notably, the budgets allocated through EPR schemes and the Single-Use Plastics Directive (SUP) appear to have little measurable impact on addressing plastic litter. This lack of financial influence restricts governance frameworks from enforcing producer accountability and advancing circular economy solutions.

The only notable **financial incentives identified are those supporting volunteer-led cleanup efforts**. While these incentives provide temporary relief, they fail to address the root causes of plastic pollution. Without comprehensive financial policies focused on prevention and systemic waste reduction, governance efforts remain largely reactive, missing the opportunity for proactive change.

4.2.3 State of affairs

a) Volunteers

Volunteers are seen by the interviewees as an important contribution to reducing plastic litter in the environment. They are seen as **ambassadors**, crucial for awareness raising on the topic. They are usually called upon within the framework of **cleanup actions**, but the interviewees also pointed out that engaging with volunteers creates **touristic and educational opportunities.** For this reason, volunteers are often **supported through the provision of tools and materials or financial incentives.**

b) Sources/sectors

During the interviews it became clear that several sectors are seen as the biggest sources responsible for the observed litter in the Living Lab Nieuwpoort area. The most mentioned sectors were **agriculture, fisheries, construction and tourism**. It was added that there should be extra attention paid to **waste disposal** within these sectors, as a lot of litter is the result of insufficiently correct handling of waste. The interviewees

also indicated that finding the specific source is hard, making the **removal a societal cost**. Next to these sectors, it was also mentioned that **packaging remains a big source of litter**, which is why the interviewees would like to create a structural dialogue with the producing industry.

To map the sources of litter in the water system of Nieuwpoort, source identification efforts are being made within the framework of TREASURE, based on the observed litter. The monitoring, citizen science activities (in collaboration with Plastic Pirates), and the transport model will soon provide crucial insights into the source emissions and movement of litter.

c) Perception

The interviewees indicated several aspects that prove why marine litter has **high urgency**, yet some others see the problem as definitely fixable.

❖ As the first cause for this urgency, interviewees referred to the **absence of ownership** of the problem. Given the lack of ownership, the costs are borne by society as a whole.
❖ Moreover, these costs are not only **economic**, but negative **ecological and health impacts** were also identified.
❖ Linked to this, interviewees also indicate **the lack of visibility of marine litter**. This makes it difficult to put the problem high on the political agenda.

The interviewees also made numerous suggestions for different solutions.

❖ The first solution would be to **strengthen the coordination for the topic**. As already highlighted above, implementing a single point of contact is needed. It was pointed out that organisations and political bodies that have an environmental coordinator are easier to contact and communication is smoother.
❖ **Providing clarity on the responsibilities** within the Living Lab area is also desired by the interviewees. This would have to be publicly accessible in order to improve transparency.
❖ Another solution is strengthening **the dialogue between the involved actors**. It was mentioned that there's a need for a bottom-up approach that could lead to more supported solutions. This dialogue should definitely involve the producers and the sectors that were identified as the most crucial sources of litter.
❖ Lastly, the interviewees suggested the need for a **stronger policy framework.** Given the fragmentation of responsibilities in Living Lab Nieuwpoort, a more efficient and stronger policy framework would benefit in favor of more supported solutions. **The focus of the desired framework should be on the sources and avoidance of liter, rather than removal.** One interviewee also pointed out that an international plastics treaty will strongly benefit the possibility for more robust governance.

d) Awareness

There is consensus between the interviewees that there's **a lack of societal awareness** for the problem of marine litter. This is mainly due to the lack of visibility of the problem. Awareness is seen as a crucial step in developing public behaviour change. In order to raise awareness, the interviewees proposed to make solutions such as plastic catchers more visible and user public visitor centers as communication platforms. Next to this, it was also brought forward that there's **a big role for schools and the education system** to raise

awareness. Also, cluster organisations could be strategically used to bring certain messages towards industry.

4.3 Key insights on marine litter governance

4.3.1 Best practice and strengths

Belgium has developed a **coordinated and multi-level approach** to tackling marine litter, ensuring alignment with European and international obligations:

- ❖ Belgium ensures a coordinated approach to tackling marine litter by providing **an action plan at various NUTS levels**, tailored to the respective competences.
- ❖ Both **European legislation** (e.g., SUP, MSFD, Directive on port reception facilities) and **OSPAR** obligations are **transposed and integrated into Flemish and federal action and implementation plans**.
- ❖ **Numerous communicative structures** exist for marine litter, with a strong emphasis on collaboration across different levels, particularly strengthened during Belgium's 2024 EU Presidency.
- ❖ The **NUTS2 level** (the provinces- in this case, West Flanders) **plays a liaison role** between the higher administrative levels (federal and Flemish) and the coastal municipalities.
- ❖ **Volunteers** play a crucial role in reducing plastic litter, **acting as ambassadors** for awareness-raising, and contributing to cleanup efforts, while also creating tourism and educational opportunities.

4.3.2 Key needs, barriers and challenges

Despite progress, several **gaps and obstacles hinder effective marine litter management**:

- ❖ The main issue between the **MSFD and WFD** is their differing focus, leading to **discrepancies in coverage and implementation** in coastal and transitional waters.
- ❖ Although the importance of inflow from riverine litter is acknowledged, it is **unclear whether OSPAR sufficiently covers this issue** and whether additional actions may be necessary.
- ❖ Clear **need for enforcement as desired policy action**, focusing on addressing the root causes of litter, such as agriculture, construction, and tourism, with a strong emphasis on local-level action.
- ❖ **Access to credible environmental data and robust monitoring are essential** for designing effective policy targets and measures. Current monitoring efforts and frameworks have gaps for microplastics and are not aligned for specific monitoring categories.
- ❖ **Preference for cost-effective avoidance actions** and the installation of plastic catchers for more targeted litter removal.
- ❖ The **absence of context-specific knowledge** (e.g. related to sources or sectors) hinders the implementation of targeted solutions, leading to a lack of specific measures and actions.
- ❖ It is still **too early to draw clear conclusions about the impact of the SUP directive**, but there is positive recognition of its effects on specific items.
- ❖ The **fragmentation of responsibilities and lack of clarity in governance** make effective litter management challenging in Nieuwpoort's transitional water system.

- ❖ Implementation of international and regional policies is challenging due to their **one-size-fits-all approach**.
- ❖ **Citizens are difficult to engage**, resulting in their **weak representation** in collaborative efforts to address litter.

Overall, the **lack of effective financial mechanisms** remains a significant barrier to tackling plastic litter and advancing sustainable waste/litter management solutions.

4.3.3   Opportunities for future improvements

To enhance marine litter management, Belgium can **leverage the following opportunities**:

- ❖ **Increasing visibility through solutions** like plastic catchers and visitor centres is seen as crucial for driving public behaviour change and societal awareness.
- ❖ **Enhancing dialogue** among involved actors, especially with producers and key sectors, is essential for finding supported solutions.
- ❖ **Effective communication** faces challenges due to fragmentation of the competences **and the lack of a central point of contact,** hindering engagement across NUTS levels.
- ❖ More **strategic, targeted, and context-specific communication**, particularly to reach hard-to-contact sectors like fisheries and agriculture.
- ❖ A **stronger policy framework focused on source reduction and litter avoidance**, rather than removal, is suggested, with an international plastics treaty seen as beneficial for robust governance.

5   Conclusion

Nieuwpoort is a historic town and seaside resort on the Belgian coast, renowned for its large marina, maritime importance, and cultural heritage. A focal point of the Living Lab in Nieuwpoort is the Ganzepoot water system, a vital network of locks and spillways managing water levels and tidal flow in the Yser River estuary, preventing flooding and supporting maritime traffic. This system connects six waterways and facilitates shipping while also supporting local yacht clubs. Water management in the area is overseen by multiple authorities, including the Maritime Services and Coast Agency, the Flemish Waterway, and the Agency for Nature and Forest, with the broader goal of preserving the region's Natura 2000 areas.

Belgium has established a coordinated approach to tackling marine litter through a multi-level approach. The involvement of volunteers in awareness-raising and cleanup efforts is a significant strength. However, key challenges remain, including discrepancies between the MSFD and WFD, gaps in monitoring, and a lack of context-specific knowledge that hampers targeted action. The governance system also suffers from fragmentation, making effective litter management difficult, especially at local levels like Nieuwpoort. There is a need for clearer enforcement, more strategic communication, and enhanced dialogue with producers and sectors like agriculture and fisheries. Future improvements could focus on better visibility for public engagement, strengthening policy frameworks for source reduction, and fostering collaboration across levels to drive more effective solutions.

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Annex I: Role of the project partners and advisory board

Flanders Marine Institute (VLIZ)

The mission of the Flanders Marine Institute (VLIZ) is to strengthen science-based knowledge about our coasts, seas and the ocean and share it as widely as possible. VLIZ coordinates the Belgian living lab, Living Lab Nieuwpoort (LLN), in collaboration with the project partners and the stakeholders. VLIZ will be involved in the data collection on plastic pollution to quantify the overall degree and the behaviour of plastic litter in the Nieuwpoort water system. VLIZ will be responsible for the development of the TREASURE toolbox, a decision support tool to help water managers and stakeholders to select best possible plastic-removal systems in specific areas. Stakeholder engagement will contribute to the understanding of enablers and constraints related to the implementation of mitigation measures, as well as identify gaps in existing regulations and knowledge. The development of a detailed data management strategy will be coordinated by VLIZ. In this living lab, three departments of VLIZ work together: Ocean and Human Health research division, VLIZ Marine Data Centre (VMDC), and Policy and Innovation division.

Contacts: Lisa Devriese, Ana Catarino,

Website: Vlaams Instituut voor de Zee (vliz.be)

Université du Littoral Côte d'Opale (ULCO)

The Oceanology and Geosciences Laboratory, part of the Université du Littoral Côte d'Opale (ULCO), is amongst the most important laboratories in the field of coastal oceanography in France. The Institut des Sciences de la Mer et du Littoral (ISML) houses a micro- and macroplastics research platform dedicated to sampling, monitoring and analysis of plastic pollution in different water bodies. ULCO will be involved in both the Belgian and the French living labs, where they will address the data collection and prevention pillars. They will share their expertise of aquatic drones, used for sampling of micro- and macroplastics in all types of waterbodies, including hard to reach, confined areas such as harbours, rivers and inland waterways. They also test different sensors for automatic recognition of plastics on the water surface and rivers banks.

Contacts: Rachid Amara, Périne Doyen

Website: https://www.univ-littoral.fr/

MULTI.engineering nv

MULTI engineering (MULTI NV) offers engineering solutions for maritime and offshore businesses, focused on sustainable themes such as reduced emissions of ship powering, offshore renewable energy production and global waste solutions for waterways.

In the TREASURE project, MULTI.engineering is responsible for the design of the plastic catcher device, including a small-scale floating garbage collection tool and a bubble screen. (DeMarc) They will define the ideal ranges of and balance between technical variables and provide input to subcontractor Herbosch-Keire, to ensure optimal conditions for the manufacturing, building and installation of the demonstrator. MULTI.engineering will be responsible for follow-up of the installation and operation of the demonstrator.

Contacts: Niko Fierens, Floris Roelofsen

Website: [Homepage | MULTI Engineering](#)

International Marine and Dredging Consultants NV (IMDC)

The International Marine and Dredging Consultants NV (IMDC) is an international engineering and consultancy company in the field of natural waters: precipitation, groundwater, rivers, estuaries, coastal areas, ports and marine waters. IMDC will assist the placement of the plastic removal device by preparing simulations of currents and plastic transport in the water system of the LLN, based on which the best location for optimal efficiency can be selected. Additionally, feasible water depths and currents velocities will be assessed to ensure optimal functioning of the bubble screen.

Contacts: Boudewijn Decrop

Website: https://imdc.be/en

Subcontractor: Herbosch-Kiere

Marine contractor Herbosch-Kiere will coordinate the manufacturing and installation of the demonstrator, based on design data provided by MULTI and IMDC.

Contacts: Geert Stellamans

Website: [Home- Herbosch-Kiere](#)

Advisory board

Name of organisation	Detail of organisation, relevance to TREASURE
Streekhuis Kust (Province of West Flanders)	The 'Streekhuis Kust' strengthens the operation of the Province of West Flanders on the coast. Streekhuis is a meeting place for authorities and regional partners. We offer support to local and regional administrations and focus on current coastal themes. Chair of the advisory board.
City of Nieuwpoort	City of Nieuwpoort is represented by the council member in charge of fisheries, environment, and water protection.
VY Nieuwpoort	Nieuwpoort Marina (Vlaamse Yachthaven Nieuwpoort).
Flanders Environment Agency (VMM)	The Flanders Environment Agency of the government of Flanders sets out to have a positive impact on the living environment in Flanders and to help make it climate-proof.
Public Waste Agency Flanders (OVAM)	The public waste agency of the government of Flanders is responsible for the protection of people and the environment from the harmful effects of the production, use and management of waste and materials.
Federal Public Service Health, Food chain safety and Environment	The Marine Environment Department of the Federal Public Service strives for a clean, healthy, safe, and productive North Sea with a wealth of biodiversity.
Blue Cluster	Spearhead cluster (innovation cluster) of innovative organisations and companies in the sustainable blue economy.

Name of organisation	Detail of organisation, relevance to TREASURE
Wind and Water Sports Flanders (WWSV)	WWSV is the unisport federation for sailing, surfing, sail car racing and related sports in Flanders.
Proper Strand Lopers	PSL is a citizen organisation with focus on clean-up activities (beaches, dunes, etc.).
Department of Mobility and Public Works (MOW)	MOW of the government of Flanders is responsible for public works of roads, waterways and air infrastructure.
Vlaamse Waterweg NV	Manages and operates Flemish Waterways including the bridges over them and the grounds along them.
Agency for Nature and Forests (ANB)	The Agency for Nature and Forests of the government of Flanders cherishes, protects and develops over 90,000 hectares of natural areas, forests and parks in Flanders.
Research Institute for Nature and Forest (INBO)	INBO evaluates biodiversity policy and management through applied scientific research, data and knowledge disclosure; link to a.o. salination and eel migration.
The Outsider Coast	Organises (group) activities in and around Nieuwpoort, e.g. Kayaking on polder rivers, water sports, etc.
Le Boat	Organization for boating vacations, also in Belgium (river cruises and boat rentals).

Annex II. Traffic light categorisation of 'Long Pillar List'

Governance

1. **What are the key stakeholders involved in the reduction of plastic litter/ prevention/clean-up efforts (local, regional, national) you are aware of?**
Important to gather the scope of stakeholders involved.

2. **What kind of responsibilities/competences do they have (design of policies/implementation of policies/creating incentives/provision of funding/other, knowledge about technical solutions in prevention, conditions in public tenders, penalties etc.)**
Linked to stakeholders (question 1). Relevant to know what the responsibilities/competences are (could be a guess by interviewee or it could be written down by organizations).

3. **What are the legal duties, extra-statutory tasks, ownership and management task?**
Linked to the responsibilities and competences (question 2).

4. **In what spatial area of responsibilities/management do you act? (e.g. harbours, waterways, shores, quays, river banks, etc.)**
Relevant to know what the management boundaries are.

5. **Does one specific governmental actor within your area have the (legal) task of removing plastic waste from the water?**
Linked to the spatial area of responsibilities (question 5). What are the boundaries/legal tasks within.

6. **Are there any mismatches between responsibilities and competences within specific organizations?**
Depends on clarity of boundaries, tasks and stakeholders involved.

7. **Is there a way mismatched competences are solved? Is the 'competence flow' secured?**
Also depends on clarity of boundaries, tasks and stakeholders. Sometimes the step before this is to get clarity of who does what to be able to solve mismatches.

8. **What challenges do you face regarding plastic litter management/ reduction? What does prevent you from taking specific steps? (Lack of data on litter amount, political interest, awareness in your organization)**
Relevant to know for tackling the problems. First recommendations are often given here.

9. **Are you sharing information about plastic litter with other organizations?**
Follow-up question should be: why and what are you sharing with other organizations. What is the purpose and win for this action? Without this goal, not really relevant for the conversation.

10. **How is the information exchanged among different organization in this field? (flow of information, formal/informal exchange, regular round tables, etc.)**
Depends on answer for question 9. What is the goal to know this? Question suggests organizations share information.

11. **Is there any specific cooperation/ information exchange between: 1) research-public administration/policy-makers-industry/businesses; 2) research-industry/businesses; 3) NGOs-public administration/policy-makers?**
Question suggests that there are specific cooperation/information exchanges. This should already be answered with question 1 (who are the stakeholders) and question 9 and 10 (if and how you are exchanging information). Often too detailed for the interviewee to give insights to (if these are known).

12. **Do you see any other barriers/ gaps in cooperation? (who is missing, where are the information and implementation gaps)**
Interesting. However, often this answer has already been giving at question 6 (mismatches). Mismatches between responsibilities/competences and barriers/gaps in cooperation is sometimes interpreted as the same.

13. **How are the costs divided between different organizations in charge? Follow-up question: How does the new EPR-SUP regulation influence this?**
Often not known by the interviewee (not the right person to ask this question). SUP regulation (details) are also often not know. Question 11 at policies is a better fit.

14. **Are you willing to pay/contribute to a joint fund from which these types of activities are paid?**
If asked, this question should be supported by follow-up question: what would be the goal of this joint fund, who should be responsible over the joint fund and are (necessary) recorded agreements?

15. **Do you know how much plastic litter is floating in your waters?**
Less relevant to this questionary. Answers are often no or without details. Question 9 about sharing plastic information could be used for the same goal as this question.

16. **What recommendations would you formulate for policy/ decision makers?**

Very important question to ask. Answers are often already given during the first 15 questions, but it is a good moment to summarize the answers again and complete the theme governance.

Policies

1. **What are the key regulations /laws on the reduction of plastic litter in the environment on the national, regional, local level?**

Important to receive insight on the scope of regulations and laws on all levels. Important to check desk research for accuracy.

2. **Can you identify any regulations in specific sectors (agriculture, horticulture, aquaculture, shipping=antifouling paints, tourism, other) on the reduction of plastic litter?**

Too detailed and difficult for most to answer (interviewee is often not working in these sectors).

3. **Are you aware of any plans, strategies, incentives (informal, non-binding) on the reduction of plastic on the international, national, regional, local level?**

Part of the question is already asked and answered in question 1. Lack of information makes this question and the follow-up (question 4) difficult to answer for some.

4. **What are the main regulations that partly overlap with these regulations/laws?**

Because of lack of regulations (or answers about these regulations) answers are often no or not known.

5. **How specifically is the reduction of plastic litter addressed in those documents? Can you identify any gaps/missing points/contradictions? How detailed are the statements?**

Question 2/3/4 are often answered with a no as there are no documents. The question gives no further insight to the policies.

6. **How could these gaps be filled? Can you formulate appropriate intervention points? Is a legal advice required?**

Based on the lack of information given at question 2/3/4/5, this question could be skipped during the conversation.

7. **How does the implementation of those documents look like? Are there concrete measures implemented?**

This question (and question 8 and 9) are not relevant. Question suggest there is an implementation of documents.

8. **What can you say about the effectiveness of these documents: Are there any restrictions, projects or measures resulting from them?**

This question (and question 7 and 9) are not relevant. Question suggest there is an implementation of documents.

9. **Is there an evaluation (incl. indicator system) of these documents in place? What does it look like?**

This question (and question 7 and 8) are not relevant. Question suggest there is an implementation of documents.

10. **What changes in your organization due to the Single Use Plastic Directive?**

Answers given based on this question refers more to practical changes in an organization: use of mugs instead of paper cups. Question 11 gives a better insight about the SUP budget and strategies.

11. **Are you aware EPR-SUP budget is available and what strategies are there with regards to spending the budget?**

Relevant for the research regarding the SUP directive framework in a country. This gives insight how to SUP is executed in the different organizations.

12. **How is the enforcement of the policies organized? Are there any threshold values of the amount of litter that is allowed in the river and how are those threshold values enforced (e.g. structural monitoring of litter)? What type of data is needed/desired for enforcement of litter in rivers?**

Enforcement and needed/desired data is relevant to gather information about. It could depend on the organization if the question should be asked/could be answered.

13. **What recommendations for the improvement of formal and informal policy framework (e.g. for the national implementation of the Water Framework Directive, other EU directives) can be formulated?**

Good question for policy. Relevant for this research to know what could be improved in the current situation.

Annex III. Selection of questions for Living Lab Nieuwpoort

Policy and regulation

Questions covered by stakeholder identification

- ❖ **Key stakeholders**. What are the key stakeholders involved in the reduction of plastic litter/ prevention/clean-up efforts (local, regional, national) you are aware of?
- ❖ **Responsible authorities**. What kind of responsibilities/competences do they have (design of policies/implementation of policies/creating incentives/provision of funding/other, knowledge about technical solutions in prevention, conditions in public tenders, penalties etc.)
- ❖ **Responsible area.** In what spatial area of responsibilities/management do you act? (e.g. harbours, waterways, shores, quays, river banks, etc.)

Questions covered by desktop study

- ❖ **Legal authority.** Does one specific governmental actor within your area have the (legal) task of removing plastic waste from the water?
  - o Rephrased to: "Which legal authority is responsible in your living lab area for litter reduction/removal?"

- ❖ **Key regulations**. What are the key regulations /laws on the reduction of plastic litter in the environment on the national, regional, local level?
- ❖ **NEW question - Monitoring program:** To what extent is there a monitoring program (for litter) in place, relevant for the Living lab area?

Questions covered by interview

- ❖ **Mismatches.** Are there any mismatches between responsibilities and competences within specific organizations?
  - o Rephrased to: "Are there any mismatches or gaps between the competences and responsibilities within the plastic litter policy in your area?"
  - o Suggestion: show the results of the stakeholder mapping to discuss this one

- ❖ **Solutions.** What recommendations would you formulate for policy/decision makers?
  - o Recommendations = possible solutions?
  - o Rephrased to "What do you see as possible solutions for the mentioned policy barriers/ mismatches?"

- ❖ **Regulation.** Are you aware of any plans, strategies, incentives (informal, non-binding) on the reduction of plastic on the international, national, regional or local level?
  - o Rephrased to "Is there any other regulation (e.g. strategies, action plans, incentives) that has a big influence on the reduction of plastic in Living lab Nieuwpoort?"

- ❖ **SUP Directive.** What changes in your organization due to the Single Use Plastic Directive?
  - o Rephrased to: "Has the Single Use Plastic Directive caused a significant impact regarding plastic litter in the environment?"
  - o Or: Best Practice. What is a best practice of the implementation of the SUP Directive?
- ❖ **NEW question - Most relevant goals of the Living Lab:** What is to your opinion the most relevant policy action or goal in terms of litter for the Living Lab area?
- ❖ **Evaluation mechanism.** Is there an evaluation (incl. indicator system) of these documents in place? What does it look like?
  - o Rephrased to "Is there an evaluation mechanism for progress towards achieving the policy goals in place?"
- ❖ **Monitoring mechanism.** What can you say about the effectiveness of these documents: Are there any restrictions, projects or measures resulting from them?
  - o Rephrased to "Is there a monitoring mechanism to evaluate the effectiveness of the policy measures? "

- ❖ **NEW question - Sources/sectors:** What are the most important sectors to focus on related to littering in the Living Lab area?
- ❖ **Recommendations.** What recommendations for the improvement of formal and informal policy framework (e.g. for the national implementation of the Water Framework Directive, other EU directives) can be formulated?
  - Covered before or making general question?
    - o Rephrased to "What would you recommend to improve the implementation of EU litter policies"?

Collaborative structures

Questions covered by stakeholder identification

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Questions covered by desktop study

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Questions covered by interview

- ❖ **Communication mechanism.** How is the information exchanged among different organizations/ authorities in this field? (flow of information, formal/informal exchange, regular round tables, etc.)
  - o Rephrased to "Are there any official knowledge or communication mechanisms in place around the topic of marine litter?"
- ❖ **Stakeholder group.** Is there any specific cooperation/ information exchange between: 1) research-public administration/policy-makers-industry/businesses; 2) research-industry/businesses; 3) NGOs-public administration/policy-makers?
  - o Rephrased to "Which stakeholder groups are involved within this communication platform/exchange?
- ❖ **NEW question - Difficult to reach Stakeholders.** What stakeholder groups do you experience as most difficult to reach?
- ❖ **NEW question - Importance of industry.** What's the importance of the involvement of industry for the reduction of litter according to you?
- ❖ **Weaknesses.** Do you see any other barriers/ gaps in cooperation? (who is missing, where are the information and implementation gaps)
  - o Rephrased to "What are the weaknesses of this communicative interaction?"
- ❖ **NEW question – Strengths.** What are the strengths of this communicative interaction?
- ❖ **NEW question - NUTS interaction.** How does the communication between the different NUTS-levels work in practice?

State of affairs

Questions covered by stakeholder identification

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Questions covered by desktop study

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Questions covered by interview

- ❖ **Implementation challenges.** What challenges do you face regarding plastic litter management/ reduction? What does prevent you from taking specific steps? (Lack of data on litter amount, political interest, awareness in your organization)
  - Two questions – same topic

- o "What are the main barriers/challenges for enhancing the implementation of the reduction of litter according to you?

- ❖ **Perception.** Do you know how much plastic litter is floating in your waters?
  - Not covered
  - Replaced by: Perception. Do you recognize plastic litter as an urgent problem?
- ❖ **NEW question – Volunteers.** Do you work with volunteers (or NGOs) to remove litter from the environment in your area?
- ❖ **IF YES: NEW question – Perception:** How do you feel about involving volunteers to keep the environment you are responsible for clean?

Questions not covered by Living Lab Nieuwpoort

- ❖ What are the legal duties, extra-statutory tasks, ownership and management task?
  - Theme: Policy and regulation
  - Remark: this is several questions in one, so will not be addressed for LLN
- ❖ Is there a way mismatched competences are solved? Is the 'competence flow' secured?
  - Theme: Policy and regulation
  - Remark: two questions, is already addressed via other question
- ❖ How are the costs divided between different organizations in charge? Follow-up question: How does the new EPR-SUP regulation influence this?
  - Theme: Policy and regulation
  - Remark: two questions, not clear what the point is
- ❖ Can you identify any regulations in other sectors (agriculture, horticulture, aquaculture, shipping=antifouling paints, tourism, other) on the reduction of plastic litter?
  - Theme: Policy and regulation
  - Remark: Interviewees are not working in other sectors – no answers will be provided.
  - Can be covered by interviews
    - o Rephrased to "Is there any other regulation (e.g. strategies, action plans, incentives) that has a big influence on the activities of the Living Lab?"
- ❖ What are the main regulations that partly overlap with these regulations/laws?

  - Theme: Policy and regulation
  - Can be covered by desktop study
- ❖ How specifically is the reduction of plastic litter addressed in those documents? Can you identify any gaps/missing points/contradictions? How detailed are the statements?
  - Theme: Policy and regulation
  - Adressed by previous questions – mismatches/gaps
- ❖ How could these gaps be filled? Can you formulate appropriate intervention points? Is a legal advice required?
  - Theme: Policy and regulation
  - Remark: Probing for solutions? Not completely clear.
    - o Rephrased to "What do you see as possible solutions for the mentioned (policy) barriers?"
- ❖ How does the implementation of those documents look like? Are there concrete measures implemented?
  - Theme: Policy and regulation
  - Double question
    - o "Are there any measures taken in order to implement these documents?"
- ❖ Are you aware EPR-SUP budget is available and what strategies are there with regards to spending the budget?
  - Theme: Policy and regulation
  - Not covered
- ❖ How is the enforcement of the policies organized? Are there any threshold values of the amount of litter that is allowed in the river and how are those threshold values enforced (e.g. structural monitoring of litter)? What type of data is needed/desired for enforcement of litter in rivers?
  - Theme: Policy and regulation

- Covered before – evaluation mechanism
- ❖ Are you sharing information about plastic litter with other organizations?
    - Theme: Collaborative structures
    - Clustered with other similar question
- ❖ Are you willing to pay/contribute to a joint fund from which these types of activities are paid?
    - Theme: Collaborative structures
    - Not covered

Annex IV. Interview questionnaire (in English and Dutch)

English

A) <u>Policy and regulation</u>

1. Is there any **regulation** (e.g. strategies, action plans, incentives) that has a big influence on the reduction of plastic in *Living lab Nieuwpoort*?
2. Has the **Single Use Plastic Directive** caused a significant impact regarding plastic litter in the environment?
    IF YES- 2.b: What is a best practice of the implementation of the SUP Directive?
3. What is to your opinion the **most relevant policy action or goal** in terms of litter for the Living Lab area?
4. Is there a **monitoring mechanism** in place to follow-up the progress towards achieving the policy goals in place?
5. Is there an **evaluation mechanism** in place to evaluate the effectiveness of the policy measures?
6. Are there any **mismatches or gaps** between the competences and responsibilities within the plastic litter policy in your area?
7. What do you see as possible **solutions** for the mentioned policy barriers/ mismatches?

B) <u>Collaborative structures</u>

1. Are there any official **knowledge or communication mechanisms** in place around the topic of marine litter?
    IF YES – 1.b: Which **stakeholder groups** are involved within this communication platform/exchange?
2. What **stakeholder groups** do you experience as most **difficult to reach**?
3. What's the **importance of the involvement of industry** for the reduction of litter according to you?
4. How does the communication between the different **NUTS-levels** work in practice?
5. What are the **weaknesses** of this collaboration in your Living Lab?
6. What are the strengths of this collaboration in the Living Lab?

C) <u>State of affairs</u>

1. What are the **most important sectors** to focus on related to littering in the Living Lab area?
2. What are the main **barriers/challenges for enhancing the implementation** of the reduction of litter according to you?
3. Do you recognize plastic litter as an **urgent problem**?
4. Do you work with **volunteers** (or NGOs) to remove litter from the environment in your area?
    IF YES – 4.b: How do you feel about involving volunteers to keep the environment you are responsible for clean?

Dutch

A) Beleid

1. Is er beleid (bijvoorbeeld strategieën, actieplannen, incentives) die een grote invloed heeft op de vermindering van plastic in Living Lab Nieuwpoort?
2. Heeft de Single Use Plastic Directive een significante impact gehad op het verminderen van plastic afval in het milieu?
   INDIEN JA- 2.b: Wat is volgens u een best practice van de implementatie van de SUP Directive?
3. Wat is volgens u de meest relevante beleidsactie of het meest relevante beleidsdoel met betrekking tot zwerfvuil in het Living Lab-gebied?
4. Is er een monitoringsmechanisme aanwezig om de voortgang richting de beleidsdoelen te volgen?
5. Is er een evaluatiemechanisme aanwezig om de effectiviteit van de beleidsmaatregelen te beoordelen?
6. Zijn er mismatches of hiaten tussen de bevoegdheden en verantwoordelijkheden binnen het beleid voor plastic afval in uw gebied?
7. Wat ziet u als mogelijke oplossingen voor de genoemde beleidsbarrières/mismatches?

B) Samenwerkingsstructuren

1. Zijn er officiële kennis- of communicatiemechanismen rond het thema marien zwerfvuil?
   INDIEN JA- 1.b: Welke stakeholdergroepen zijn betrokken binnen dit communicatieplatform?
2. Welke stakeholdergroepen ervaart u als het moeilijkst te bereiken?
3. Hoe belangrijk vindt u de betrokkenheid van de industrie bij het verminderen van zwerfvuil?
4. Hoe werkt de communicatie tussen de verschillende NUTS-niveaus in de praktijk?
5. Wat zijn volgens u de zwaktes van deze samenwerking in uw Living Lab?
6. Wat zijn volgens u de sterktes van deze samenwerking in het Living Lab?

C) Stand van zaken

1. Wat zijn de belangrijkste sectoren om u op te richten met betrekking tot zwerfvuil in het Living Lab-gebied?
2. Wat zijn volgens u de belangrijkste barrières/uitdagingen om de vermindering van zwerfvuil te versterken?
3. Ziet u plastic afval als een urgent probleem?
4. Werkt u samen met vrijwilligers (of NGO's) om zwerfvuil in uw gebied op te ruimen?
   INDIEN JA- 4.b: Hoe denkt u over de betrokkenheid van vrijwilligers bij het schoonhouden van het milieu waarvoor u verantwoordelijk bent?