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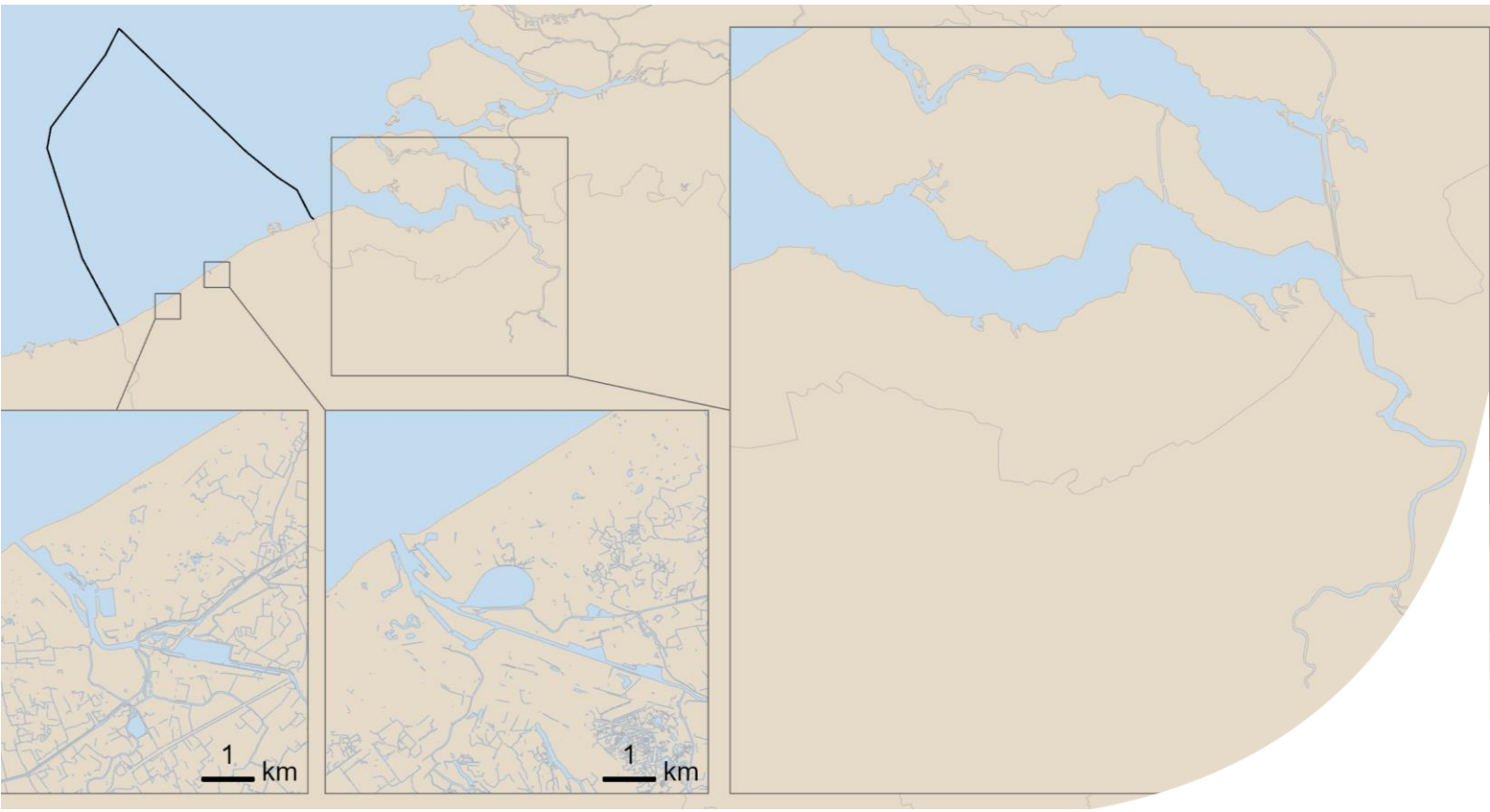

Mapping of policy instruments and powers of authorities in the transition zone from inland waters to sea: three study areas in Flanders

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Advisory question

This memorandum aims to clarify the boundary between sea and inland waters for three Belgian study areas: the Scheldt estuary, the Yser estuary, and the water system of Ostend. These water systems represent a transition zone between the sea and inland waters, and a correct interpretation of the marine area is crucial for, among other things, interpreting the environmental objectives and targets set out in several key policy instruments (e.g. on environmental pollution).

This issue was also highlighted by Mr. Gert Verreet (Department of Economy, Science and Innovation) during the PLUXIN-project. The development of this memorandum is part of various ongoing projects, such as the PLASTFLOW tender (commissioned by OVAM within the framework of the Cmartlife project), Interreg-project TREASURE, and the Horizon Europe-projects INSPIRE and SOS Zeropol2030.

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Authors: Silke De Buyser, Lisa Devriese, Britt Lonneville, Thomas Verleye, Hans Pirlet. Flanders Marine Institute (VLIZ)

Contact person: lisa.devriese@vliz.be

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Summary

Aquatic systems such as rivers and seas are interconnected, allowing elements like marine pollution, ecosystem services, and carbon accounting to spread from one system to another. However, in management practices, artificial boundaries are often drawn to develop area-specific policies, set environmental goals, and implement (management) measures. In legislation and policy concerning marine pollution, this intrinsic connectedness is acknowledged, and measures or environmental goals are set from the source to the sea. However, the terms used, such as 'to the sea' or 'in the marine environment,' are not entirely unambiguous. For the interpretation and evaluation of policy measures and environmental targets, a clear delineation of the marine area is needed, specifically regarding the boundary between the sea and inland waters. This report specifically examines this boundary in three Belgian study areas: the Scheldt estuary, the Yser estuary, and the water system of Ostend. These are important transitional areas between the sea and inland waters. Additionally, the report delves deeper into the distribution of responsibilities within these (dynamic) water systems, with particular attention to the specific boundaries that determine where and by whom these responsibilities can be exercised.

In a subsequent section of this report (planned for the end of 2024), the insights from this document will be used to interpret the environmental objectives and ambitions, and to map the potential impact of administrative and geographical boundaries on environmental policy, with a focus on marine pollution.

Highlights:

- The international UN Convention on the Law of the Sea (UNCLOS) provides a legal framework for the management and distribution of maritime rights and responsibilities among countries. Globally, UNCLOS establishes legally binding maritime boundaries, including the boundary between the sea and inland waters, which is determined by the baseline[1].
- The OSPAR Convention and the Water Framework Directive (WFD) have a scope that extends beyond the baseline. This means that the boundary of the OSPAR Convention, which focuses on the protection of the sea, lies further inland than the baseline. Conversely, the WFD, which focuses on the protection of inland waters, extends seaward beyond the baseline. This way, both policy instruments better capture the land-sea processes.
- 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 (cf. UNCLOS). The OSPAR Convention starts from a broader marine area, also including the estuary.
- The freshwater limit, and thus the inland delineation of the scope of the OSPAR Convention, is often not clearly defined. For the Yser estuary and the water system of Ostend, this boundary was determined through the classification in the Flemish s*troomgebiedbeherplannen*, specifically at the *Ganzepoot* and the *Sas-Slijkens* lock complex.
- The management transition from federal to Flemish jurisdiction occurs at the baseline (cf. UNCLOS). Certain activities, such as fishing, coastal defence, and port access, form exceptions to this rule.
- The freshwater limit does not affect the spatial distribution of responsibilities.

[1] Baseline: The boundary between internal waters and the territorial sea, i.e. the low water mark.

1. Introduction

The delineation of clear and unambiguous marine boundaries plays a crucial role in the distribution of rights and the allocation of responsibilities. Well-defined marine boundaries are essential for effective management and governance. In contrast, unclear boundaries can undermine the effectiveness of policies and become a source of conflict (Sutherland 2005). However, due to the interconnected nature of water systems, these boundaries are often difficult to establish (Liquete, Somma, and Maes 2011; Østhagen 2020). Moreover, many marine aspects, such as pollution, ecosystem services, or carbon accounting, are not confined to these administrative boundaries (López-Hoffman et al. 2010; Dauwe et al. 2023; Devriese et al. 2023). Their transboundary nature complicates the implementation of measures or the assessment of the environmental status in many cases (Langlet 2018).

Pollution in particular can spread over vast distances, far from its original source (Devriese et al. 2023). Crossing not only national borders but also the boundaries between land and sea. Rivers and estuaries are often considered the main sources of marine pollution (Pinheiro et al. 2021). Although management often establishes an artificial dividing line between the sea and inland waters (Reuter, Juhn, and Grantham 2016), pollution-related policy instruments acknowledge this interconnectedness and implement measures from source to sea (Kleverlaan and Reichelt-Brushett 2023). These measures and environmental objectives are typically framed using terms such as 'to the sea', 'in the sea', 'to the marine environment', 'into the marine environment', (Devriese et al. 2023; OVAM 2016). To evaluate the impact of policy measures or progress towards achieving environmental targets, a clear and unambiguous delineation of the relevant marine scope is needed.

In the first part of this report, the delimitation of the marine area is examined. The spatial delineation of the marine scope, as defined in various policy instruments, is investigated and compared, with a particular focus on the boundary between the sea and inland waters. The key policies relevant to the protection of the Belgian part of the North Sea (at global, European, national, and Flemish levels) were examined. Particular attention is paid to policies that contain a description of the 'marine area.' Building on information from the Compendium for Coast and Sea, the definitions of the different scopes of the policy instruments are compared to clarify the differences between them (e.g., Plancke et al. 2023). This report focuses on three study areas, which form a transition between the sea and inland waters. In addition to mapping the marine scope of various policy instruments, the report also discusses the distribution of responsibilities within these (dynamic) water systems, including the precise boundaries within which these responsibilities apply.

In a second part, which will follow this report, the focus will be on how the operational boundaries of the various policy instruments and responsibilities influence the implementation of pollution policies. This will be based on the data and insights gathered in this document.

This report includes the following chapters:

- **Chapter 1 - Introduction:** Outlines the main objective of this report, as well as an introduction to the three study areas.
- **Chapter 2 - The Marine Area:** Covers the different definitions of the marine operational area based on several key policy instruments related to the protection of the marine environment.
- **Chapter 3 - Responsibilities:** Provides an overview of the responsibilities of national agencies responsible for implementing water policies, followed by an application to the specific study areas.

Study Areas

- **The Scheldt Estuary**

The Sea Scheldt and its tidal tributaries (*Durme, Rupel* with the *Zenne, Dijle*, and *Netes*), the Western Scheldt, and the mouth of the Scheldt together form the Scheldt estuary (*Figure 1*). The Sea Scheldt is the Belgian part of the Scheldt where the tides are still noticeable, from the Belgian-Dutch border to the weir and lock complex in *Merelbeke*. The tributaries are also partially affected by the tides. The exact spatial boundary of the estuary is formed by the flood control dikes (Plancke et al., 2023). The Sea Scheldt is divided into the Lower Sea Scheldt with brackish water and the Upper Sea Scheldt with fresh water, with the division roughly at *Rupelmonde* ("Sea Scheldt" – www.vleet.be). The Western Scheldt is the Dutch part of the Scheldt estuary and includes the area between the Belgian-Dutch border and the river mouth near Breskens and *Vlissingen* ("Western Scheldt" – www.vleet.be; "The Scheldt" – www.vnsc.eu). The Scheldt estuary includes several marinas, with berths at *Linkeroever, Willemdok*, and *Kempisch Dok* (www.jachthavenantwerpen.be). Additionally, there are two Natura 2000 areas in the estuary: the "*Schelde- en Durme-estuarium*" from the Dutch border to Ghent and the "*Beneden-Schelde*" area (*Figure 1*) (www.natura2000.vlaanderen.be). In 2023, the *National Park Scheldevallei* was recognized (www.rivierparkscheldevallei.be).

Figure 1: An overview of the Scheldt estuary and the Natura 2000 sites present.

- **The Yser estuary**

The Yser estuary, the tidal area of the Yser, extends over a length of three kilometres, from the mouth in the North Sea to the lock complex *De Ganzepoot* (Provoost T. 1997). *De Ganzepoot* connects the harbour channel with six different waterways (www.nieuwpoort.be). In Nieuwpoort, there are three yacht clubs: the Royal Yacht Club Nieuwpoort (K.Y.C.N.) in the Old Marina, the Flemish Yacht Club Nieuwpoort (V.Y.) in the yacht docks at Portus Novus and the outer harbour, and the Air Force Sailing Club, also in Portus Novus ("Jachthavens aan de Vlaamse Kust" 2018). The Flemish Natura 2000 area "*Duingebieden inclusief IJzermonding en Zwin*" (BE2500001) includes most of the dune areas along our coast, as well as the Yser Estuary (*Figure 2*). At the mouth of the Yser, on the seaward side, lies the marine Natura 2000 area "Flemish Banks" (www.natura2000.vlaanderen.be).

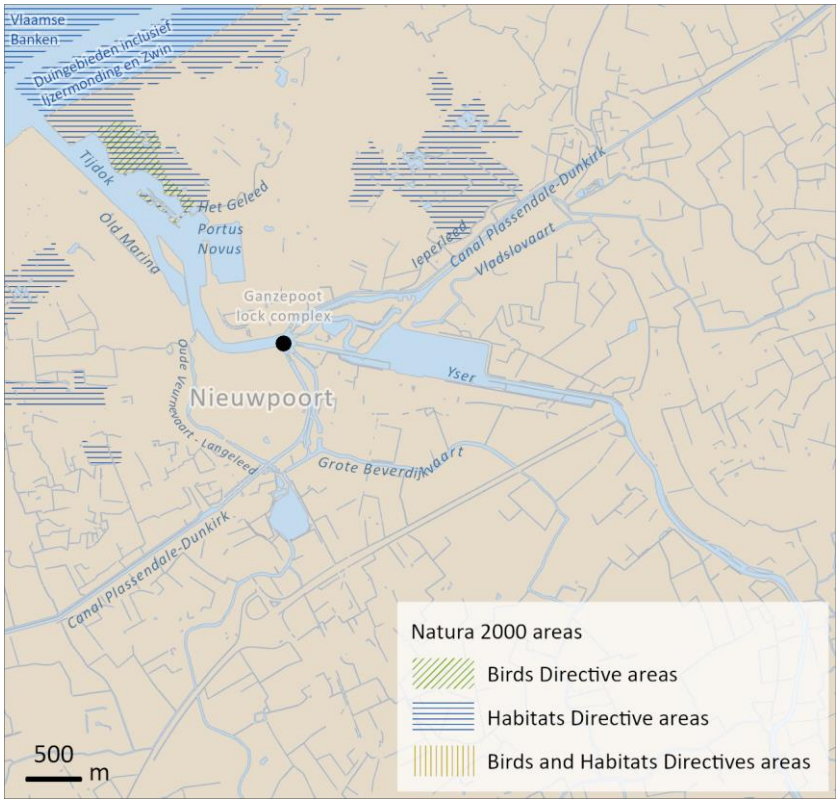

Figure 2: An overview of the Yser estuary and the Natura 2000 sites present.

- **The water system of Ostend**

  The Ghent-Ostend Canal is an important waterway connecting the coastal ports of Zeebrugge and Ostend with 'Flemish inland waters' (e.g., the Scheldt and Leie). The Port of Ostend, which is part of this canal, extends from the harbour channel to the North Sea up to the Plassendale bridge (www.portofoostende.be; www.seineschelde.be). Ostend is home to three yacht clubs: Royal Yacht Club Ostend (R.Y.C.O.) in the Outher Dock, Royal North Sea Yacht Club (R.N.S.Y.C.) in the Montgomery Dock, and Mercator Marina in the Mercator Docks (*Figure 3*) ("Jachthavens aan de Vlaamse Kust" 2018). The mouth of the canal is located in a bird directive area covering 144.80 km², extending to the *Oostendebank* ("activities at sea" - www.health.belgium.be). Additionally, the dunes of *Oosteroever* are part of the Special Protection Area (SPA) "*Duingebieden inclusief IJzermonding en Zwin*" (BE2500001) (www.natura2000.vlaanderen.be).

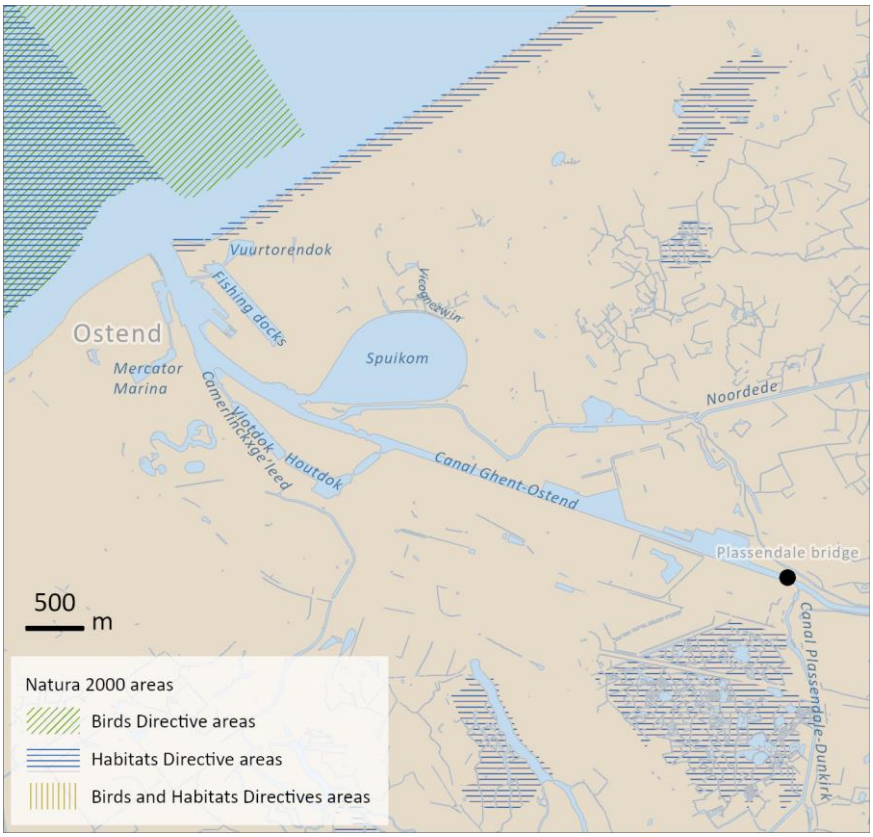

Figure 3: An overview of the Ostend water system and the Natura 2000 sites present.

2. The maritime area

2.1 How is the maritime area defined?

The international United Nations Convention on the Law of the Sea (hereafter UNCLOS) provides the overarching global framework for jurisdiction over marine areas. In addition, numerous policy instruments at global, European, and national level offer instrument-specific descriptions of their geographical scope, often including a spatial definition of what is considered as marine area. The focus here is primarily on instruments aimed at protecting the marine environment (such as the Belgian part of the North Sea) and those that provide a description of the 'marine area.' As a result, the following description is not an exhaustive list of instruments that, in one way or another, reference spatial boundaries.

2.1.1 The Legal Basis: The International United Nations Convention on the Law of the Sea (UNCLOS, 1982)

The International United Nations Convention on the Law of the Sea (UNCLOS) defines legally binding maritime zones for the international community. Since 1994, these definitions have been applied globally, ensuring that each coastal state possesses the following zones (*Figure 4*) (Somers 2010; UNCLOS 1982):

- Baseline: The boundary between internal waters and the territorial sea;
- Inland waters: This includes all waters and waterways on the landward side of the baseline, encompassing internal waters;
- Internal waters: This specifically covers all waters of seaports, bays, gulfs, and river mouths, bounded seawards by the baseline;
- Territorial Sea (TZ): This extends up to 12 nautical miles (nm) (22.2 km) from the baseline, where a state has sovereign rights and jurisdiction;
- Contiguous Zone (CZ): A strip adjacent to the seaward boundary of the territorial sea (12 nm (22.2 km)) extending to 24 nm (44.4 km), where a state can continue to enforce laws related to customs, taxation, immigration, and pollution;
- Exclusive Economic Zone (EEZ): This zone extends from the end of the territorial sea up to a maximum of 200 nm (370.4 km) from the baseline. In this zone, a coastal state has sovereign rights for the purpose of exploring, exploiting, conserving, and managing both living and non-living natural resources in the waters, on the seabed, and in the subsoil thereof. Additionally, the coastal state must consider the rights and duties of other states within the EEZ, such as the right of passage and the freedom to lay cables and pipelines;

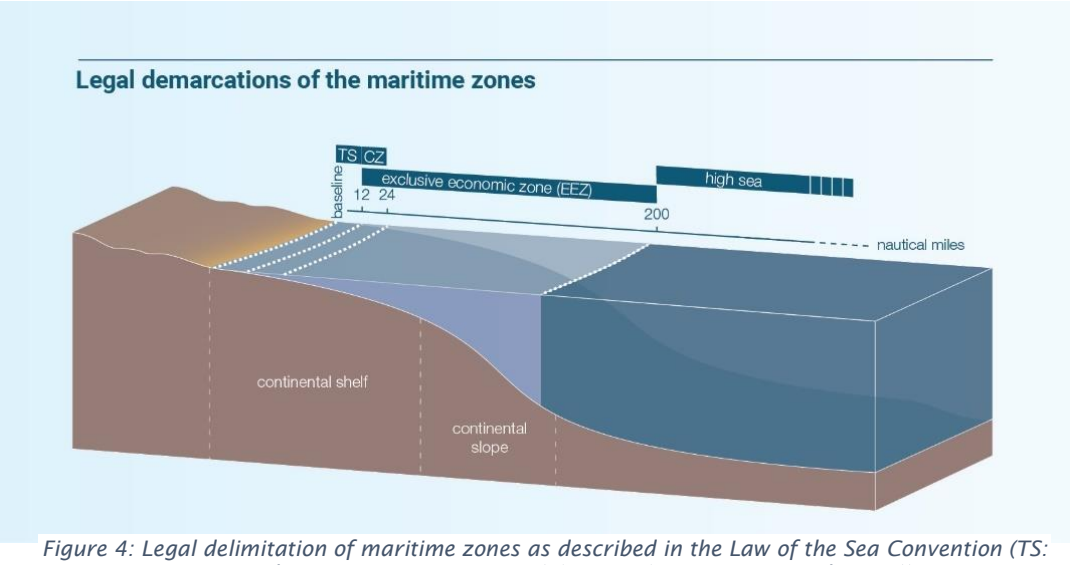

Figure 4: Legal delimitation of maritime zones as described in the Law of the Sea Convention (TS: territorial sea, CS: contiguous zone) (source: (Lescrauwaet et al. 2022))

- Continental Shelf: This consists of the seabed and subsoil of the submarine areas that extend beyond the territorial sea to the outer edge of the continental margin (or at least up to 200 nm (370.4 km)) or up to a maximum of 350 nm (648.2 km) from the baseline, if the conditions set out in UNCLOS Art. 76 are met. In this zone, the coastal state has sovereign rights regarding the exploration and exploitation of natural resources.
- The High Seas: This includes the waters beyond the EEZ or the area beyond the limits of the continental shelf when that shelf extends beyond 200 nautical miles. In this area, all states enjoy freedom of navigation, overflight, laying of submarine cables and pipelines, construction of artificial islands, fishing, and scientific research (Lescrauwaet et al. 2022; UNCLOS 1982).

The United Nations Convention on the Law of the Sea (UNCLOS) provides the legal foundation for the delimitation of marine areas, stating that a state's sea begins from the baseline: **"** *the normal baseline for measuring the breadth of the territorial sea is the* ***low water mark*** *along the coast as marked on large-scale charts officially recognized by the coastal State* " (UNCLOS 1982). The internal waters of a state are defined as "*the waters on the landward side of the baseline of the territorial sea*" (UNCLOS 1982). The following section examines whether various policy instruments deviate from this delineation or not.

2.1.2 Global Treaties

Protocol of the London Convention (1996)

The Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter (London Convention 1972) and its Protocol (1996) regulate the dumping of waste and other materials at sea. The Protocol completely replaces the original treaty and applies to the 'marine area'. This is defined as " *Sea means all marine waters other than the internal waters of States"* (London Protocol 1996). Internal waters are excluded, and **the baseline** (according to the UNCLOS definition) is therefore adopted as the reference point for the delimitation of the sea area. The term 'baseline' or any reference to UNCLOS is not mentioned in the Protocol (London Protocol 1996).

2.1.2 Regional Sea Conventions

OSPAR Convention (1992)

The OSPAR Convention (1992) on the Protection of the Marine Environment of the North-East Atlantic (hereafter OSPAR Convention) defines its scope as the 'maritime area.' This is defined as "the *internal waters and the territorial seas of the Contracting Parties, the sea beyond and adjacent to the territorial sea under the jurisdiction of the coastal state to the extent recognised by international law, and the high seas, including the bed of all those waters and its sub-soil*". Within this context, internal waters are defined as "*the waters on the landward side of the baselines from which the breadth of the territorial sea is measured, extending in the case of watercourses up to the freshwater limit (the point in a watercourse where, at low tide and during periods of low freshwater flow, the salt content noticeably increases due to the presence of seawater).*" (OSPAR Convention 1992). As a result, the scope of the OSPAR Convention extends beyond the baseline and considers **the freshwater limit as the landward boundary of the marine area.**

Other Regional Sea Conventions (1992 - 1996)

The other Regional Sea Conventions use the same definition as the OSPAR Convention to determine the 'maritime area'. The Convention on the Protection of the Marine Environment of the Baltic Sea Area (Helsinki Convention/HELCOM) describes the **freshwater limit** in its agreement (Helsinki Convention 1992[i]), the Convention for the Protection of the Marine Environment and the Coastal Region of the Mediterranean (Barcelona Convention), and the Convention on the Protection of the Black Sea Against Pollution (hereafter Bucharest Convention) describe this extension in their protocols (Protocol for the Protection of the Mediterranean Sea against Pollution from Land-Based Sources, 1980; Amendments to the Protocol for the Protection of the Mediterranean Sea against Pollution from Land-Based Sources, 1996[ii]; "Protocol on the Protection of the Black Sea Marine Environment against Pollution from Land-Based Sources," 1992[iii]).

2.1.3 European legislation

Water Framework Directive (2000)

The Water Framework Directive (WFD, 2000/60/EC) establishes the European policy framework for the protection of all surface and groundwater bodies. The WFD aims to achieve good ecological and chemical status for surface waters by 2027. Surface waters include "*inland waters, except groundwater; transitional waters and coastal waters, except in respect of chemical status for which it shall also include territorial waters*" (2000/60/EC). The scope of the WFD extends as follows:

- To achieve good ecological status, it applies up to and including coastal waters, defined as *"surface water on the landward side of a line, every point of which is at a distance of one nautical mile on the seaward side from the nearest point of the baseline from which the breadth of territorial waters is measured, extending where appropriate up to the outer limit of transitional waters."* (2000/60/EC), and thus must be achieved up to one nautical mile (nm) beyond the baseline.
- To achieve good chemical status, it applies up to and including the territorial sea, which extends up to 12 nautical miles (nm) from the baseline (UNCLOS 1982).

Additionally, the WFD focuses on achieving good quantitative and chemical status of groundwater, which is defined as *"all water which is below the surface of the ground in the saturation zone and in direct contact with the ground or subsoil"* (2000/60/EC). The maritime area is not explicitly defined by the directive. However, it provides a spatial description of the term 'inland waters' according to the UNCLOS definition: *"all standing or flowing water on the surface of the land, and all groundwater on the landward side of the baseline from which the breadth of territorial waters is measured"* (WFD, 2000/60/EC). Implicitly, the WFD also acknowledges the delineation of the 'marine area' by **the baseline**. Despite using the same terminology, the WFD does not contain direct references to UNCLOS.

Marine Strategy Framework Directive (MSFD) (2008)

The Marine Strategy Framework Directive (MSFD, 2008/56/EC) aims to achieve or maintain a good environmental status of the EU's marine waters. The original goal was to achieve this by 2020; however, since the expiration of this deadline, the MSFD continues to operate in six-year cycles. During each of these six-year periods, Member States are required to update their marine strategies. The third cycle will begin in 2024. The scope of the MSFD aligns with its definition of the marine waters: *"waters, the seabed and subsoil on the seaward side of the baseline from which the extent of territorial waters is measured extending to the outmost reach of the area where a Member State has and/or exercises jurisdictional rights, in accordance with the Unclos, …""* (MSFD, 2008/56/EC). Consequently, the MSFD uses the definitions in line with UNCLOS, where the **baseline** forms the landward boundary of the marine area. The MSFD makes a direct reference to UNCLOS and states that this directive must take into account the obligations arising from this agreement for the Community and its Member States.

2.1.4 Federal legislation

Law for the protection of the Marine Environment (2022)

The Act of 11 December 2022 on the protection of the marine environment and the organization of marine spatial planning in the Belgian sea areas (hereafter MMM Law) is a federal law focused on the management and protection of the Belgian North Sea. The MMM Law provides, through an implementing decree (Royal Decree of 23 June 2010), the national implementation of the MSFD and the seaward components of the WFD. The MMM Law applies to all activities that may impact the Belgian sea area[2]. The sea area is defined as follows: "*the territorial sea, the continental shelf, and the exclusive economic zone of Belgium*." This definition considers the **baseline** as the landward boundary, in accordance with UNCLOS. The MMM Law also references the obligations arising from UNCLOS.

[2] *With the exception of military activities that are urgent or indispensable for the protection of public order, public safety, or the defense of the territory.*

2.1.5 Flemish legislation

The Flemish Decree on Integrated Water Policy (2003)

The Decree on Integrated Water Policy is a national implementation of the landward elements of the European Water Framework Directive (WFD) and focuses on the sustainable management of water resources, protection against water pollution, and prevention of flooding. Like the WFD, the decree aims to achieve a good ecological and chemical status of surface water and a good chemical and quantitative status of groundwater. However, the decree only applies to the water systems located in the Flemish Region and, therefore, adapts the WFD's definition of surface water as: "*inland waters, excluding groundwater*." While the WFD's definition of surface water also includes coastal waters and, therefore, extends into the marine area, the Decree on Integrated Water Management does not. The decree only incorporates the landward elements of the WFD relative to the baseline. Like the WFD, the Decree on Integrated Water Management does not define the 'marine area' but provides a description of 'inland waters': "*all permanently or regularly standing or flowing water on the land surface, and all groundwater, on the landward side of the baseline from which the breadth of the territorial sea is measured.*" Consequently, the **baseline** is also used here to separate the marine area from the inland waters.

2.1.7 Overview of differences in scope of the above policy instruments

The international United Nations Convention on the Law of the Sea (UNCLOS) provides the overarching legal framework for the delimitation of the marine area and establishes a clear land-sea boundary through the **baseline**. While most of the policy instruments discussed above follow the baseline for delimiting their scope, we see that the OSPAR Convention and the Water Framework Directive (WFD) do not. The OSPAR Convention, aimed at protecting the marine environment, extends landward beyond the baseline to the **freshwater limit.** The WFD, aimed at protecting inland waters, extends seaward by 1 to 12 nautical miles (nm) beyond the baseline for certain aspects.

In the context of this note, which investigates the clarity of the term 'to the sea,' only the landward boundary of the marine area needs to be considered. Within the WFD, this boundary is also determined by the baseline. It is only the OSPAR Convention that deviates from this. Thus, with UNCLOS, two different boundaries are defined for the landward delimitation of the marine area, i.e., the baseline and the freshwater limit (*Table 1*).

Table 1: Overview of the policy instruments relevant for the Belgian part of the North Sea and the landward boundary (the boundary between sea and inland waters) of their scope.

Policy framework	Landward boundary of the marine Area
Global	
UNCLOS	Baseline
London Convention	Baseline
Regional Seas	
OSPAR Convention	Freshwater limit
European Union	
Water Framework Directive	Baseline
Marine Strategy Framework Directive	Baseline
Federal	
MMM Law	Baseline
Flemish	
Flemish Decree on Integrated Water Policy	Baseline

2.3 The baseline and the freshwater limit for the three study areas

In UNCLOS, the 'normal' baseline is described as "*the line from which the breadth of the territorial sea is measured, this being the low-water line along the coast as marked on large-scale charts officially recognized by the coastal State"* (UNCLOS 1982). For deeply indented coastlines or an archipelago, a 'straight baseline' is used. This straight baseline is drawn between the two outermost points of a river mouth at low water. The same principle applies to bays where the natural entrance at low water is no greater than 24 nm. Islands located beyond twice the breadth of the territorial sea are granted their own territorial sea, but if they lie within this distance, straight baselines can be drawn. If they fall within the territorial sea, their low-water line is used as the normal baseline, which creates a protrusion in the territorial sea (Somers 2010; UNCLOS 1982). Belgium does not have a deeply indented coastline, so the **normal baseline applies along the entire coast**. This corresponds to the low-water line and the extremities of permanent harbour works that extend beyond the low-water line ("Administratieve eenheden" - www.vlaanderen.be).

The Baseline at the Study Areas (*Figure 5*) ("basislijn" - www.geopunt.be):

- **The Scheldt estuary:** Here, the Dutch baseline applies, a straight baseline at the mouth of the Scheldt into the North Sea.
- **The Yser estuary:** The baseline follows the low-water line.
- **The Ostend water system:** The baseline extends just beyond the eastern and western harbour piers.

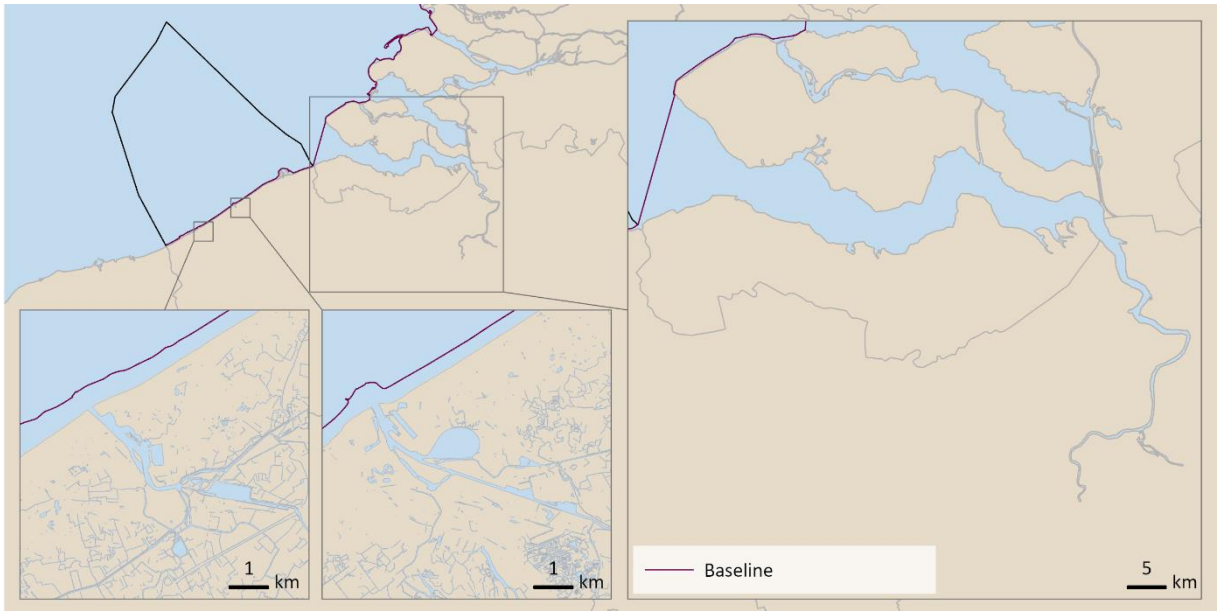

Figure 4: The baseline at the three study areas.

2.3.2 The freshwater limit

The OSPAR Convention indicates the freshwater limit as the boundary of the marine area, defined as *"the point in a watercourse where, at low tide and during periods of low freshwater flow, the salt content noticeably increases due to the presence of seawater"* (OSPAR Convention 1992). This corresponds to the point marked as the last saltwater intrusion in a watercourse. For the Scheldt estuary, maps are available that show salinity gradients (OMES monitoring program (MONEOS)). For the Yser estuary and the watersystem of Ostend, the freshwater limit can be located using the Flemish *stroomgebiedbeheerplannen*. In these plans, different water types are assigned to each water body, with the boundary between the 'fresh' type and the 'brackish' type being considered the formal freshwater limit ("Stroomgebiedbeheerplannen 2022-2027" - Stroomgebiedbeheerplannen 2022-2027" - integraalwaterbeleid.be).

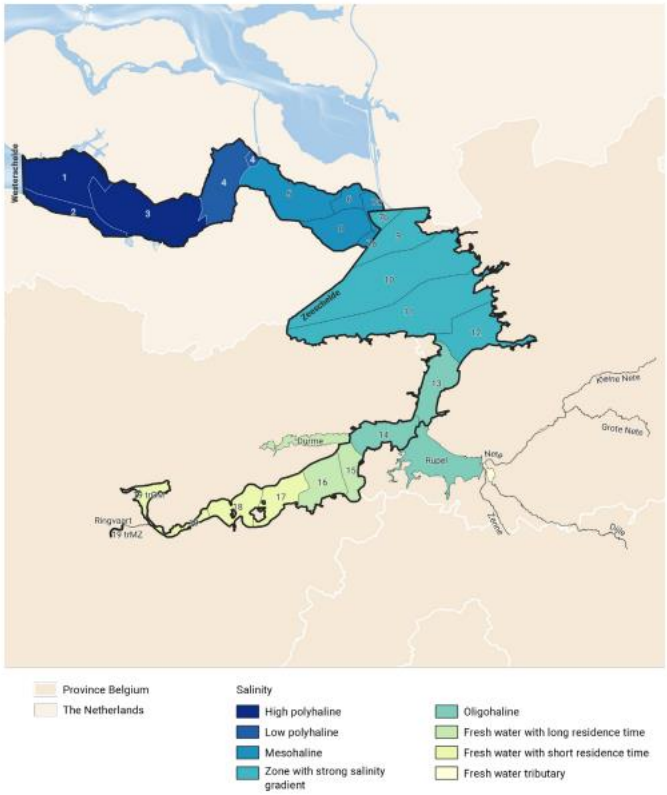

Figure 5: Salinity zones and OMES compartments of the Scheldt estuary (source: compendium coast & sea)

The freshwater limit at the study areas:

- **The Scheldt Estuary:** The boundary between the oligohaline (0.5-5 psu) and the freshwater zone is located at the mouth of the *Rupel* into the Scheldt (*Figure 6 and Figure 7*) (Plancke et al., 2023).

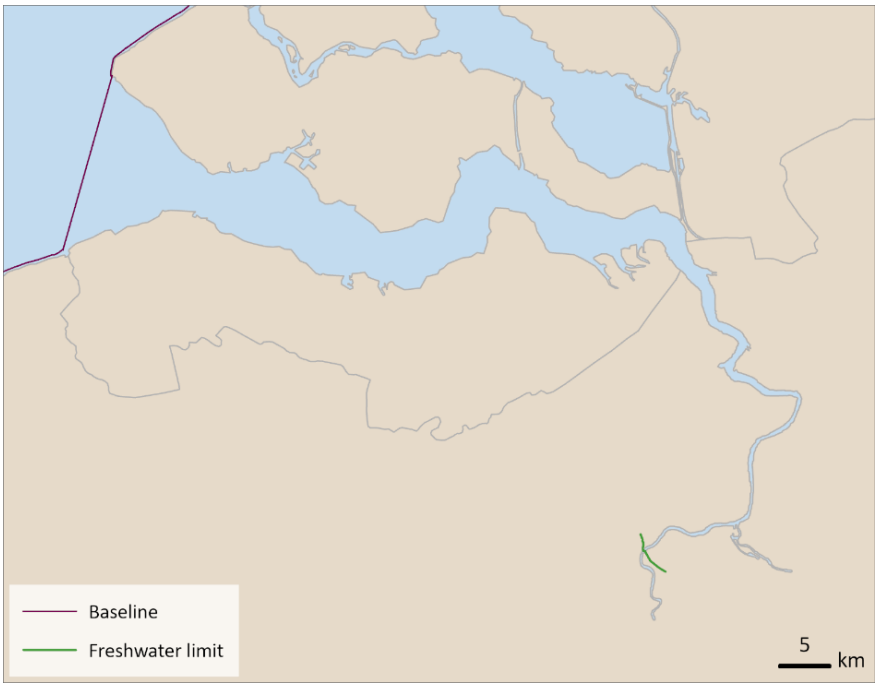

Figure 7: The formal freshwater limit at the Scheldt estuary.

- **The Yser Estuary:** The formal boundary between the 'brackish' water body *'Havengeul Ijzer'* (VL17_15) and the 'fresh' water body *'IJzer III'* (VL17_9) is located at *De Ganzepoot* sluice complex. However, Viaene et al. (2008) investigated saltwater intrusion in the Yser under various sluice management scenarios. Under the baseline scenario, freshwater conditions prevail at the Schoorbakkebrug, while oligohaline conditions are present at the Uniebrug. In scenarios where one or more sluice gates are opened to the maximum (up to 3.40m TAW), the freshwater conditions at the Schoorbakkebrug could shift towards oligohaline conditions (with even mesohaline conditions at the Uniebrug). Under normal management conditions, it can be concluded that the theoretical freshwater limit lies between the *Uniebrug* (7 km inland) and the *Schoorbakkebrug* (11 km inland) (*Figure 8*).

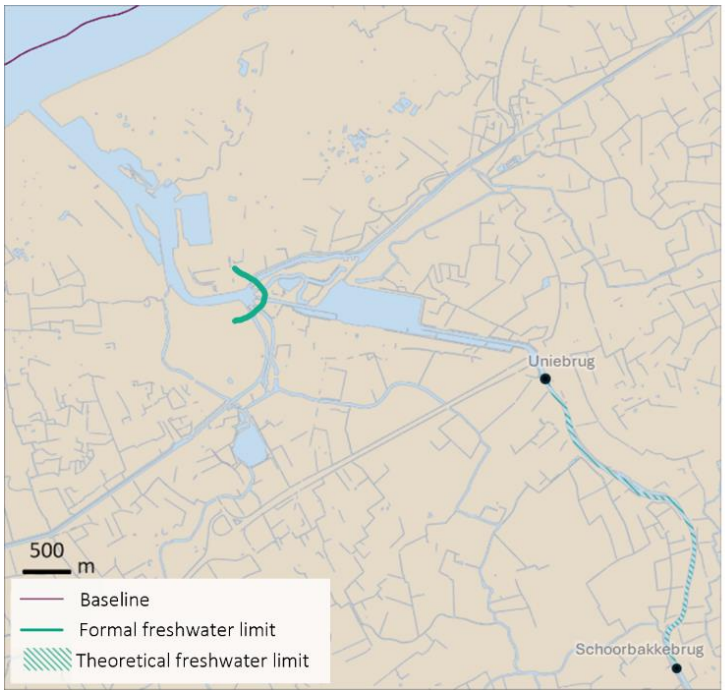

Figure 8: The formal and theoretical freshwater limit at the Yser estuary.

- **The water system of Ostend:** The formal boundary between the 'brackish' water body *'Oostendse Havengeul + dokken'* (VL17_185) and the 'fresh' water body *'Kanaal Gent-Oostende III'* (VL08_164) is located at the *Sas-Slijkens* sluice complex (*Figure 9*).

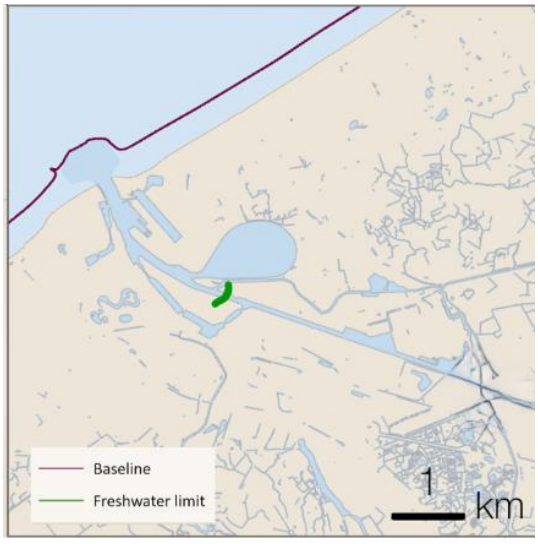

Figure 9: The formal freshwater limit at the water system of Ostend.

The maritime area based on the OSPAR definition is larger than that based on UNCLOS, as areas such as estuaries are considered as maritime areas under OSPAR (*Figure 10*).

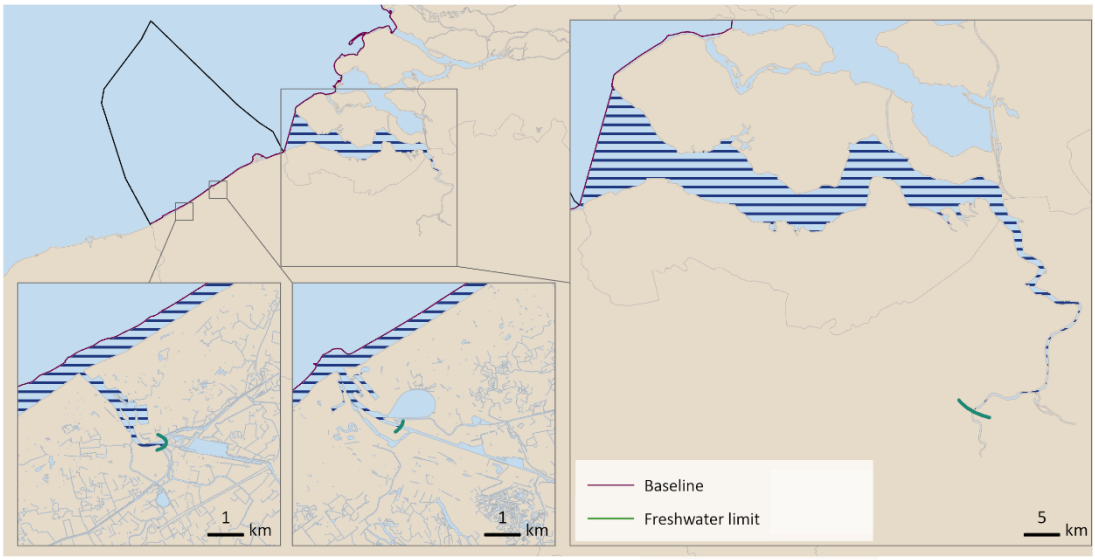

Figure 10: The difference between the baseline and the freshwater boundary at the Scheldt and Yser Estuaries and the water system of Ostend.

3. Authorities in aquatic management

3.1 National division of responsibilities in water management

In the third chapter of this memorandum, the focus is on the national division of reponsibilities regarding water management, specifically in relation to the three study areas: the Scheldt estuary, the Yser estuary, and the water system of Ostend. Emphasis is placed on the boundaries within which these competences apply, particularly at these transition zones between sea and inland waters. In Belgium, the management of marine and inland waters is divided between various regional and federal authorities. The federal government, specifically the FPS Public Health, Food Chain Safety and Environment – Marine Environment division, is responsible for developing policies and managing the coastal and marine waters of the Belgian sea areas. This responsibility extends over the territorial sea and the exclusive economic zone, starting from the baseline (www.health.belgium.be).

Inland from the baseline, water management falls under the responsibility of the Flemish government. However, for certain activities carried out from the coast, such as fisheries, coastal defence, and maintaining access to seaports, the Flemish government's jurisdiction extends seawards beyond the baseline. The Commission for Integrated Water Management (CIW) was established to coordinate water policy in Flanders. This commission consists of representatives from various Flemish government departments and stakeholders involved in water management and plays a central role in advising and promoting an integrated approach to water management. The Flemish Environment Agency (VMM) chairs the CIW ("About CIW" – www.integraalwaterbeleid.be).
The main waterway managers are:

- **The Maritime Access division**, part of the Department of Mobility and Public Works (hereafter MOW), is responsible for managing the accessibility of seaports in Antwerp, Ghent, Ostend, and Zeebrugge. This includes not only the management of the ports and their infrastructure but also ensuring safe shipping channels from the sea ("Maritime Access" – www.vlaanderen.be).
- **The Agency for Maritime Services and Coast** manages the coastal zone and the marinas and fishing ports of Nieuwpoort, Ostend, Blankenberge and Zeebrugge in a sustainable manner. They also provide nautical assistance for safe and smooth maritime traffic (www.agentschapmdk.be).
- **The Vlaamse Waterweg nv** manages the navigable waterways that do not fall under the management of the Maritime Access Division (www.vlaamsewaterweg.be).
- **The Flemish Environment Agency** (hereafter VMM – policy domain environment) manages groundwater and the non-navigable waterways of the first category (www.vmm.be).
- **The provinces and municipalities** manage the non-navigable waterways of the second and third categories.
- **The polders and water boards** take over the management of the latter categories where polders or drainage areas are present (www.vvpw.be).
- **The Agency for Nature and Forest** holds primary responsibility for achieving the Natura 2000 objectives (www.natuurenbos.vlaanderen.be; "The Consultation Process" www.natura20000.vlaanderen.be).

Table 2 provides an overview of these authorities by operational area, with a detailed description of their management activities. For a more comprehensive overview of all parties involved in the water policy, see *Annex 1* ("Management of Navigable Waterways", "Management of Non-Navigable Waterways" - www.vlaanderen.be; River Basin Management Plans for Scheldt and Meuse 2022 - 2027).

Tabel 2: An overview of the managing authorities per area type and their responsibilities.

Operational area	Authority	Management
Belgian part of the North Sea starting at the baseline	FPS Health, Food Chain Safety and Environment – Marine Environment division	- Marine management (including marine spatial planning) - Protection and restoration of Natura 2000 site

Operational area	Authority	Management
The maritime access to the seaports of Antwerpen, Gent, Oostende and Zeebrugge	Department of Mobility and Public Works (MOW) - Maritime Access division	- Maintenance of maritime access to seaports: dredging, wreck removal, channel deepening, and silt processing. - Construction and renovation of port Infrastructure: such as locks. - Subsidizing other port infrastructure e.g. docks and quay walls. - Management of domain properties of the Flemish region within ports: such as bridges and roads. - Sea defenses (protection against sea flooding)
Marinas and fisher ports; Beach and dunes	Agency for Maritime Services and Coast (MDK) – Coastal division	- 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.
Port area	Porth authority	- Infrastructure management - Transport logistics - Safety and security - Promoting environmental protection and sustainability
	Marinas	- Infrastructure management - Transport logistics - Safety and security - Waste management
Other navigable waterways – *detailed in the Decree of the Flemish Government of January 12, 2018, regarding the description of the territorial jurisdiction of Vlaamse Waterweg nv*	Vlaamse Waterweg nv	-Integral maintenance and management of these waterways, including the verge vegetation - Construction and maintenance of bridges and locks
Non-navigable waterways Category 1	Flemish Environment Agency (VMM)	Maintenance of the watercourse, including the bed of the watercourse.
Non-navigable waterways Category 2	Provinces (or polder or watering board)	
Non-navigable waterways Category 3	Municipality (or polder or watering board)	
Roadside ditches along municipality roads (non-classified waterways)	Municipality	Maintenance of the watercourse, including the bed of the watercourse.
Roadside ditches along regional roads and highways (non-classified waterways)	Agency for Mobility and Transport	

Operational area	Authority	Management
Other unclassified watercourses	Owner of adjacent plot	
Natura 2000 in Flanders, including waterways	Agency for Nature and Forests (ANB)	- Management and protection of nature reserves and forests in Flanders - Monitoring and guidance of the Flemish Natura 2000 program (development of management plans, implementation on own grounds) - Seeks private and public partners for the implementation of the plans (INBO evaluates)

3.2 Authorities for the study areas

The estuaries and coastal zone represent a transition area where federal and Flemish management overlap, and within Flanders itself, various policy domains are involved. By focusing on the Scheldt and Yser estuaries and the water system of Ostend, we can gain a clear understanding of how the different authorities interact, allowing us to identify any potential overlaps or gaps in management.

3.2.1 The Scheldt estuary

For the broader, cross-border management of the Scheldt, the Flemish-Dutch Scheldt Commission (VNSC) and the International Scheldt Commission (ISC) have been established. Through the VNSC, Belgium and the Netherlands collaborate on various aspects of water management, navigation, and nature conservation in the Scheldt estuary. The ISC, which includes members from Belgium, France, and the Netherlands, coordinates initiatives to improve water quality and manage flood risks in line with the Water Framework Directive (www.vnsc.eu; www.isc-cie.org). Additionally, the Coordination Commission for Integrated Water Management (CIW) plays a crucial role in aligning and implementing water policies in Flanders, contributing to the joint efforts of ISC and VNSC (www.integraalwaterbeleid.be).

The water management of the Sea Scheldt is a Flemish responsibility (*Figure 11*):

- The port area and access routes are managed by the Maritime Access division – MOW, in collaboration with the Port of Antwerp-Bruges, from the Dutch border to the confluence of the Rupel with the Scheldt.
- The marinas within this area are co-managed by various Antwerp yacht clubs.
- Other navigable waterways that flow into this area and the upstream section at the confluence with the *Rupel* are managed by the *Vlaamse Waterweg nv*. This includes, among others, the Upper Sea Scheldt, *Rupel, Durme, Zenne, Nete, Dijle,* and *Dender* rivers.
- The non-navigable waterways that flow into the navigable ones are managed by the Flemish Environment Agency (VMM) for the first category, the province of Antwerp and the province of East Flanders for the second category, and the municipalities for the third category. Many municipalities have transferred their authority to the provinces ("*Werkingsgebieden*" - www.vlaamsewaterweg.be; "*Beheer van de onbevaarbare waterlopen*" - www.vlaanderen.be; "*Benedenscheldebekken*" – sgbp.integraalwaterbeleid.be)
- Various polders and water boards are active in the Scheldt estuary region, including the *Polder Ettenhoven* and *Muisbroek, Polder van het Land van Waas, Polder van Tielrode, Polder Scheldeschorren-Noord, Polder Schelde Durme Oost*, and *Polder Vlassenbroek* (www.vvpw.be).
- The Special Protection Area (SPA) "Scheldt and Durme Estuary" from the Dutch border to Ghent, SPA "Lower Scheldt" and the management of Scheldt Valley National Park fall under the responsibility of the Agency for Nature and Forest (ANB). ANB is the primary authority responsible for achieving Natura 2000 objectives and collaborates here with the *Vlaamse Waterweg nv*, the Province of Antwerp and East Flanders, local municipalities and cities, other regional authorities (e.g., Port of Antwerp and Left Bank Development Corporation), *Natuurpunt*, and other recognized land management organizations (e.g., *vzw Durme*) ("*Natuur gebieden*" – www.antwerpennoord.be).

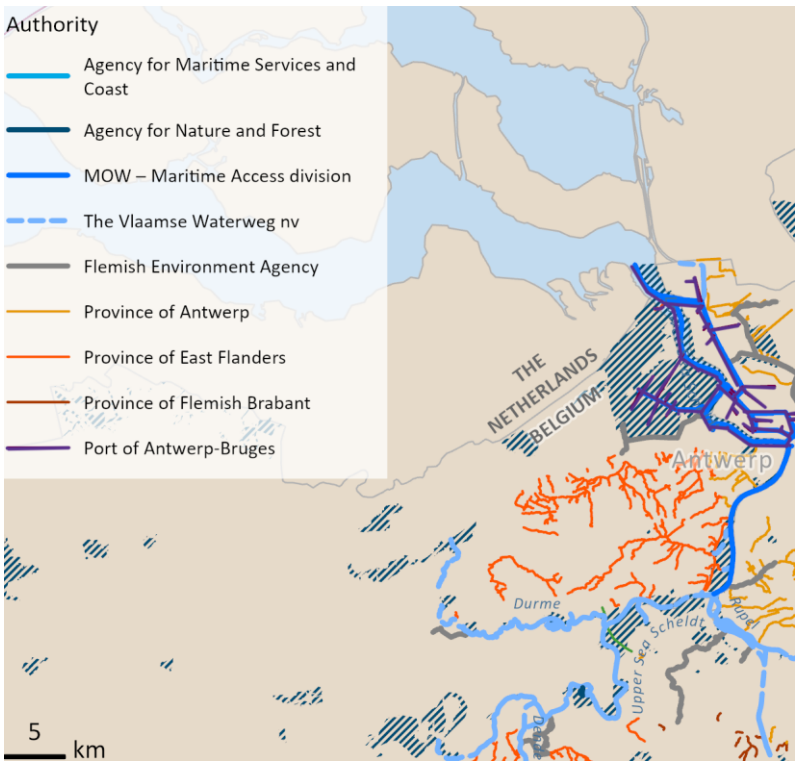

Figure 11: An overview of the most important authorities for the Scheldt estuary.

3.2.2 The Yser estuary

Seaward of the baseline, the Marine Environment division (FPS Public Health, Food Chain Safety, and Environment) is responsible for water management, including achieving the Natura 2000 objectives for the "Flemish Banks" area. The water management of the Yser estuary is a Flemish responsibility (*Figure 12*):

- The mouth of the Yser, specifically from where the river flows into the sea up to the sluice complex, including the marinas, is managed by the Maritime Services and Coast Agency (MDK).
- The marinas within this area are co-managed by local yacht clubs.
- The other navigable waterways include the further course of the Yser and the Plassendale-Dunkirk Canal. Upstream of the sluice complex, these fall under the management of the *Vlaamse Waterweg nv*, West Region division.
- The non-navigable waterways:
    - The *Grote Beverdijkvaart*, a non-navigable waterway of the first category, is managed by VMM-Ostend.
    - The *Ieperleed* and *Vladslovaart*, both classified as non-navigable waterways of the second category, are managed by the province of West Flanders and the *Vlaamse Waterweg nv*, respectively.
    - The non-navigable waterways (second category) 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).
- There are no active polders or water boards at the Yser estuary (www.vvpw.be).
- The Flemish Nature Reserve Yser Estuary, part of the Special Protection Area (SPA) "Dune Areas including Yser Estuary and Zwin," is managed by the Agency for Nature and Forest (ANB). ANB collaborates with the MDK and Defence (Lombardsijde Camp) for this purpose ("Natuurbeheerplan IJzermonding En Kamp Lombardsijde" 2023). *Vlaamse Waterweg nv* also contributes by contracting an external company to clean up floating litter in and along the navigable waterways (www.seru.be). Additionally, the city of Nieuwpoort collaborates with the Flemish initiative *Mooimakers* to provide materials for voluntary cleanup actions on and along the water ("Milieu" – www.nieuwpoort.be).

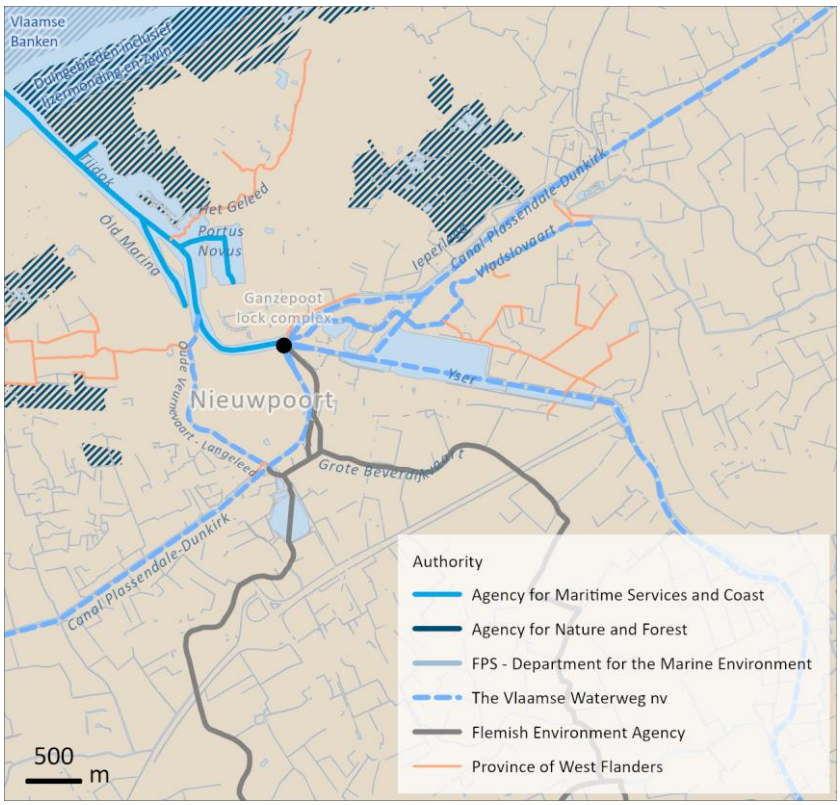

Figure 12: An overview of the most important authorities for the Yser estuary.

3.2.3 The water system of Ostend

The Marine Environment division (FPS Public Health, Food Chain Safety, and Environment) manages the waters seaward of the baseline, including the Special Protection Area (SPA) at sea, which encompasses the mouth of the Ghent-Ostend Canal in the North Sea ("Bird Directive Areas in the Belgian Part of the North Sea" – www.health.belgium.be). The water management of the Ostend water system is a Flemish responsibility (*Figure 13*):

- The mouth of the Ghent-Ostend Canal is managed by the Maritime Access division up to the confluence with the Plassendale-Dunkirk Canal. The Maritime Access division works closely with Port of Ostend at the port complex, including the harbour docks and the branch near *Vlotdok* and *Houtdok.*
- The marinas and fishing port of Ostend, including the waterways branching within the water system in that direction, are managed by MDK. The marinas are co-managed with yacht clubs, while the fishing port is managed in collaboration with Port of Ostend.
- The other navigable waterways are located upstream of the Plassendale-Dunkirk Canal and are managed by the *Vlaamse Waterweg nv* (West Region division) ("Werkingsgebieden" - www.vlaamsewaterweg.be; "Port Areas in Ostend" - www.portofoostende.be).
- The non-navigable waterway *Camerlinckxgeleed* (category 1), which flows into the Ostend water system, is managed by VMM-Ostend.
- There are no active polder boards or drainage authorities within the Ostend water system (www.vvpw.be).
- The dune areas on the *Oosteroever*, which are part of the Special Protection Area (SPA) "*Duingebieden inclusief IJzermonding en Zwin*" fall under the management of the Agency for Nature and Forest (ANB). *Natuurpunt Middenkust* is also involved in this management (www.natura2000.vlaanderen.be; "Natuurpunt Middenkust" – www.natuurpunt.be).

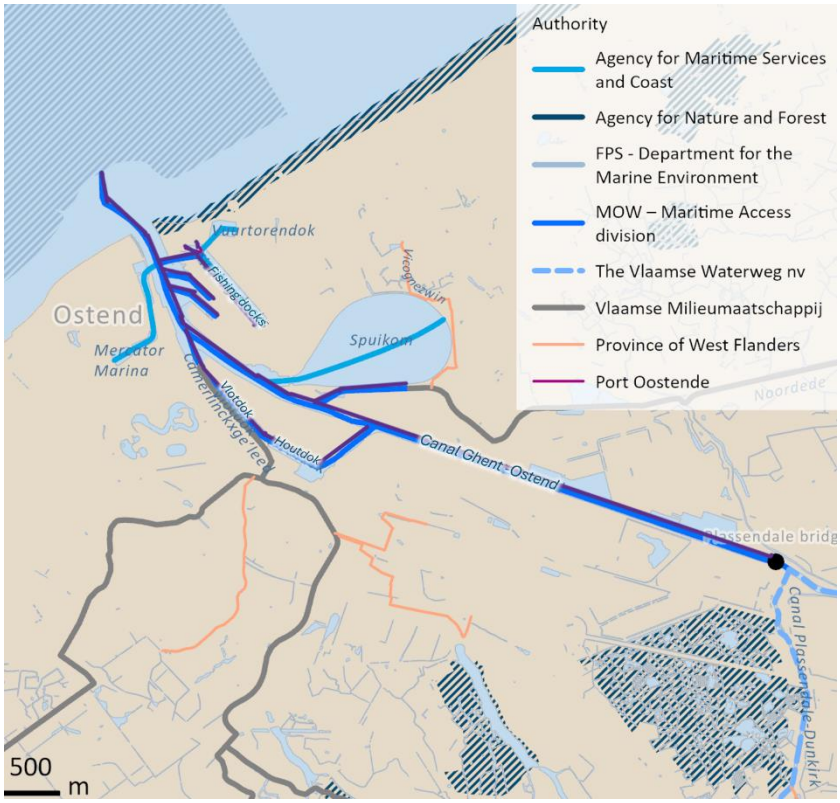

Figure 13: An overview of the most important authorities for the water system of Ostend.

3.2.4 Overview of the differences between the study areas

The administrative transition from federal to Flemish jurisdiction takes place at the baseline, as defined in the international UN Convention on the Law of the Sea (UNCLOS). This is with the exception of certain activities carried out from the coast, such as fishing, coastal defence, and maintaining access to seaports. These activities fall under Flemish jurisdiction and extend seaward beyond the baseline. The local, operational management of the study areas falls under Flemish jurisdiction. Multiple actors are involved in these systems, with the composition varying per study area. The Yser estuary differs the most compared to the other two study areas due to the absence of a port authority. Consequently, the tasks are carried out by MDK and the marinas instead of by the Maritime Access division (MOW) and a port authority. In Ostend, MDK also manages the coastal zone and the marinas. Upstream of the study areas, the jurisdiction is entirely transferred to the *Vlaamse Waterweg nv,* and from this point, the responsibilities are determined by the type of waterway. The freshwater limit is not considered for determining jurisdiction. In the case of the Scheldt and Yser estuaries, this coincidentally aligns with the transfer of authority from the Maritime Access Division (MOW) to the *Vlaamse Waterweg nv*, but this is not the case for the water system of Ostend.

4. Highlights

Below are the key insights from this note summarized as highlights:

- The international UN Convention on the Law of the Sea (UNCLOS) provides a legal framework for the management and distribution of maritime rights and responsibilities among countries. Globally, UNCLOS establishes legally binding maritime boundaries, including the boundary between the sea and inland waters, which is determined by the baseline.
- The OSPAR Convention and the Water Framework Directive (WFD) have a scope that extends beyond the baseline. This means that the boundary of the OSPAR Convention, which focuses on the protection of the sea, lies further inland than the baseline. Conversely, the WFD, which focuses on the protection of inland waters, extends seaward beyond the baseline. In this way, both policy instruments better capture the land-sea processes.
- 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 (cf. UNCLOS). The OSPAR Convention starts from a broader marine area, also including the estuary.
- The freshwater limit, and thus the inland delineation of the scope of the OSPAR Convention, is often not clearly defined. For the Yser estuary and the water system of Ostend, this boundary was determined through the classification in the Flemish s*troomgebiedbeherplannen*, specifically at the *Ganzepoot* and the *Sas-Slijkens* lock complex.
- The management transition from federal to Flemish jurisdiction occurs at the baseline (cf. UNCLOS). Certain activities, such as fishing, coastal defence, and port access, are exceptions to this rule.
- The freshwater limit does not affect the spatial implementation of the jurisdictions.

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Annexes

Annex 1: Distribution of authorities for water policy in Belgium

Table 2: An overview of the competent federal and regional instances and their responsibilities.

Instance	Authority
Federal level	
FPS Public Health, Food Chain Safety and Environment – Department for the Marine Environment	- Sustainable management of the Belgian part of the North Sea - Permits for activities at sea
FSP Mobility and Transport	- Shipping at sea
Ministry of Defence	- Marine component of defence
FPS Economy, SMEs, Self-employed and Energy	- Offshore sand minning - Offshore energy
Flemish level	
Agency for Maritime Services and Coast	- Responsible safe and smooth traffic to and from Flemish ports - Protection of the Flemish coast against flooding - Coastal division: economic, ecological and recreational development of the coastal zone (beach, coastal dunes, coastal marinas/fishing ports)
Department of Mobility and Public Work (MOW) – Maritime Access division	- Management and maintenance of all waterways to the Flemish seaports (Antwerp, Ghent, Ostend, and Zeebrugge) - Scientific research, technical support, and advisory services (regarding shipping and infrastructure) for these waterways
Flemish Environment Agency (VMM)	- Chairmanship of CIW - Management of groundwater - Management of non-navigable waterways category 1 (including lood prevention measures) - Imposition of water pollution charges - Measures and monitors the quantity and quality of surface water, groundwater, and waterbeds, and reports on the results
Vlaamse Waterweg nv	- Management of navigable waterways and water-related lands in Flanders (including flood prevention measures)
Departement of Environment	- Support and guidance for municipalities in erosion control - Class 1 permits
Agency for Nature and Forest (ANB)	- Management of public nature areas (including water) - Management of public inland fishery

Vlaamse Landmaatschappij (VLM)	- Manure policy
Public Waste Agency of Flanders (OVAM)	- Responsible for waste management and soil remediation - Awareness campaigns
Agency of Agriculture and Fisheries	- Agriculture policy - Sea fishing
Provinces	- Management of non-navigable waterways category 2 (outside the jurisdiction of polders and water boards) - Advisory services for class 1 permits - Class 2 permits
Province of West Flanders	- Spatial planning of beaches and dikes - Integrated coastal management
Cities/municipalities	- Management of non-navigable waterways category 3 (outside the jurisdiction of polders and water boards) - Roadside ditches along municipal roads - Local waste management/sewer management - Local advisory services and permit issuance
Coastal municipalities	- Structuring the beaches within the framework provided by the province - Touristic beach use (concession passed on from MDK)
Polder or watering (if applicable)	- Management of non-navigable waterways category 2 & 3
Aquafin nv	- Management of above-ground wastewater infrastructure (collectors, pumping stations, and wastewater treatment plants) - Upon request of municipalities: Sewer management
Drinking water companies	- Sanitation of drinking water
Port company	- Harbour management
Yacht club	- Marina management

Annex 2: Other delimitation definitions

[i]*HELCOM: "Baltic Sea Area" shall be the Baltic Sea and the entrance to the Baltic Sea bounded by the parallel of the Skaw in the Skagerrak at 57° 44.43'N. It includes the internal waters, i.e., for the purpose of this Convention waters on the landward side of the base lines from which the breadth of the territorial sea is measured up to the landward limit according to the designation by the Contracting Parties." ("Helsinki Convention" 1992)*

[ii]*Barcelona Convention: Amendments to the Protocol for the Protection of the Mediterranean Sea against Pollution from Land-Based Sources: Protocol Area: d) brackish waters, coastal salt waters including marshes and coastal lagoons, and ground waters communicating with the Mediterrenean Sea." (Amendments to the Protocol for the Protection of the Mediterranean Sea against Pollution from Land-Based Sources", 1996)*

[iii]*Bucharest Convention: "This Protocol shall apply to the Black Sea as defined in Article I of the Convention and to the waters landward of the baselines from which the breadth of the territorial sea is measured and in the case of fresh- water courses, up to the fresh-water limit." ("Protocol on protection of the Black Sea marine environment against pollution from land based sources", 1992)*