https://doi.org/10.62836/jee.v1i1.0002

Global Science Publishing

JEE

Journal of Environment and Ecosystems

https://ojs.sgsci.org/journals/jee

Article

The 'CôTe Des Havres', Cotentin Peninsula (France): Controversy over the Future of a Much-Appreciated Coastal Area Faced with Climatic Hazards

Jean-Claude Dauvin

Université de Caen Normandie, Laboratoire Morphodynamique Continentale et Côtière, CNRS, UMR 6143 M2C, 24 Rue des Tilleuls, 14000 Caen, France

Abstract: The coast of '*Les Havres*' (Cotentin), bordering the western basin of the English Channel, extends from Cap de Carteret in the north to Cap de Granville in the south and includes eight *havres*, unique morphological features along the French coasts with a high common natural heritage interest. The human footprint is ancient and rich in local activities. Today, the development of shellfish farming, tourism and land use requirements has profoundly transformed the territory. While the coast of '*Les Havres*' forms a unique geographical and morphological entity, its historical and economic development concerns the whole of a territory that has a shared common interest vulnerable to coastal erosion and the risk of submersion. Due to administrative divisions, coastal protection projects against the risks of submersion and erosion are carried out in a very sectoral manner without an overall vision. The area suffers from structural fragmentation at all levels (geographical, morphological, sedimentological, demographic, economic and political), without leadership capable of mobilizing a proactive and innovative development of the territory. Above all, the issues at stake are represented in a highly diverse manner. This study aims to show that the coast of '*Les Havres*' has a territorial cohesion linked to its past and that it should share an integrated vision of its future that goes beyond the barriers of current administrative and local development divisions. Such problems are exacerbated by associations making demands against the State. This situation is not unique at the scale of the English Channel; a coastal sea shared between the United Kingdom and France. A Satoumi management approach would be well adapted to the coast of '*Les Havres*'; such an initiative seems essential today.

Keywords: estuary; governance; coastal management; fragmentation; English Channel

1. Introduction

The '*Côte des Havres*' is situated in France along the western coast of the Cotentin Peninsula (western basin of the English Channel, EC) extending from Cap de Carteret in the north to Cap de Granville in the south. It includes eight '*havres*', corresponding to estuaries or inlets, which represent unique morphological features along the French coast. This coastline forms a particular geographical and morphological unit about 60 km in length from south to north, with a shared historical and economic development concerning the whole territory [1].

Despite many scientific observations of the evolution of this coast, these have not been translated into concerted adaptation measures [2]. This is detrimental to the sharing of a common future, as vested interests and

Received: 16 January 2026; Accepted: 24 February 2026.

Corresponding: Jean-Claude Dauvin (jean-claude.dauvin@unicaen.fr)

the denial that coastal erosion is both irreversible and inevitable, are obstacles to an integrated approach. Climate trends show that the threats of erosion and submersion are inevitable and would require adaptation and reorganization of the coastal territory [1,3,4].

This study aims to show that the Havres coast shows a territorial cohesion linked to its past, and that an integrated vision of its future should go beyond the barriers of current administrative and local planning divisions. Such problems are exacerbated by associations claiming that the State lacks integrated perception, authority and financial means faced with the risks associated with the rise in sea level in resonance with climate change. Moreover, this complex situation and the difficulty of finding an innovative governance seems to be the general state of affairs at the scale of the English Channel (EC) in spite of numerous analyses and proposals mainly developed in the framework of the French-UK Interreg programmes.

2. A Unique Geographical and Morphological System

The '*Côte des Havres*' is characterised by a low coast with sandy beaches bordered by small dune barriers interrupted by eight estuaries or inlets, extending from La Vanlée in the south to Barneville-Carteret in the north (Figure 1; Table 1). Small coastal rivers, often with low flows, maintain a passage through the dune barrier. The smallest of these estuaries covers less than a square kilometre (Barneville-Carteret), while the largest corresponds to the Havre de Regnéville, which is formed by the mouths of the Sienne and the Soulles rivers [5] (Figure 2). Sedimentary transit leads to the formation of sandbanks which partially close the entrance to the harbours, whose openings fluctuate greatly over time [6–8]. Sandbanks, mudflats and salt marshes are developed inside these estuaries, which are only invaded by the sea during spring tides [9]. They therefore undergo regular successions of filling and emptying with the tides, favouring a temporary occupation of the salt marshes by sheep during neap tides. The silting up of harbours is inevitable in the long term, which will modify the surfaces of the sandy areas where sediments accumulate from the foreshore [1].

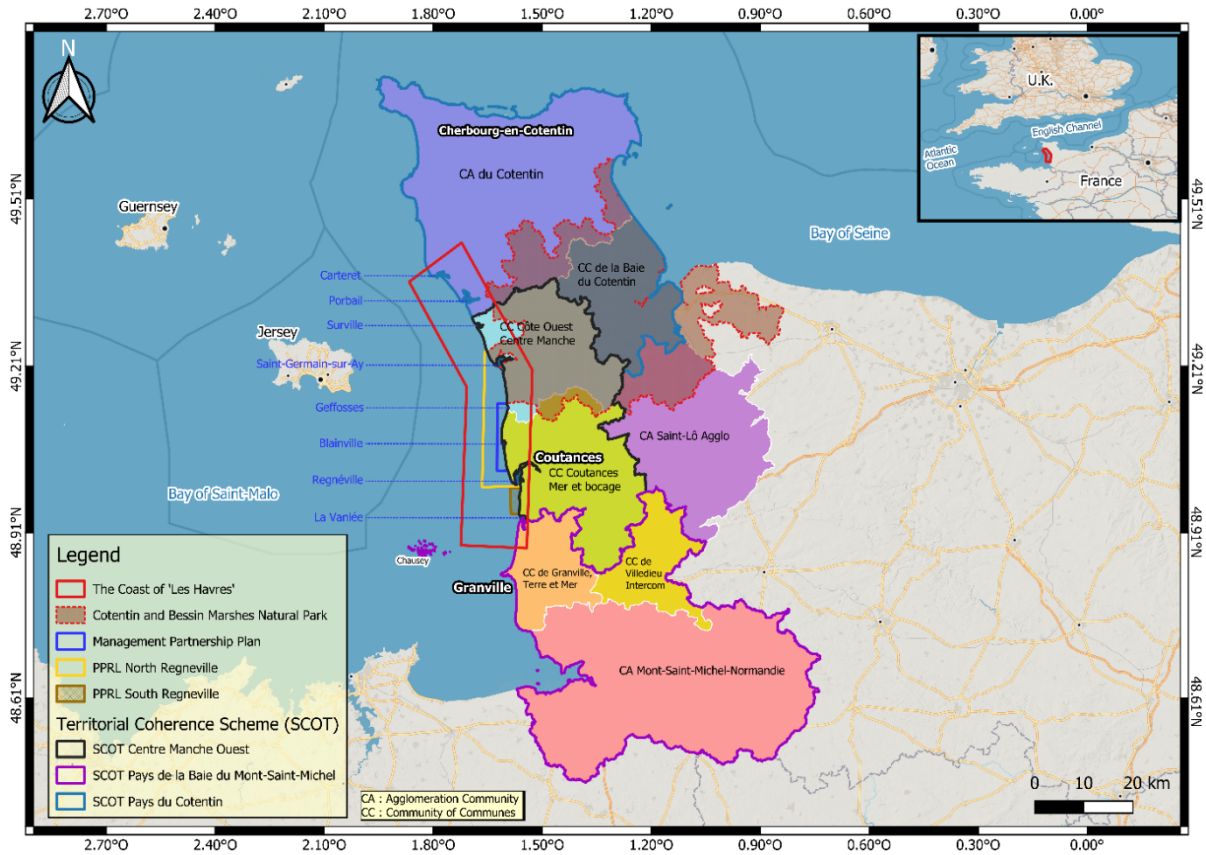

Figure 1. Map of the Manche Department and locations of the eight estuaries on the 'Côte des Havres', with the identification of the various administrative and territorial boundaries.

Human occupation of the '*Côte des Havres*' is very ancient and dates back to the Neanderthals. Neolithic remains are also found near the Portbail inlet which illustrate the persistent prehistoric settlement by humans [5]. The first land reclamations date back to the Middle Ages with developments to prevent the sea from invading low-lying fields during spring tides. Like on many other coastlines, these works were carried out under the impetus of monks living in abbeys such as Lessay.

Table 1. Main features of the eight estuaries/inlets on the Côte des Havres, western Cotentin, Normandy (western English Channel).

Estuaries/ Inlets of '*Côte des Havres*'	**Surface in km²**	**Rivers**	**Present Human Activities**	**Natural Heritage**	**Past Activities**	**Human Installations**
La Vanlée	4; 2.8 of salt-marsh	Vanlée, Belle-Croix, Pont de Bois, Hardes	Sheep grazing Gabion, net fishing	Natural Heritage (1988) Type 1 and 2 ZNIEFF since 1988 Natura 2000 'West Coast of the Cotentin from Bréhal to Pirou' (2004) Special Area of Conservation (SAC) (2014)	Tangue extraction Salt production Sheep grazing	Submersible tidal causeway (1972) Silting up
Regnéville	9.15; 5.7 of salt-marsh	Sienne, Soulles, Vaux, Passevin	Sheep grazing Harvesting of samphire Boat harbour	Site listed for general interest (1973) Ranked National Level (1989) Natura 2000 'West Coast of the Cotentin from Bréhal to Pirou' (2004) Site of Community Importance (SCI) (1989) Special Area of Conservation (SAC) (2014)	Anchorage area Tangue extraction Sheep grazing	
Blainville	1.7; 0.8 of salt-marsh	Rivière du Moulin de Gouville, ruet du Goulet, ruet Ganne	Shellfish farms	Type 1 and 2 ZNIEFF Natura 2000 'West Coast of the Cotentin from Bréhal to Pirou' (2004) Special Area of Conservation (SAC) (2014)	Anchorage area Tangue extraction Sand extraction Sheep grazing	Successive reclamation, up to 1962 Extension of shellfish farming facilities, disappearance of the dune barrier over 500 m during the storm of 10 March 2008
Geffosses	1.5; 1.4 of salt-marsh	Douit, Landelles Bretteville, Canal Pont à la Reine	Ornithological observatory Educational trail Sheep and donkey pasture	Type 1 and 2 ZNIEFF Natura 2000 'West Coast of the Cotentin from Bréhal to Pirou' (2004) Hunting Reserve of the Public Maritime Domain (1976)	Anchorage area Tangue extraction Sand extraction Sheep grazing	Construction of a tourist road in 1970, cutting off and then re-establishing the marine character of the inlet; Digging of ponds

Table 1. Cont.

Estuaries/ Inlets of '*Côte des Havres*'	Surface in km²	Rivers	Present Human Activities	Natural Heritage	Past Activities	Human Installations
Saint-Germain-sur-Ay	7.2; 3.2 of salt-marsh	Ay, Brosse, Ouve	Sheep grazing	Ranked National Level (1990) Type 1 and 2 ZNIEFF Natura 2000 '*Estuary of Saint-Germain-sur-Ay- Lessay countries*' Site of Community Interest (SCI) Special Area of Conservation (SAC, 2014)	Anchorage area (construction of guardhouses), Extraction of tangue Salt production Harvesting of samphire, Geese and sheep grazing	Reclamation (1960) of 100 ha
Surville	0.85	Dure		Type 1 and 2 ZNIEFF Natura 2000 'Western Littoral of Cotentin from Saint-German-sur-Ay to Rozel' Special Area of Conservation (SAC, 2014)	Anchorage area Tangue extraction Sheep grazing	
Portbail	3.3; 1.9 of salt-marsh	Pont aux œufs, Gennetot, Lanquetot	Marina with 300 berths Harvesting of samphire Sheep grazing	ZNIEFF type 1 and 2 Natura 2000 'Western Littoral of Cotentin from Saint-German-sur-Ay to Rozel', Site of Community Interest (SCI), Special Area of Conservation (SAC, 2014)	Archaeological site Neanderthal flint flakes (−40,000 years ago) Anchorage area Fisheries Salt production Oyster storage	Construction of a tourist road in 1970, cutting off and then re-establishing the marine character of the inlet; Digging of ponds
Barneville-Carteret	0,9; 0.5 of salt-marsh	Gerfleur, Fleuve	Marina with 700 berths Nautical activities	Type 1 and 2 ZNIEFF	Anchorage area Tangue extraction, Salt production	Numerous dykes and construction of the harbour (1850), reclamation, the most anthropized estuary of the '*Côte des Havres*'

Fish-traps on the intertidal zone and other techniques dating back more than 4000 years have been used to catch fish by trapping them during the ebb tide. These fisheries are V-shaped, being made of wood or stone; the wooden fish-traps of Agon-Coutainville and Hauteville-sur-Mer are listed in the Inventory of Intangible Cultural Heritage in France [10].

Over the years, villages with hill-top churches were built on rocky promontories between 20 and 50 m above sea level several kilometres from the shore. The earliest constructions date back to the Middle Ages. The church and village of Portbail are an exception to the rule since they were built on the banks of the Portbail inlet near a bridge with thirteen arches and the early Christian baptistery. This building is the oldest in the region and dates from the Romanesque period [5].

(1)

(2)

(3)

(4)

(5)

(6)

(7)

(8)

Figure 2. Representative photos of the 'Côte des Havres'. (**1**) General view of the 'Côte des Havres; (**2**) view of the Regnéville estuary; (**3**) view of the Blainville-sur-Mer estuary and the CABANOR oyster farming area; (**4**) dune barrier and sandy spit in Saint-Germain-sur-Ay estuary; (**5**) Dyke and urbanization at Agon-Coutainville; (**6**) row of protective piles at Blainville-sur-Mer; (**7**) Row of mussel stakes at the Pointe d'Agon; (**8**) Oyster tables in Blainville-sur-Mer. Photo credits: Philippe Fauvel except 5, Teddy Bear photos.

Historically, harbours are characterized by common human activities: beaching ports, extraction of sandy shelly mud (*tangue*), salt production (including several localities named after salt works), and sheep farming

(Table 1). However, until the 1960s, the coastal communes remained strongly anchored to the agricultural activities of the Normandy bocage linked to dairy farming and market gardening. These activities took place on sandy land reclaimed from the sea owing to the construction of walls, dykes and floodgates to prevent flooding during high spring tides.

However, due to the need for soil improvement, kelp was harvested on rocky foreshores or on the tide line to provide the necessary nutrients for crops. Additional resources for farmers and coastal populations also came from the sea: harvesting eelgrass (before the "wasting disease" of the 1920s and 1930s) and seaweed *Chondrus crispus* (used for alginates), as well as fishing for molluscs such as the warty Venus clam, Manila clam and abalone, and also crustaceans such as lobsters, crabs and shrimp; fishes such as conger eel, sole and sea bream caught during spring tides.

3. A Remarkable Biodiversity

The biological richness of the harbours was soon recognized for the diversity of bird species as well as the exceptional halophilic flora [5]. Livory and Coulomb have drawn up a list of 241 species of birds observed from 1979 to 2023 in the Regnéville estuary [11]. This site is known for being a home for barnacle geesse migrating from Canada during the winter. Due to his long experience of observations, Alain Livory has been able to show that populations of 26 species are increasing while 23 others are declining.

Regnéville estuary is also a privileged site, being one of the richest in Normandy for its biodiversity. Including more than 3,700 species of fauna and flora identified by [12–14]. For several years now, a colony of seals has come to shelter at low tide in this estuary, representing an area of great heritage interest. The Sienne River, which flows into the Regnéville estuary, hosts a population of Atlantic salmon, sea trout and eels that were very abundant up until the 1970s. These migratory fish are also found in other rivers joining the Regnéville estuary as well as in other estuaries and rivers on the West Cotentin coast.

A study was carried out on the benthic macrofauna of the Blainville and Regnéville estuaries in the spring of 2010 coupled with estimates of the areas covered by the three main habitats (schorre), sandbanks and channels and mudflats (slikke). This has led to an estimate of the biological production of these two estuaries, which can then be used as an indicator of trophic capacities and the importance of the schorre in these ecosystems [9]. The abundances and biomasses per m^2 of the three habitats are similar to those found elsewhere in other large estuaries bordering the north-east Atlantic, and the macrofauna serve as trophic resources for fish at high spring tide and for birds at low tide and neap tide, thus explaining the high activity of birds on these sites.

Apart from Barneville-Carteret, all the estuaries and coastal dunes of the Côte des Havres, including two areas of the rocky intertidal zone, are recognized as Natural Areas of Fauna and Floristic Interest (ZNIEFF in French) (www.normandie.developpement-durable.gouv.fr, accessed on 14 January 2026. These ZNIEFFs also form part of the Natura 2000 Network (Table 1). The Chausey Islands archipelago, off the coast of Granville and the '*Côte des Havres*', is a site that combines many protection measures because of its remarkably rich natural heritage. This marine area hosts the largest European population of Bottlenose dolphin *Tursiops truncatus* with more than 500 individuals. In the early 2010s, this area was at the core of a project for a Marine Natural Park in the Normano-Breton Gulf, but came to nothing due to differences in the points of view of the Normandy and Brittany regions.

The intertidal zone of the western coast of the Cotentin is characterized by remarkable marine habitats with high biodiversity or heritage interest such as eelgrass beds, the beds of the polychaete *Lanice conchilega*, and the honeycomb worm reefs of the polychaete *Sabellaria alveolata* [15–19].

4. Ancient and Recent Development of the '*Côte des Havres*'

Human activities have been long established in estuaries and coastal areas (Table 1), becoming increasingly intense since the end of the 19th century in terms of urbanization, economic development and tourism. At first, beach huts and fishermen's houses were erected on the dune ridge without any protection from the sea. Then, from the 1930s and into the 1960s, the growing attractivity of this coast led to the urbanisation of land formerly used for extensive activities, even if the coast of '*Les Havres*' remains relatively less built up compared to the coasts of Calvados in Normandy. The presence of permanent dwellings facing the sea required the installation of riprap and protective dykes.

Campsites, holiday centres and secondary homes have been developed [1]. At the same time, urban developments have been deployed, along with asphalt roads, structures and excavated ports in the harbours, as well as tourist facilities such as golf courses, racecourses and casinos.

For example, to increase the area of agricultural land, 120 hectares were reclaimed from the sea in the early 1960s (1962–1964) in the estuary of Blainville, similarly 100 ha in the estuary of Saint-Germain-sur-Ay, and a smaller area in the estuary of Surville [5]. The harbour of Geffosses was cut off from the sea during the construction of a bridge dam with flood gates in 1970. These gates were subsequently removed to allow the harbour to regain its maritime character [5].

An economic turning point took place during the late 1960s and early 1970s with the transition from an economy focused on agriculture and artisanal maritime activities (artisanal fishing, seaweed harvesting, recreational fishing by the inhabitants of coastal municipalities) towards to an economy focused on the professionalization of shellfish farming. This has occurred in parallel with the development of tourism which has created direct and indirect employment: oyster shops, construction of buildings and oyster farms. The demographic decline has been halted thanks to the development of shellfish farming, tourism and the return of many locally born retirees who left the area in the 1960s to work in the Paris region. Most of the coastal municipalities are showing an increase in their population, which has stimulated craft activities, particularly construction (housing and shellfish farming) and shops, including those related to oyster farming [2,20,21].

to attract seaside investments, and property prices vary greatly depending on the proximity of the coast. Coastal municipalities often suffer from a high rate of second homes, making winter life undynamic despite cultural efforts. There is a strong demand for housing for permanent residents, oyster workers, employees of tourist establishments and many retirees.

Shellfish farming is a recent activity on the '*Côte des Havres*', beginning at Blainville-sur-Mer in 1968 and then followed by a gradual increase. While initially carried out by newcomers as well as farmers from the coastal zone wishing to diversify their activity, it is also the result of individual initiatives from local inhabitants [22]. Over the past thirty years, specialisation in oyster farming has been linked to the arrival of oyster farmers from other production areas. Today, the '*Côte des Havres*' hosts 114 companies out of a total of 300 in Normandy, with 484 ha of oyster beds, representing about 40% of the region's oyster farms. Oyster production exceeds 10000 t per year, comparable with mussel production. There are around a dozen oyster-farming areas, the main ones being at Blainville-sur-Mer, Gouville-sur-Mer and Pirou. These have been built just behind the dune barrier or in the estuary as in the case of Blainville [22]. Fears expressed about the effects of climate change are not perceived in the same way depending on the age of the professionals and the location of their companies [22]. Some fear a breach of the dune barrier at an equinox spring tide that would submerge their workshops. Others do not think they will be worried during their professional lifetime. Finally, few people still think it would be possible to relocate their workshops farther inland [22].

However, small-scale fishing activities continue on the '*Côte des Havres*', particularly with traps, and fishing vessels using harbours such as Portail and Barneville-Carteret, and anchorage areas at Blainville-sur-Mer, Gouville-sur-Mer and Pirou. These artisanal fisheries are focused on commercial species such as whelks, lobsters, spider crabs and cuttlefish. Other fish species, i.e., sea bass, mackerel and sea bream, are fished with a line or net. Since the *Côte des Havres* faces the Channel Islands, fishermen have been affected by Brexit, particularly in the Granville Bay agreements. Using semi-structured interviews and participant observations, Berkenbosch et al. showed that past and current fisheries management regimes have been unable to manage the dynamics of the fishing industry in the Normano-Breton Gulf including the '*Côte des Havres*' [23]. The UK-centred environmental protection policies introduced by Brexit have led to further problems in fisheries management and have contributed to geopolitical instability [23].

Finally, festive events turned toward the sea promote the maritime heritage of the territory: whelk fair in Pirou, oyster fair in Blainville-sur-Mer, sea festival in Gouville-sur-Mer, Barneville-Carteret, Bricqueville-sur-Mer (Vanlée estuary).

5. A Territory Vulnerable to Coastal Erosion

The Manche department invested very early in coastal surveillance, creating an innovative observatory—

unique in France—dedicated to monitoring the coastline and sandy beaches. This system was set up to deal with the disturbing amount of erosion after the storms of the 1980s; it was based on solid collaborations, in particular with Caen Normandy University [1,3,4]. In 2023, a new system was put in place to improve our understanding of coastal dynamics and predict the risks related to erosion and climate change. This project is based on major collaborations with coastal engineering specialists and experts in drone topography, as well as with INTECHMER-Cherbourg for the analysis of coastal mobility. In addition, in July 2024, 16 CoastSnap stations were put into operation, encouraging locals to participate in citizen science by sharing photos of the coast.

The average erosion of the coastline is 7 m over the last thirty years, with a maximum of 230 m. The coastal retreat rates vary greatly from one sector to another, ranging between 1 and 12 m per year; on the other hand, accretion in some areas can reach 2 to 3 m per year [3,4]. Erosion is strongly linked to storm events, but no significant correlation has been identified with sea level rise (1.4 mm per year) or the Saros tidal cycle of 18 years and 11 days [3].

However, observations alone are not enough to explain the coastal dynamics. In addition to the general rise in sea level, which is related to Global Climate Change, modifications in long-shore sediment transit are linked to the construction of slipways for access to the sea, while the large areas covered by oyster tables and the thousands of mussel stakes play an important role in cross-shore sediment transit [1,3,4,24].

For example, sedimentary transit is hindered by the presence of slipways perpendicular to the coastline, leading to sand accumulation on one side and strong erosion on the other. The use of slipways on stilts would restore sedimentary flows. The negative impact of permanent slipways would be minimized by replacing them with temporary slipways deployed only during the tourist season. More than 2 m of sand has been lost in fifty years in some areas of the intertidal zone at Blainville-sur-Mer, causing rocky areas to appear instead of sandbanks (personal observations). Conversely to coastal dunes, which are subject to erosion and the repeated assaults of storms, estuaries become silted up as a result of a sedimentary flow from the coastal zone toward the harbours. This process is exacerbated by the reduction in the volume of water oscillating during spring tides, which causes a decrease in the volume of the estuaries in relation to the increased land reclamation [1]. The total silting up of these harbours is inevitable during the 21st century.

The effects of destructive storms and the widespread risks of submersion are spectacular, such as seen with the rupture of the dune barrier north of the Blainville-sur-Mer slipway in March 2008. This storm affected all the Atlantic and Channel coasts of France [25]. These exceptional events are often followed by ministerial visits with impressive announcements of mobilization by the State, unfortunately without having any effect commensurate with the issues at stake.

These coastal and estuarine systems in Normandy are particularly exposed and sensitive to climate change [26], but are also affected by the large number of artificial structures such as dykes, slipways and riprap. The temporal evolution of this coastline therefore has a dual climatic and anthropogenic origin which should be taken into account [1,3,4].

6. An Administrative Division That Is Not Compatible with an Integrated Approach

The eight estuaries of the *Côtes des Havres* are currently placed under four administrative authorities. The Vanlée estuary has been included in the '*Communauté de communes de Granville, Terre et Mer*' (32 communes) since 1 January 2014. Four of these communes border the Vanlée estuary and account for a total of 6500 inhabitants. The '*Communauté de communes Coutances Mer et Bocage*' (CCMB) was created on 1 January 2017 and is now made up of 48 municipalities, 10 of which border the Regnéville and Blainville estuaries with 15000 inhabitants. The '*Communauté de Communes Côte Ouest Centre Manche*' was also created on 1 January 2017 and now has 30 municipalities, seven of which border the Geffosses, Saint-Germain-sur-Ay and Surville estuaries with 12,000 inhabitants. Finally, the Portbail and Barneville-Carteret estuaries are bordered by three municipalities (5200 inhabitants) belonging to the '*Communauté d'agglomération du Cotentin*', created on 1 January 2017 and which comprises 129 municipalities. In total, there are nearly 40,000 inhabitants in the municipalities of the '*Côte des Havres*', a population that is multiplied by 5 during the summer period, thus requiring developments such as wastewater treatment plants for nearly 200 000 inhabitants.

The Cotentin and Bessin Wetland Regional Nature Park, created on 14 May 1991, groups together 119 municipalities in the departments of Calvados and Manche, but only four of these municipalities border the Saint-Germain-sur-Ay estuary.

Three Territorial Coherence Schemes (SCOT) concern the '*Côte des Havres*'. They set out the general guidelines and objectives of land use planning and sustainable development in terms of ecological transition, economic development, land management, mobility, urban planning, housing, and preservation of agricultural, natural and coastal areas, water quality. The territories concerned must then translate these objectives in a more operational way into their Local Urban Plans (LUP) and major development projects.

The SCOT of the '*Pays de la Baie du Mont-Saint-Michel*' was approved on 13 June 2013, and concerns *pro parte* the '*Communauté de communes de Granville, Terre et Mer*' and the Vanlée estuary. The SCOT of the Centre-Manche-Ouest, which was approved on 12 February 2010, concerns the communities of municipalities of CCMB and '*Côte Ouest Centre Manche*', i.e., the Regnèville, Blainville, Geffosses, Saint-Germain-sur-Ay and Surville estuaries. The SCOT of the '*Pays du Cotentin*' approved on 12 April 2011 concerns the '*Communauté d'agglomération du Cotentin*' and the Portbail and Barneville-Carteret estuaries.

7. A Complex Stacking of Structures

In addition to the administrative division, many operators and structures are interested in the management of this territory (Figure 3), leading to a dispersion of the actions, which are often very local, and means that integrated approaches on the scale of the entire '*Côte des Havres*' are ineffective.

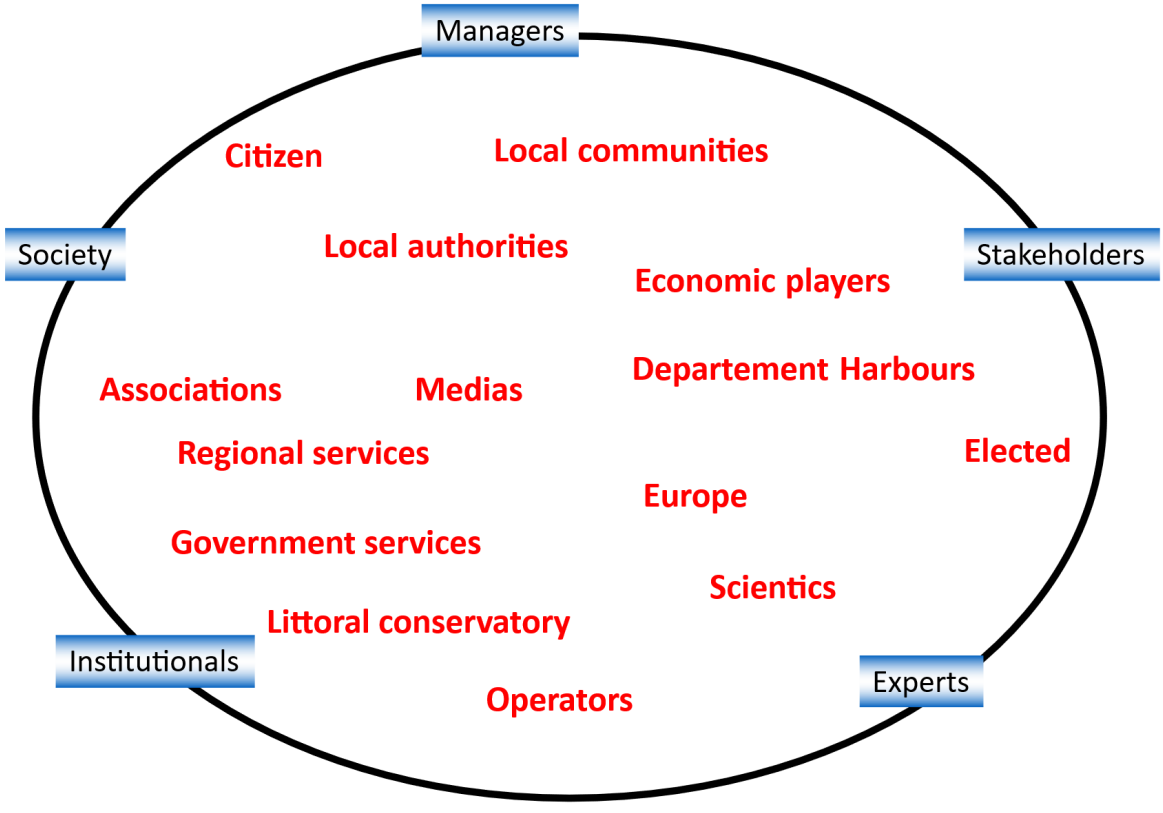

Figure 3. A roundtable of the actors involved in the management of the '*Côte des Havres*'.

The '*Syndicat Mixte Espaces Littoraux de la Manche*' manages the land of the '*Conservatoire du Littoral et des Rivages Lacustres*' and the Manche department. It is the operator of the Natura 2000 sites in six of the eight estuaries (https://www.symel.fr/). The Permanent Centre for Environmental Initiatives, CPIE of the Cotentin (1993) '*Vivre en Cotentin*' federates awareness-raising and educational actions on the coast and estuaries.

All along the coast, Authorized Syndicate Associations (*Associations Syndicales Autorisées, ASA*) are

flourishing as public administrative establishments created and controlled by the State, ensuring better collaboration with State services. Their prerogatives are exercised within a perimeter defined when they were created. There are about fifteen ASAs on the '*Côte des Havres*'. In the municipality of Agon-Coutainville alone, two ASAs manage the 3 km of the sea dyke. At the level of the Manche department, the ADTCOC ('*Association de défense du trait de Côte ouest Cotentin*') created in 2021, brings together 15 ASAs and many shellfish farmers with the aim of fighting against "inaction" in the face of erosion and rising waters. It campaigns to protect the existing structures before relocating them and aims to convince people of the urgency of maintaining or strengthening the facilities in their sector. Recently, in Gouville-sur-Mer, the association '*Trait de Côte*' held its general assembly on Friday 14 March 2025 and expressed the desire to create a new ASA.

Other associations, such as the '*Association de chasse maritime Côte ouest Manche*' and the '*Association des Amis de la Côte des Havres*', aim for sustainable development and believe in participatory democracy in order to observe, instruct, inform, reflect and make propositions on the future of the Havre coast, as well as participate in the roundtable discussion with stakeholders (Figure 3).

8. A Sectoral Vision of Public Action

The GEMAPI policy ('*Gestion des Milieux Aquatiques et Prévention des Inondations*') was created in response to the complex challenges of coastal and river risks. It represents a transfer of responsibility from the State to the inter-municipalities through a tax to raise funds for the necessary studies and works. However, GEMAPI does not take erosion into account. The '*Programme d'Actions de Prévention des Inondations*' (PAPI), with its detailed risk management measures, reflects the desire for structured and concerted action to anticipate and mitigate the effects of rising sea level.

Benefiting from the Climate and Resilience Act, the CCMB supports the PPA (Development Partnership Plan) '*Entre deux Havres*' (https://www.coutancesmeretbocage.fr, accessed on 21 January 2026). The PPA aims to implement a global development project integrating the relocation and adaptation of activities impacted by erosion and coastal risks (shellfish farming areas in the Blainville-sur-Mer estuary, Gouville-sur-Mer campsites), as well as the rewilding and depolderisation of coastal ecosystems (estuaries, dunes and coastal zone). This approach includes the reorganization of the area between Agon-Coutainville and the Geffosses estuary (landscape enhancement, mobility, public spaces, etc.) (https://www.coutancesmeretbocage.fr/).

The PPA is based on three complementary pillars:

· Anticipating the evolution of the coastline by relying on regulatory urban planning tools (PLU, SCOT) and carrying out development projects (adaptation and relocation of activities, rewilding).

· Coastal risk management, in addition to the definition of community dyke systems, in conjunction with the GEMAPI service.

· The project involves supporting many actors, including associations and experts, in order to facilitate communication with the population and elected officials.

Signed in October 2021, the project is co-piloted by the CCMB and the Prefect of the Manche, and represents an initial investment of more than 3.6 million euros. Act 1 (January 2022–May 2023) made it possible to analyse the situation and understand the perception of the actors and inhabitants of the territory. Act 2 (2023–2025) concerns the development of the overall development project (Guide Plan), in consultation with local stakeholders. Act 3 (2024–2050) will be deployed in the territory as soon as the Guide Plan is delivered: the relocation of the activities concerned and rewilding will be carried out gradually in the years to come (https://www.coutancesmeretbocage.fr/).

Two Prevention Plans Littoral Risk (PPLR) have been drawn up by the prefectural services of the Manche department. They apply to the retreat of the coastline; dune migration and marine submersion. A PPRL aims to ensure the safety of property and people through three main principles: (1) prohibit new construction in the most dangerous risk sectors and not increase the presence of issues in flood zones that are not or only minimally urbanized; (2) improve the sustainability of buildings subject to risk by reducing the vulnerability of existing buildings and only authorise new developments in flood zones under conditions and (3) not aggravate the hazard by preserving natural and agricultural areas.

The first PPRL was signed in December 2025 and concerns the municipalities south of Le Havre de Regneville and the second currently being developed concerns the municipalities north of the Havre de Regneville and four of the eight harbours: Regneville, Blainville, Gefosses and Saint-Germain-sur-Ay.

The CCMB has also taken charge of the management of the dykes in the municipalities of Hauteville-sur-Mer, Montmartin-sur-Mer and Regnéville-sur-Mer. The relocation of the wetland farm at Montmartin-sur-Mer represents a symbolic and practical initiative aimed at adapting land use planning to the changing realities of the climate (https://www.coutancesmeretbocage.fr/).

In addition, the '*Communauté de communes Côte Ouest Centre Manche*' wishes to implement coastal management actions resulting from the '*Notre littoral pour demain*' project on the Côte des Havres, by integrating land use planning, GEMAPI and risk management. The rewilding of the St Germain-sur-Ay estuary is envisaged as a complementary solution to the adaptation and relocation of the properties.

Thus, the future of the territory must be part of a global vision; indeed, the natural factors and ecological functions of this ecosystem depend on internal factors (determined by existing structures) as well as external factors on a global scale (Figure 4).

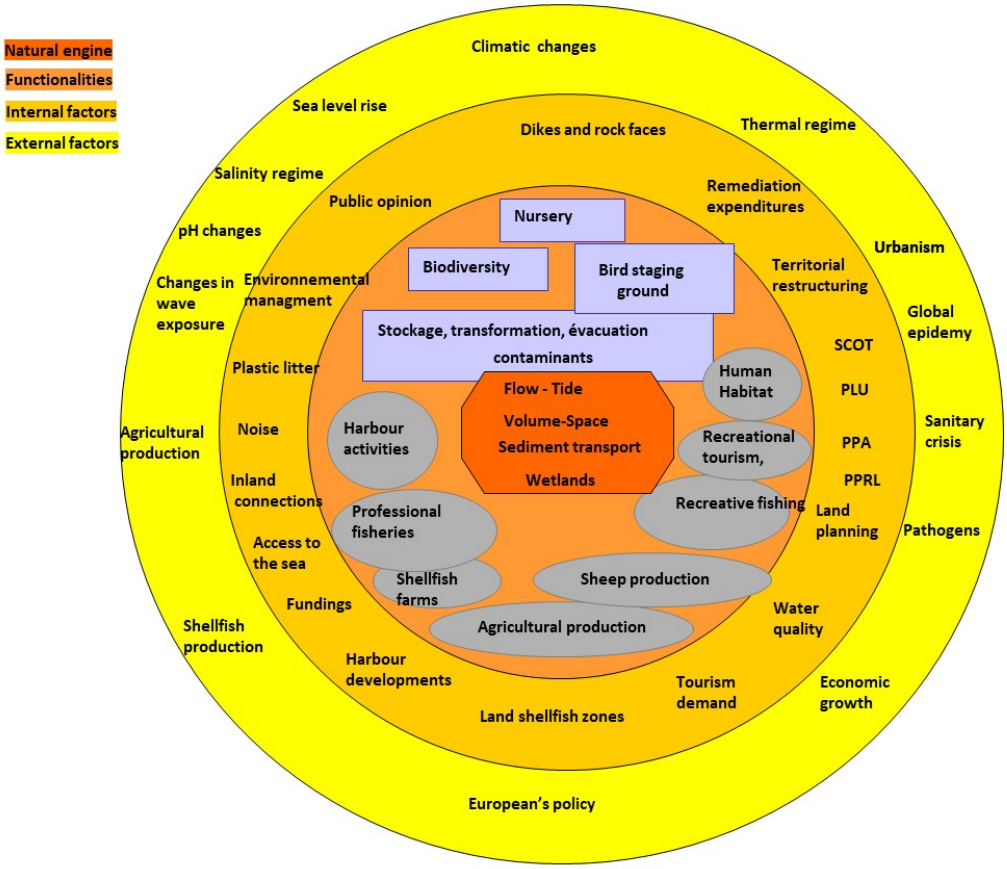

Figure 4. Main external, internal and natural factors associated with the environmental functioning of the 'Côte des Havres'. According to the GIP Seine-Aval (https://www.seine-aval.fr/).

9. Beyond a Local Approach, towards Integration in the English Channel Area

Over a period of two decades, the cooperation programme '(Interreg V-A) France-United Kingdom (Manche-Channel)' addressed the most important cross-border challenges linked to the implementation of the Europe 2020 strategy in the regions bordering the EC. It was shown that multi-disciplinary and cross-sectorial projects and integrated approaches were essential to improve management and governance of the English Channel coasts [27]. Nevertheless, governance of this area is a complex task since local, regional, national, European and international policies and agreements have to be taken into account. Over the last decades, new maritime and coastal policies and legislation have been put in place to face the challenges of the marine environment and maximise opportunities [27]. But regarding the vision of EC territory, there is a contrast

between European and regional political territories and the positions of the French and UK governments. Regional authorities have developed an extraordinary and enthusiastic cooperation on both sides of the Channel, mainly through the INTERREG A projects. But today, there are two separate national visions of the EC as well as a desire to manage the EC as one unique space. Therefore, a real gap exists between the desire to have a cross-border approach and the disparate state positions that persist in national politics. This aspect emerged during the French Special National Commission for Public Debate (NCPD) '*La mer en débat*', which was organised by the French State from 5 November 2023 to April 2024 as a large public forum on maritime planning to discuss the future of the sea, the coastline, marine biodiversity and offshore wind power (https://www.debatpublic.fr/la-mer-en-debat, accessed on 21 January 2026).

Only the French Maritime Zone has been considered up to the limit of separation of the sea between France and the United Kingdom. Moreover, the French side of the EC was separated into two seaboards: from the western tip of Brittany to the Mount-Saint-Michel Bay and from the Mount-Saint-Michel Bay to the Belgian frontier (including the '*Côte des Havres*'). This sectorial vision appears incompatible with the EU Marine Strategy Framework Directive (MSFD) which advocated an ecosystem-based approach to the management of human activities while enabling a sustainable use of marine goods and services. MSFD specified that "Member States sharing a marine region or subregion shall cooperate to ensure that, within each marine region or subregion, the measures required to achieve the objectives of this Directive, in particular the different elements of the marine strategies [⋯] are coherent and coordinated across the marine region or subregion concerned, in accordance with the following plan of action for which Member States concerned endeavour to follow a common approach" (https://eur-lex.europa.eu/eli/dir/2008/56/oj/eng, accessed on 22 January 2026). Glegg et al. have determined that the current governance of the EC lacked integration between countries, sectors, legislation and scientific research [28]. Recent developments within the EU's marine management frameworks are significantly altering the approach to marine governance.

Effective practice in marine spatial planning (MSP), with a participatory evaluation of experience, has been analysed in a pilot study on sites in Dorset and the Solent in Southern England [29]. Fletcher et al. noted that MSPs were associated in all cases with a unique mix of contextual factors, including the ecological and socio-economic priorities set by the prevailing physical, coastal and oceanographic conditions [29]. Therefore, the conclusions may be applied elsewhere to a variable extent, for example in other sites of the EC, or may require some degree of adaptation, such as for the '*Côte des Havres*'.

For instance, in the years 2010, France (http://www. gouvernement. fr/) developed an integrated vision concerning the coastal zone and the sea (e.g., Livre bleu, Stratégie nationale pour la mer et les oceans), while the UK (http://archive.defra.gov.uk/) developed its own marine science strategy and a UK National Strategy for the Sustainable Use and Protection of the Seas (http://www. bmu. de/english/nature/downloads/doc/42928. php, accessed on 10 January 2026) [27]. Rodriguez-Rodriguez et al. have examined the current status of designation, management and monitoring of the network of Marine Protected Areas in the EC [30,31]. By the middle of the years 2010, MPAs had been designated belonging to 12 different categories: 11 MPA designation categories in France, six in the UK and one in the Channel Islands. In addition, management structures and approaches differ between the two countries, with more actors involved in the UK. While similar monitoring techniques are used, they are more standardized in the United Kingdom.

Cabral et al. used a modelling approach to incorporate the knowledge from scientists and managers of the Normano-Breton Gulf about risks for EUNIS benthic habitats and their impact on Ecosytem Service potential [32]. The InVEST (Integrated Valuation of Environmental Services and Trade-offs) Habitat Risk Assessment (HRA) models have allowed us to identify the nearshore and coastal habitats with the highest impacts from human activities. The benthic habitats of the estuaries and the intertidal zone of the '*Côte des Havres*' show a moderate risk that is lower than on the north-Brittany coast such as in the bays of Saint-Brieuc and Saint-Malo where the inputs of organic matter, fertilizers and other nutrients are the highest. Friedrich et al. have examined how ecosystem service assessments can support participatory marine spatial planning on six sites including three sites bordering the EC [33], the Normano-Breton Gulf, Poole harbour and Plymouth Sound to Fowey. This study aimed to identify why, how and under what conditions ecosystem service assessments can support effective engagement. These authors found that stakeholder engagement played a key role in marine spatial planning and other area-based marine management approaches.

Moreover, effective marine engagement is often difficult to achieve, mainly due to conflictual relationships and the limited understanding of marine ecosystems and management contexts.

An interesting study by Carpenter et al. based on Public Perception Research (PPR) on both sides of the EC examined the public use of and funding priorities for the marine and coastal environment [34]. Their results show that there are country-level differences regarding the reasons for using the EC. French citizens are more likely to holiday on the coast than English citizens. Conversely, English people use the Channel coastal area more for travelling than French people. Nevertheless, there are no country-level differences in the types of activity undertaken by citizens. English and French citizens participate in similar activities when visiting the EC coast, enjoying the scenery, recreation and leisure. However, there are significant differences in the types of activities undertaken on the two coastlines. The English side of the EC is more frequently used for visiting historic landmarks and cultural attractions, as well as for education, research and artistic and creative activities. On the other hand, wildlife watching, fishing and water sports are undertaken more often on the French coast. Moreover, compared to French respondents, English respondents put a higher priority on cleaner water and beaches, as well as improving coastal flood defences. By contrast, French respondents place a higher priority on offshore renewable energy, sustainability of businesses, eco-friendly developments, and research and cultural links [34].

Following the Directive 2014/89/EU, France completed its first round of maritime spatial planning (MSP) in 2022. Guyot-Téphany et al. analysed the public's participation in marine spatial planning (MSP) in France [35], based on participatory processes involving stakeholders as well as the wider public, using a dedicated online platform open between 2018 and 2021. The public was consulted successively on the diagnostic, strategic and operational components; the State authorities collected more than 4,300 online contributions. The analysis shows that MSPs have remained firmly anchored in a sector-wide approach, in terms of the four French Metropolitan seaboards as well as the outcomes of the public consultation. Guyot-Téphany et al.'s study also reveals how the authorities influence this policy, since public consultation appears to be more an illusion of involvement rather than any genuine involvement that could generate real change [35]. The sectoral approach appears to focus on discussions around two activities (fisheries and Offshore Wind Farms) and their associated issues, which contrasts with the integrated approach that MSP is expected to convey. Finally, the analysis showed significant differences between the seaboards, revealing, in particular, that environmental issues are very local.

10. Point of View

Although the '*Côte des Havres*' can be considered as a geographical and morphological unit, with a common past and destiny, it should be noted that the administrative divisions, the competences of elected officials and the numerous projects for the future do not allow an integrated approach to this part of the West Cotentin coast.

Some municipalities or ASAs still prefer to fight 'against the sea' with riprap and dykes, while others are looking to develop broader and more integrated visions to start building the coast of tomorrow [2]. There is therefore still a disagreement between two visions, one advocating new coastal protection structures and another integrating a necessary strategic retreat with the relocation of oyster farming infrastructures and campsites threatened by the risks of marine submersion.

Today, in order to reduce the effects of marine erosion on the dune barriers, coastal protection measures are regularly implemented by the municipalities, sometimes at great cost. These methods include gabion baskets, piles, geotextile sandbags, weirs, placing dead Christmas trees at the top of the beach, and beach nourishment which is often of limited volume. Often, these temporary measures are swept away, like fir trees or sandbags during storms, requiring expensive waste collection. A real Shadok-type operation!

However, the multitude of human activities (urbanization, agriculture, shellfish farming, tourism, coastal development) add complexity to undertaking relocation actions [2]. Moreover, the socio-political organization of governance amplifies these challenges: the multiple levels of decision-making (communal, intercommunal, regional, departmental, State), each producing its own regulations and projects, often with very local scope, do not take into account the whole of the '*Côte des Havres*'. This fragmentation creates inconsistencies, making it difficult to coordinate and manage the necessary actions. For elected officials, it becomes extremely difficult to know who to contact and what actions to take, with each decision being made alone [2].

According to the LITTOCEAN survey [2], the '*Côte des Havres*' suffers severely from structural fragmentation at all levels (geographical, morphological, sedimentological, demographic, economic and political). In a word, this fragmentation is territorial, lacking any leadership capable of mobilizing the coastal management towards proactive and innovative development. Above all, the issues at stake are represented in a highly diverse manner.

Beyond observing what should be done, should we just let the current situation continue into the future?

A first option would be a reorganization of the '*La Côte des Havres*' territory into a single administrative unit, bringing together all the coastal municipalities of the '*Côte des Havres*' from Coudeville-sur-Mer to Barneville-Carteret. This would be undoubtedly difficult to implement because local and national reluctance would be expressed. With such a redistribution, municipalities bordering the coast could be associated together based on their desire to join. A new mode of governance should be set up, as well as the appointment of a single leader. This implies an appropriation of the territory by all the actors (Figure 3) and their adherence to a shared project and solidarity on the scale of the '*Côte des Havres*'.

Moreover, it is surprising that in most of the studies carried out to date, there is a virtual absence of sociological studies on citizens' feelings and the principle of shared acceptability of a common vision for the future [36]. This requires the involvement of citizens, permanent residents and secondary home owners, as well as economic actors (tourism, shellfish farming, artisans and traders, market gardening) in defining the challenges and future of the territory. It is clearly necessary to adapt to Climate Change and the risk of submersion and act over the long term by thinking globally in terms of all the external forcings and internal factors, and also by acting locally (Figure 4).

The point of view of Clergeau [37], a specialist in urban ecology, is enlightening. He recently wrote that 'elected officials too often talk about budgetary problems, but their choices are mainly aimed at finding scapegoats. It is unimaginable today that all health and ecological knowledge is swept away in this way, both in support structures and in operationality. A majority of the population, experts, scientists and associations have been sounding the alarm for several years. Some elected officials have integrated these warnings into their speeches, but positive actions are still rare and the growing weight of climate sceptics relayed by the media is slowing down the decision. We see too few decisions going in the right direction, apart from those of local or baronies" and the power of money which remains the primary line of conduct. Knowledge no longer guides the decision and long-term thinking seems more and more difficult to undertake!'

This point of view perfectly illustrates the situation encountered on the '*Côte des Havres*', which is also marked by a historical lack of decision on the part of the politicians and the absence of a vision for the future of a shared territory. There have been many studies, reports and ministerial visits, but too few concrete and lasting actions. In addition, the discourse of elected officials is not always explicit or consistent depending on the alliances and funding opportunities. But in their defence, the situation is extremely complex; elected officials need guidance and decision-making support from scientists (and not only from design of engineering firms). The Normandy IPCC (Intergovernmental Panel on Climate Change) was set up at the initiative of the president of the Normandy region, Hervé Maurin. This group of regional experts has taken stock of our knowledge in nine fields of study, already highlighting the visible effects of Climate Change in Normandy and the need to take urgent measures rapidly (seehttps://www.normandie.fr/giec-normand(accessed on 12 January 2026) and volume 20 of the quarterly journal 'Etudes Normandes: What are the effects of climate change in Normandy?).

In the face of irreversible threats, it is surprising that an Integrated Management of this Coastal Zone (ICZM) has not been envisaged. Such an approach would have made it possible to include all the actors around a common objective in a vision of sustainable development [38]. On the other hand, the '*Côte des Havres*', a unique territory on the French coast, would be an excellent candidate to apply the Satoumi concept proposed by Professor Tetsuo Yanagi of Japan. This concept is based on the achievement of sustainable development for marine and coastal areas that have been shaped and maintained by prolonged interactions with human activities. It involves strengthening the links between landscapes, humans and nature [39]. In Japan, traditional fisheries and cultures based on the sustainable use of coastal ecosystems are deeply connected to the Satoumi principle which positions humans as members of the ecosystem.

Indeed, despite the published work of scientists, particularly in the context of INTERREG IVA projects,

which proposed a governance of the English Channel between France and the United Kingdom [27–29], we can realize that there are really two different national approaches. These depend on differences in the history, culture and practices between the two countries and the stacking up of different levels of administrative structures [33, 35]. Moreover, these differences have been further exacerbated by Britain's exit from the European Union. It is now illusory to talk about any governance of the English Channel. Analyses carried out at the local, national and European level show that the suitable spatial scale remains a local entity that can be appropriated by citizens, permanent and temporary residents, politicians and the State.

Hence, the future of the 'Côte des Havres' must be part of an *Ecosystem-Based Management approach at the local scale, but at the same time integrating a* global vision. Indeed, the natural factors and ecological functions of this ecosystem not only depend on internal factors (controlled by existing structures) but also external factors on a very large or global scale (Figure 4). In brief, 'think global, act local'. The Satoumi concept is undoubtedly adapted to the coast of Les Havres. An orientation towards this concept seems essential today!

Funding

This research received no external funding.

Institutional Review Board Statement

Not applicable.

Informed Consent Statement

Not applicable.

Data Availability Statement

Not applicable.

Acknowledgments

I thank Caen University and the Centre National de la Recherche Scientifique (UMR 6143 M2C CNRS) for welcoming me as at the M2C laboratory. I also thank Michael Carpenter for editing the English style and grammar of this paper.

Conflicts of Interest

The author declares no conflict of interest.

References

1 Levoy F. Available online: https://side.developpement-durable.gouv.fr/PACA/doc/SYRACUSE/334620/surcote-subir-reagir-et-s-adapter-aux-changements-globaux-l-exemple-de-la-cote-des-havres-ouest-cote (accessed on 14 January 2026).

2 LITTOCEAN. Ouest Cotentin—Une Diversité D'occupation des Havres. Available online: https://www.littocean.fr/wp-content/uploads/2025/01/Ouest-Cotentin-enquete-2.pdf(accessed on 14 January 2026).

3 Levoy F, Monfort O, Anthony EJ. Multi-Decadal Shoreline Mobility of a Managed Sandy Tidal Coast (Normandy, France): Behavioural Variability in a Context of Sea-Level Rise and Increasing Storm Intensity. *Regional Studies in Marine Science* 2023; **62**: 102973.

4 Levoy F, Monfort O. Impacts Environnementaux des Ouvrages de Stabilisation du trait de côte: Etude de cas sur le Littoral Ouest-Cotentin. *LHB Hydroscience Journal* 2025; **111**: 2496174. https://doi.org/10.1080/27678490.2025.2496174

5 Fauvel P. *Balade sur la Côte des Havres;* Corlet Imprimeur: Condé-en-Normandie, France, 2024; 264p.

6 Lafond LR. *Etude Morphologique de la Zone Intertidale 'Les Havres du Cotentin'*; Rapport de contrat N° 82/6773; Ecole Pratique des Hautes Etudes, Dinard, France, 1986; 127p. https://archimer. ifremer. fr/doc/

00047/15848/13251.pdf

7 Robin N, Levoy F, Monfort O. Short-Term Morpho-Dynamics of an Intertidal Bar on Megatidal Ebb Delta. *Marine Geology* 2009; **260**: 102–120.

8 Robin N, Levoy F, Monfort O, et al. Short-Term to Multi-Decadal Scale Onshore Bar Migration and Shoreline Changes in the Vicinity of a Megatidal Ebb Delta. *Journal of Geophysical Research* 2009; **114:** F04024

9 Dauvin JC, Delhay JB, Hacquebart P, et al. The Evolution of Habitat Areas and Carrying Capacity for Western Cotentin Estuaries (North-Western France). *Cahiers de Biologie Marine* 2014; **55**: 77–89.

10 Billard C. *Terre de Pêcheries: 4000 ans D'archéologie et D'histoire sur le Littoral de la Manche*; Coéditions Orep/Crécet, Nonant, France, 2012; 128p.

11 Livory A, Coulomb B. Available online: https://manche-nature.fr/dossier-n-12-de-manche-nature-les-oiseaux-du-havre-de-regneville/ (accessed on 14 January 2026).

12 Livory A. Available online: https://manche-nature. fr/vertebres-du-havre-de-regneville/ (accessed on 14 January 2026).

13 Livory A. Available online: https://manche-nature. fr/invertebres-du-havre-de-regneville/ (accessed on 14 January 2026).

14 Livory A, Stallegger P, Boittin F, *et al*. Available online: https://manche-nature. fr/flore-faune-havre-de-regneville-volume-5/ (accessed on 14 January 2026).

15 Guillaumont B, Hamon D, Lafond LR, *et al*. E*tude Régionale Intégrée du Golfe Normano-Breton. Carte bio-Morpho-Sédimentaire de la Zone Intertidale au 1/25, 000 Côte Ouest du Cotentin et Baie du Mont-Saint-Michel*; Les Presses Bretonnes: St-Brieuc, France, 1987.

16 Hamon D. *Etude Ecologique du Site Cotentin Centre—2ème Volume: Chapitre III—A L'intertidal, les îles Chausey, le Cotentin Centre*; École Pratique des Hautes Etudes: Dinard, France, 1983; 164 p.

17 Lecornu B, Schlund E, Basuyaux O, *et al*. Dynamics (2010–2014) of the Sabellaria alveolata reefs on the west coast of Cotentin (France). *Regional Studies in Marine Science* 2016; **8**: 157–169.

18 Pezy JP, Delecrin C, Baffreau A, *et al*. Anthropogenic impact of oyster farming on macrofauna biodiversity in an eelgrass (Zostera marina) ecosystem of the English Channel. *Ecological Indicators* 2017; **106**: 105–114.

19 Schlund E, Basuyaux O, Lecornu B, *et al*. Macrofaunal Biodiversity Associated with Sabellaria alveolata Reefs on the West Coast of Cotentin (France). *Springerplus* 2016; **5**: 1260.

20 Syndicat Mixte Du Pays De Coutances. Élaboration de Stratégies Locales de Gestion Durable de la Bande Côtière de L'ouest-Cotentin. Available online: https://www. cocm. fr/images/PDF/Littoral/Rapport_final_NLPD_Ouest_Cotentin.pdf (accessed on 21 January 2026).

21 Zarrouki A. Analyse et Mise en Récit D'initiatives Territoriales Terre-Mer Innovantes dans le cadre de L'adaptation au Changement Climatique et des Transitions Ecologique et Energétique. Master Thesis, Université de Caen Normandie, Caen, France, 2024.

22 Madeline, A., Les Enjeux Sociogéographiques de L'ostréiculture dans la Manche: L'exemple de la Côte des Havres. Master Thesis, Université de Caen Normandie, Caen, France, 2023.

23 Berkenbosch K, Stoffelen A, Bono F. More-Than-Human Geopolitics: How Fishing Shapes Cross-Border Relations in the Gulf of Saint-Malo. *Geopolitics* 2025; **31**(**1**): 288–312. https://doi.org/10.1080/14650045.2025.2490739.

24 Kervella Y. Impact des Installations Ostréicoles sur L'hydrodynamique et la Dynamique Sédimentaire. Ph.D. Thesis, Université de Caen Normandie, Caen, France, 2010.

25 Cariolet JM, Costa S, Caspar, R, *et al*. Aspects Météo-Marins de la Tempête du 10 Mars 2008 en Atlantique et en Manche. *Environnement Aménagement Société* 2010; **215**: 11–31.

26 Hacquebart P, Joncourt Y, Sylvand B, *et al*. BRANCH: Etude des Effets du Changement Climatique sur les Ecosystèmes Côtiers et Estuariens en Basse-Normandie. Lot 3: Etude de la Macrofaune Benthique. Unpublished work, 2007.

27 Evariste E, Claquin P, Robin JP, *et al*. What Did We Learn from PEGASEAS Forum "Science and Governance of the Channel Marine Ecosystem"? *Marine Pollution Bulletin* 2015; **93**: 1–4.

28 Glegg G, Jefferson R, Fletcher S. Marine Governance in the English Channel (La Manche): Linking Science and Management. *Marine Pollution Bulletin* 2015; **95**: 707–718.

29 Fletcher S, McKinley E, Buchan KC, *et al*. Effective Practice in Marine Spatial Planning: A Participatory Evaluation of Experience in Southern England. *Marine Policy* 2013; **39**: 341–348.

30 Rodriguez-Rodriguez D, Rees S, Mannaaerts C, *et al*. Status of the Marine Protected Area Network across the English Channel (La Manche): Cross-Country Similarities and Differences in MPA Designation, Management and Monitoring. *Marine Policy* 2015; **51**: 536–546.

31 Rodriguez-Rodriguez D, Sciberras M, Foster NL, *et al*. Status of Management Effort in 153 Marine Protected Area across the English Channel. *Marine Pollution Bulletin* 2015; **94**: 168–175.

32 Cabral P, Levrel H, Schoenn J, *et al*. Marine Habitats Ecosystem Service Potential: A Vulnerability Approach in the Normand-Breton (Saint Malo) Gulf, France. *Ecosystem Services* 2015; **16**: 3066318.

33 Friedrich LA, Glegg G, Fletcher S, *et al*. Using Ecosystem Service Assessments to Support Participatory Marine Spatial Planning. *Ocean & Coastal Management* 2020; **188**: 105121.

34 Carpenter A, Shellock R, von Haartmane R, *et al*. Public Perceptions of Management Priorities for the English Channel region. *Marine Policy* 2018; **97**: 294–304.

35 Guyot-Téphany J, Davret J, Tissière L, *et al*. Public Participation in Marine Spatial Planning in France: From Minimal Requirements to Minimal Achievements. *Ocean & Coastal Management* 2024; **256**: 107310.

36 Monfort A, Amalric M, Becu N, et al. Analyser la Réception Sociale du Recul Stratégique Face au Risque de Submersion Marine en Camargue et en Normandie à Travers une Expérience Simulée. *Bulletin de L' association de Géographes Français* 2022; **98**: 530–545.

37 Clergeau P. L'écart se Creuse Entre les Décideurs et Les Experts. *Ouest France*, 26 March 2025.

38 Dauvin JC, Bellan G, Bellan-Santini D, *et al*. *Gestion Intégrée des Zones Côtières: Outils et Perspectives Pour la Préservation du Patrimoine Naturel*; Muséum National d'Histoire Naturelle, Paris, France, 2002.

39 Yanagi T. *Integrated Coastal Management in the Japanese Satoumi*; Elsevier: Amsterdam, The Netherlands, 2019; 250p.