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► **To cite this version:**

Alice Mazeaud, François Bénitez, Anaïs Ridet, Arno Bringer, Christine Plumejeaud, et al.. Governance and public policies of coastal water quality in the “ Pertuis Charentais ”. ISTE publishing, In press. hal-02458353

HAL Id: hal-02458353

<https://hal.science/hal-02458353v1>

Submitted on 28 Jan 2020

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Governance and public policies of coastal water quality in the « Pertuis Charentais »

The coastal area of the Charente-Maritime region is highly attractive and mainly used for economic and recreational activities. Each year, 3 million tourists visit this territory stretching over 460 kilometers of coastline. According to the National Statistics Institute, more than 6.5% of the local economy relies on tourism. The Pertuis Charentais, which are the receptacle of three rivers (the Sèvre-Niortaise, the Charente and the Seudre), create a good natural environment for shellfish farming. The shellfish sector is an additional structuring activity. It shapes land and sea territories and contributes to the development of the department identity. In terms of economics, shellfish farming achieves a turnover of 350 million euros and generates nearly 25,000 direct jobs. 23% (50,000 tonnes) out of the 217,000 tonnes of shellfish sold in 2016 were shipped by companies located in this department.

Given the importance of its coastal activities, the water quality is of major importance and represents a challenge for the Charente-Maritime. Poor water quality is detrimental to the life of the biodiversity living there. Poor conditions will thus affect the water, its usage and the various environments. People's health and safety may also be impacted. If a potential toxic bacteria or microscopic algae was likely to develop, bathing could become dangerous and be prohibited. Poor chemical status could lead to the closure of shore fishing areas, having consequences on both professional and recreational fishing. Bacteriological contamination could affect aquaculture meaning the coastal shellfish could not be sold. These degradations are

serious threats to the economic activities of the Charente coastline. Thus, it is essential to identify the public stakeholders managing the coastal water quality ¹.

In 2017, the Nouvelle-Aquitaine Regional Economic, Social and Environmental Council (CESER- Conseil Economique, Social et Environnemental Régional)² published, for the first time ever, a report entitled "The Coastal Water Quality in Nouvelle-Aquitaine: Current Status and Prospects" which highlighted the governance complexity. There is a strong fragmentation of public policies dealing with this matter. Despite the abundance of discourses and strategies promoting Integrated Coastal Zone Management (ICZM) (Vertigo, 2013) [VER 13], coastal waters, which are "shallow water bodies close to the coastline"³, are not a category included in public action policies. Using a geographical definition, coastal waters are not subject to integrated management. Indeed, they are in-between integrated freshwater and integrated maritime water management policies. Usually defined by their uses, coastal waters are divided in bathing waters, shellfish waters, etc. Thus, while European directives focus on achieving a good water status, water quality is monitored and controlled based on its uses – bathing, shellfish farming, fishing, etc. – and on public health matters.

There is a need to point out why the degradation of nearshore water quality and its consequences, mainly on shellfish aquaculture, should not involve the public sphere (Garraud, 2010) [GAR 10]. Given the importance of socio-economic issues, one may find surprising that it is not the heart of both the political and media agenda. Several factors could explain the "controlled publicity" (Candau, Deldreue, Deuffic 2012) [CAN 12] of coastal water quality. In addition to having a mediatization strategy which could be tricky, there are difficulties in pointing who is responsible for pollution. This is mainly due to the lack of scientific expertise and the unbalanced powers among actors working upstream. Finally, there is a need to define and measure quality. Indeed, several regulations define quality thresholds based on pre-identified indicators. But these different quality measurements blur the true notion of quality. Despite positive assessments of nearshore water quality, the increased mortality of oysters demonstrates that current indicators are not flawless. In fact, only chemical or biological elements identified as degradation factors are

¹ The analysis is based on documentary analyses and interviews carried out within the framework of two Master studies interns, F. Bénitez and A. Ridet, funded by the EVOLPEC 'Evolution du littoral sous contrainte naturelle et anthropique des Pertuis Charentais' project.

² CESER is a regional consultative assembly composed of economic and social actors representing civil society.

³ As there is no official definition, we have used the one provided by CESER in 2017.

measured. Therefore, the impact of the recent creation of the Gironde Estuary and Pertuis Marine Protected Area on coastal water quality management is questionable.

3.1. Fragmented management of coastal waters

For several decades, water policies have globally been relying on territories. The catchment area, which is a natural unit, was created to support this policy territorial management - (Brun, Lassere, 2011) [BRU 11]. In France, these principles were enforced by the 1964 Water Act. They were then integrated in the European Water Framework Directive (WFD), in 2000⁴. The objective is to carry out action plans based on the basin or sub-basin of a lake or river, and not based on their politico-administrative unit. Thus, a hydro-geographically coherent policy should be developed and implemented. Indeed, water naturally flows and acts independently of political-administrative borders or public matters differing from one catchment area to another (such as floods, pollution and water shortage). This principle was adopted by the Marine Strategic Framework Directive in 2008 (MSFD)⁵ for maritime waters management. Nonetheless, despite promoting Integrated Coastal Zone Management (ICZM), it has never been implemented. Although counting on territories helps to organize water management (also called the "great water cycle"), sectoral breakdowns based on already existing national public actions are still running. This includes drinking water and distribution management, flood risk management, bathing waters, waste waters, shellfish waters, etc. This territorial model does not replace the intervention of political and administrative authorities. These elements contribute to a fragmented coastal water management.

3.1.1. The coastline: in-between integrated water management policies

The Water Framework Directive or WFD (2000/60/EC) aims at achieving or maintaining good status of surface water and groundwater on European territories, including the outermost regions (ORs). In France, the directive has been implemented on river basins by developing Master Plans for Water Development and Management. The Marine Strategic Framework Directive MSFD (2008/56/EC) aims at achieving or maintaining good environmental status in marine waters throughout Europe, excluding the outermost regions. In France, this has been implemented on marine sub-regions by developing a Marine Environment Action

⁴ Directive 2000/60/EC of the European Parliament and of the Council from the 23rd of October 2000 establishing a framework for a community water policy.

⁵ Directive 2008/56/EC of the European Parliament and of the Council from the 17th of June 2008 known as the "Marine Framework Directive".

Plans from 2012 onwards. On instruction of the government, "these two directives have a common objective of achieving good status of waters to which they apply, waters which partly overlap" . Indeed, the coastal waters are overlapping areas. Using the WFD terminology, inshore waters include two components: coastal waters which are "surface waters located between the baseline used to measure the width of territorial waters and a distance of one nautical mile (1852 m)", and transitional waters which are "near river mouths and rivers, partially saline because of their proximity to coastal waters, but fundamentally influenced by freshwater currents" . The MSFD includes coastal waters and applies from the baseline.

The goal of these directives is to bring degradation of water quality to a halt and restore the good status of both land and marine waters. According to the WFD, good status water is defined as "water that allows a rich and diversified animal and plant life, that is free of toxic products and available in sufficient quantity to meet all human uses and activities". "Ecological status look at the ecosystem as a whole. It is based on biological parameters (such as the abundance of fish species in a river) and considers the physic-chemical parameters (for example the oxygen dissolved in water or the temperature) and the morphology and hydrology of the environment. Chemical status is assessed on the basis of the presence and concentration of pollutants in water. Chemical status is divided into two categories: "good" and "not good". Ecological status has five categories ranging from "very good" to "poor". The definition of good environmental status of marine waters reflects the above: "marine waters that protect ecological diversity and dynamism of cleaned oceans and seas, that are healthy and productive under their inherent conditions, and that provide a sustainable environment, which safeguard its resources for present and future usage and activities". Both policies set objectives imposing obligations to achieve results according to three principles: integrated management, consideration of environmental and socio-economic data and public participation. The goal is to articulate expertise and management at a river basin level. Following an iterative process, the principles are part of a 6-year cycle including successive phases of evaluation, definition and implementation of measures. The WFD predicted that good status would be achieved in 2015 while the MSFD planned on reaching it in 2020. Both policies are at different stages of the program, the WFD being in the evaluation phase of the second cycle (2016-2021) and the MSFD having just completed its first cycle (2012-2018).

The policies are implemented in hydro-geographical basins as shown in the map below. According to the WFD, coastal waters are connected to the nearest river basin district. The Pertuis Charentais depend on the Adour-Garonne basin for the Sèvre and Charente basins, and the Loire-Bretagne basin for the Sèvre-Niortaise basin. These three Pertuis are also located in the river catchment area to which they

connect. According to the MSFD, the Pertuis Charentais belong to the submarine region of the Bay of Biscay (see Figure 3.1).



Figure 3.1. Territories of Water Management in the Pertuis Charentais

Giving territories the responsibility of carrying public action implies new governance principles, including concerted management. Water policies are a symbol of participatory shift in the public action (Participations, 2018) [PAR 18]. It has long promoted a principle of concerted management involving all water bodies (often referred to as the "Water Parliament" in France). For each basin, an administrative agency called the Water Agency is responsible for implementing the Water Development and Management Scheme. The scheme is defined by a basin committee composed of representatives of the state services, local authorities and water bodies. A local water commission is in charge of defining actions in compliance with the Water Development and Management Scheme and detailed in the River Basin Management Plans. The composition of the commission is defined by law⁶ and made to represent all water users. Thus, 50% are representatives of the

⁶ Article R212-30 of the Environmental Code.

municipalities, 25% are users and 25% are members of the state services. All 3 Pertuis Charentais are included in the scope of one River Basin Management Plan⁷.

The regulations on marine waters are more recent and rely on government services. Indeed, each marine sub-region is led by the Maritime Prefect, responsible for the development and implementation of a reviewable Marine Environment Action Plan, such as the Master Plans for Water Development and Management, every six years. The Prefect is helped by a front-line maritime advisory council which includes representatives of the State, of public bodies and of local authorities. It also comprises members of professional activities, companies and employee representatives whose actions are directly linked to the exploitation of the sea and the coastline. In addition, the advisory council welcomes NGOs representatives promoting the protection of coastal and marine environment or protecting coastline and sea users.

Coastal waters are interface between the two policies (the WFD and the MSFD) which are in-between freshwater and marine water policies. Both management plans should be implemented simultaneously and in a coherent manner. Depending on the impact location and the pressure origin, the Marine Environment Action Plan and/or the Water Development and Management Scheme should apply. The monitoring of water status is an environmental innovation as it aims at preserving good chemical and ecological statuses of water regardless of its usage. Good status underlines the environmental state and ability to ensure the development of fauna and flora. However, it is not a qualitative marker.

3.1.2. Coastal waters: controlled and regulated according to their uses

Historically, water policies are first and foremost public health policies (Barone, Mainz, 2019) [BAR 19]. States have monitored and regulated water quality to avoid human risks. The promotion of water management organized in territories kept the pre-existing sectoral regulations. Monitoring the water ecological status did not substitute but complemented health monitoring. Thus, prior to the creation of the mentioned Directives (WFD and MSFD), coastal waters and the two activities that are of interest in this paper – namely bathing and shellfish farming – were regulated,

⁷ Refer to the SAGE Sèvre-Niortaise and Marais Poitevin documentation, which was approved on 29th of April 2011 (<https://www.sevre-niortaise.fr/documentation/download-category/sage-sevre-niortaise-et-marais-poitevin/>), SAGE Seudre approved on 7th of February 2018 (<http://www.sageseudre.fr/sage>), and SAGE Charente pending for approval (<http://www.fleuve-charente.net/domaines/le-sage/projet-2>).

including by European law. The Swimming Directive was adopted in 1976 and then replaced by a new one in 2006⁸. It mentions a set of parameters to follow so that bathing waters are compliant. In the Pertuis Charentais, the bathing water quality is monitored by a decentralized service of the Ministry of Health, the Regional Health Agency (RHA). In 2018, 91 sea bathing areas were monitored. The majority of the Charente-Maritime sites are of excellent quality. Indeed, 71% of sites are assessed as excellent, 26% as good, 2% as of sufficient quality and one site is of insufficient quality. When quality is insufficient, the mayor should prohibit bathing.

The Shellfish Water Directive adopted in 1979 was replaced by a new directive in 2006⁹ requiring States setting threshold values for water quality, establishing pollution reduction plans and monitoring waters. Article 1 defines shellfish waters "as coastal and brackish waters designated by Member States as in need of protection or improvement to ensure the life and growth of shellfish species (bivalve and gastropod mollusk), thus contributing to the good quality of edible shellfish products". This shellfish directive was repealed in 2013 by the WFD. The biological and physico-chemical parameters of the 2006 Shellfish Water Directive are now used to assess the quality within river basins. Nowadays, the shellfish water safety classification is based on European regulations 853/2004/EC and 854/2004/EC. A decree from 2013¹⁰ enables to set microbiological thresholds of each category: – A, B, C or NC – and classify the potential activities of recreational and professional fishing. The decree distinguishes three groups of shellfish species (marine gastropods, burrowing bivalves and non-burrowing bivalves) which are classified based on their contamination and purification potential with regard to microbiological contaminants.

Monitoring is carried out regularly by a public state institution, the French Research Institute for the Exploitation of the Sea (IFREMER – Institut Français de recherche pour exploitation de la Mer), in charge of several monitoring networks including the microbiological control network, which monitors the professional production areas to classify or declassify the products (A, B, C, NC); the phytoplankton and phycotoxins observation network which monitors toxic or

⁸ Council Directive 76/1160/CCEE of the 8th of December 1975 on bathing water quality

⁹ Council Directive 79/923/CCEE of the 30th of October 1979 on the quality required for shellfish waters. Directive 2006/1113/CCE of the European Parliament and of the Council from the 12th of December 2006 on the quality required for shellfish waters.

¹⁰ Decree of the 6th of November 2013 on the classification for health monitoring and management of production areas and relaying areas for live shellfish.

harmful species to the marine fauna in coastal waters, particularly those at risk for shellfish consumption. The chemical contamination observation network assesses the level of chemical contamination in classified shellfish production areas. Based on the chemical contamination observation network assessment, the departmental direction of territories and sea service of the Ministry of Ecological Transition and Agriculture classifies areas¹¹ and triggers alert processes in the event of contamination. In 2017, "the alert system was used 21 times after a contaminant detection and 1 time for preventive reasons (N0), subsequently engaging the level 2 alert system. In 2017, the system resulted in 41 additional samples and analyses. One must note these devices are only used for professional fishing. Let's add that since 1996, in the Charente-Maritime, the regional health agency (RHA) has also carried out bacteriological monitoring for recreational fishing leading to regulatory measures.

Monitoring the quality of shellfish or bathing waters induces regulatory effects. Bathing, shore fishing or marketing shellfish products may be prohibited due to poor water quality. Given the socio-economic challenges with regards to tourism and shellfish farming activities, local authorities may also decide to pursue proactive policies. They directly or indirectly contribute to supporting tourism and shellfish activities, particularly funding research and development programs. The following groups participated financially: the agglomerations of Marennes-Oléron and La Rochelle in the Local Action Group Fisheries Aquaculture¹² and the Nouvelle-Aquitaine Regional Council in the Regional Center for Aquaculture Experimentation and Application¹³. The Charente-Maritime department has also developed a coastal water monitoring plan, although water management is not its competence. Following the identification of pollutants when port dredging (which the department is responsible for), the department has developed a pollution monitoring system to prevent further spreading¹⁴. It has set up its own coastal water monitoring networks, including the bathing water quality monitoring network (2011); the shellfish production area quality monitoring network (2014); and the "coastal water" plan (2014). Thus, counting on its own networks (RCD17), the department monitors surface water, adding to the WFD system. It analyzes more than 150 parameters linked to sanitation, agriculture, drinking water supply and

¹¹ <http://www.atlas-sanitaire-coquillages.fr/classements-sanitaires>

¹² Territorial project funded by the European Maritime Affairs and Fisheries Fund for the sustainable development of local maritime sectors. There are two European Maritime Affairs and Fisheries Funds in this territory.

¹³ Association whose objective is to promote the development of aquaculture and shellfish farming in the Poitou-Charentes region.

¹⁴ The treatment of polluted sludge is expensive.

swimming. The department also provides technical and financial support to municipalities monitoring the coastal water quality voluntarily, also called active monitoring. Municipalities with bathing areas also benefit from assistance: "we provide technical assistance for water quality management to municipalities in our department, including coastal territories"¹⁵.

To sum-up, from a geographical point of view, coastal waters are in-between two environmental policies, organizing territorial water management. These policies aiming at achieving good ecological status are the WFD – for land waters – and the MSFD – for marine environment. In coastal waters, which are first defined by their uses (bathing or shellfish farming), both directives apply. Their quality is monitored and regulated by public health policies, involving various stakeholders.

3.2. The difficulty of publicizing coastal water quality

The long-standing existence of these policies emphasizes the numerous activities depending on coastal water quality. Yet, the issue is not at the heart of the political and media agenda. While the local press reports on the beach quality every summer and writes on fishing and marketing bans, the coastal water quality is little discussed¹⁶. In the Pertuis Charentais, the quality of coastal waters and the related consequences, including on shellfish farming, is not a main public matter. Other than a few isolated cases of long-lasting bathing prohibition, the coastal water quality in the Charente-Maritime region has not had negative impacts on tourism. Nonetheless, shellfish farmers have been concerned for years about the rise in shellfish mortality. Several mortality events have occurred in hollow oysters (*Magallana gigas*) and common mussels (*Mytilus edulis*) since the 1970s. At the time, an epizootic disease (gill disease) eradicated the Japanese oyster (*Magallana angulata* or *Crassostrea angulata* depending on the classification), forcing oyster farmers to change their production methods and replace their livestock by hollow oysters (*Magallana gigas*) between 1969 and 1972. Another critical event is the OsHV-1 herpesvirus epizootic in 2008, which destroyed more than 80% of the hollow oyster spat. Since 2008, abnormal spat and juvenile oyster mortality rates have been observed each year. Since 2012, abnormal adult oyster mortality rates have been noted. Finally, in 2014 and 2016, mussel mass-mortality rates were noticed. In addition, many shellfish areas have been downgraded, and some faced

¹⁵ The 8th of March 2019, Interview, officer in charge of studying vulnerability profiles of shellfish production areas, coastal water quality unit, sea and coastal management, service of the departmental ports of Charente-Maritime.

¹⁶ We are far from the controversy that the green algae created in Brittany. Refer to (Brun, Haghe, 2016; Levain, 2016) [BRU 16] [LEV 16].

administrative closures due to poor bacteriological results or the presence of toxic algae in the Pertuis Charentais. To understand and tackle these issues, IFREMER carried out observation and analysis programs (shellfish observation network RESCO in 2009, MYTILOBS in 2012 and MORBLEU between 2015 and 2018). However, even in case of disasters, an event or a social fact is never a public problem by itself. The agenda-setting of a problem do not depend on the “gravity” of a social problem but on the political work of policy entrepreneurs (stakeholders, elected representatives, interest groups, etc.)¹⁷. This political work is even harder when public systems are led by well-established coalitions, as in the case of water policies¹⁸. It is also impacted by the tricky media coverage situation, the unbalanced powers between the public society and farmers, and the almost impossible objectification of coastal water quality.

3.2.1. The "controlled publicity" of coastal water quality and the consequences on the shellfish production in the Pertuis Charentais

In the Charente-Maritime region, debates on water mainly focus on water quantity¹⁹. This problem is taken seriously in the following basins – Sèvre-Niortaise, Charente and Seudre – because, since the 1990s, numerous associations have denounced the water usage by corn farmers. This means that the controversy over water quantity, its use and management is the result of the mobilization of policy entrepreneurs that succeeded in problematizing and politicizing the problem, by identifying causality and responsibility between the water quantity and the agricultural practices. Three arguments can be put forward to explain the difference in the construction of water quantity and water quality problems.

First, coastal water quality impact coastal stakeholders, which could also be both the cause and first victim of pollution and degradation. The recent reflection on plastic waste illustrates it²⁰. Roughly, 80% of pollution comes from the land. But

¹⁷ The case of the “green algae” problem is emblematic of how public problems are constructed mainly by pointed out the responsibility of a social group (here the agricultural stakeholders), whereas for a long time, the agricultural pollutions was thought as “diffuse” (Bourblanc, Brives, 2009) [BOU 09].

¹⁸ Similar analysis in the field of coastal management (Jordan, Greenaway, 1998) [JOR 98].

¹⁹ Having extensive literature on water-related conflicts in the Charente basin, refer to (Granjou, Garin 2006; Mazeaud, 2011; Bouba-Olga, Boutry, Rivaud, 2010) [GRA 06] [MAZ 11] [BOU 10].

²⁰ Refer to the following example <https://www.sudouest.fr/2019/08/22/ces-dechets-qui-de-rangentca-bouge-dans-le-departement-6469276-1352.php>

coastal stakeholders are under-represented in (land) water management commissions. A representative from the commission in charge of the Seudre River Basin said:

"Officially, the composition should be balanced as the local water commission includes representatives of the agricultural sector, of the shellfish farming, of the environment, of water users. But, in numbers, for one seat, many members from the agricultural area will come in groups, and, although they do not participate each time, we tend to see them more. They dominate. [...] They have a strong influence on writing documents."

The situation is similar in the Charente local water commission, the facilitator in charge of the Charente River Basin highlighted:

"The situation is similar in the entire Charente basin. There are bottom-up stakeholders but many more top-down players. The power relationship between the various users exist. They are several factors involved. In addition, shellfish farmers are not as organized. Each department possesses one chamber, which relies on agricultural trade unions and services. It is nationally structured, and implies having lobbyists. I do not mean that the shellfish farmers do not benefit from lobbying. However, the lobbies fight for powers. There are "cartographic, and geographical" power relations as well as power relations based on the activities".

Farmers quickly understood the need to invest in water management in order to influence policies that directly affect them. Due to their economic weight and organization, they can restrain measures on irrigation or inputs which are not in their best interests. In addition, they could guide River Basin Management Plans on managing the main issue, namely maintaining water resources to enable the irrigation of field crops, particularly maize crops. Promoting agricultural interests put pressure on both water quantity and quality, on which shellfish farming depends. Thus, even if land and shellfish farmers share common values that help maintaining their relationships (Bossuet, Boutry 2012) [BOS 12], they do not have similar interests nor resources. In local water commissions, situations are clearly uneven. Therefore, reports of local water commissions from Charente and Seudre have never mentioned discussions on coastal water quality and shellfish mortality.

Facing a well-structured and dominant coalition, entrepreneurs often resort to media coverage. This strategy used by environmental groups and fishermen opened doors for discussions on quantitative water management. The method consisted in showing dead fish through repeated drying or pointing fingers at corn farmers for

using drinking waters for irrigation (Mazeaud, 2011) [MAZ 11] . On Tuesday, 5th of August 2014, a group of roughly 300 shellfish farmers gathered in La Rochelle to show their anger after mass-mortality hit their oyster farms. They dumped empty shells outside the prefecture to challenge the State and its permissiveness²¹. Professionals condemned "the growth of pesticides in estuaries, the rise in water temperature, the multiplication of pathogens and the dumping of dredging sludge"²². However, protests are rare among shellfish farmers. It's uneasy for shellfish farmers to pointed out the responsibility of land famers, whereas they share common values (Candau, Deldreve, Deguit 2012) [CAN 12] . In addition, developing a media coverage strategy might be tricky. Going public may damage the territory image and its activities. The director of the Charente-Maritime regional shellfish farming committee underlined the phenomenon:

"If we mention mortality rates, the marine environment deteriorating, the environmental quality, the message is not that positive. We always aim at making positive statements on the quality of our products, their nutritional interests, their taste, rather than talking about mortality or environmental degradation. But, at some point, remaining passive and not acting will work against us"²³.

The third explanation remains in the fact that media coverage is tricky. The pollution is invisible to the naked eye²⁴, and shellfish farmers cannot rely on expertise to identify causality and responsibility. On the basis of current scientific knowledge, it is difficult to explain the oyster mortality. Despite IFREMER carried many studies, the reasons remain poorly understood. Two potential causes were noted: the production methods and the types of species exploited as well as the poor quality of coastal waters. Nevertheless, no causal connection could be made between the contamination and the mortality rate. With this objective in mind, the Regional Council of Shellfish decided to co-finance a scientific project called AQUAECOs (Improvement of the environmental quality and limitation of the pesticides and microplastics toxicity on shellfish activities located in the Pertuis Charentais). The goal is to study the toxicity of microplastics and pesticides on common mussels and hollow oysters to, then, research and provide solutions to reduce toxic impacts.

²¹ " Oysters, mussels: farmers shout their distress" (Huîtres, moules : les éleveurs crient leur désarroi), Le Monde, Saturday, the 9th of August 2014

²² idem

²³ The 25th of February 2019, Interview, Director of the CRC 17.

²⁴ Unlike quantity or nitrate pollution matters, which promote the appearance of green algae.

To sum-up, the degradation of coastal water quality has negative impacts on numerous activities, particularly on shellfish farming where oysters suffer from excess mortality rates. While the causes of the degradation are unknown, we know for a fact that 80% of pollution in coastal waters comes from the land. However, coastal stakeholders are under-represented in water management bodies and benefit from less influential positions. On the contrary, members of the agricultural sector have significant influence on economic and political levels in the region. Moreover, shellfish farmers cannot implement media strategies that may negatively impact their activities, as they do not rely on expertise to identify causality and responsibility.

3.2.2. The quality assessment of variable-geometry coastal waters

The good status of quantity (such as water flow and groundwater level) is based on the river itself. On the other hand, water quality is measured using standardized indicators²⁵. The water quality assessment may easily lead to regular monitoring enabling the classification of areas or bodies of water. Based on the WFD, the decree from the 25th of January 2010 sets biological and physico-chemical parameters to evaluate surface waters. The monitoring control network (RCS) put in place is responsible for carrying out the assessment. Some water bodies benefit from a deadline extension (up to 2012 or 2027) in order to achieve good water status. The monitoring of these areas is dealt by the operational control network (RCO). The IFREMER then uses the measurements to qualify the status of water bodies. The method detailed in article R212-10 of the Environmental Code is the following: "the status of surface water is determined using the worst measures recorded on both the ecological and chemical statuses". Therefore, a poor result in one of the parameters reduces the overall status of water bodies. A "WFD Atlas", compiling the results, is available for individuals to look at the water quality. They may filter which water body they are interested in²⁶. Most of the water bodies located in the Pertuis Charentais are stated as in "good condition".

The MSFD also defines indicators to assess good water status. However, the list is not as stable as the one from WFD, which is an older body. The measure consistency of the good ecological status of water bodies remains a major issue, mainly for coastal waters. Despite having similar categories of indicators (whether

²⁵ On the development of these indicators, refer to (Bouleau, Carter, Thomas 2018) [BOU 18].

²⁶ This web tool is available using the following web link:
http://envlit.ifremer.fr/var/envlit/storage/documents/atlas_DCE/scripts/site/carte.php?map=AG (page consulted on 15/05/2019).

they are physical, biological or hydromorphological), the studied components vary. In addition, for the same descriptor, the preferred indicator may differ. Nonetheless, "scientists setting thresholds and determining good status are for the harmonization of the two directives. This will prevent different regulations from being applied to similar parameters/perimeters"²⁷. Thus, to control costs and respect the years of experience of the WFD, the joint WFD-MSFD recovery zone will first harmonize their methods on assessing water status. Therefore, the indicators of good ecological status of marine waters used are the one defined by the WFD.

To monitor biological and chemical parameters of coastal waters, the IFREMER can rely on existing networks monitoring bathing and shellfish waters. However, the status determination of water bodies rests on sectoral indicators, which are based on water usage. Public health scheme includes monitoring in their plan. Two bacteria – *Escherichia coli* germs and intestinal enterococci, which are known to be dangerous for humans, are sought after. However, the health impact depends on how these bacteria were put in contact with humans. Therefore, the thresholds vary according to the prohibition of bathing, fishing or marketing shellfish. In the case of shellfish waters, chemical contaminants are also measured.

Thus, the same water area could be cleared for one use but not for another. Nothing could prevent a body of water in good ecological status from being declared of insufficient quality for such activities. Although the articulation of ecological status and chemical status of the WFD plans for a declassification mechanism, there is none in place. Indeed, the poor status of one of the parameters does not reduce the overall water status. Given the socio-economic consequences of limiting or prohibiting uses, the qualitative approach is difficult to adopt. The variable-geometry definition given for coastal water quality blurs the notion of quality, or good status, itself. Indeed, the various classifications based on the measures coexist.

The issue comes more from the abundance, rather than from the absence, of data available on good ecological status. Yet, current indicators are insufficient to report on the state of coastal waters. The parameters mainly assess the water quality consequences on human health. However, the biological quality of the environment should be considered, as some waters of good quality may prevent the development of species living there. Indeed, the waters in the Pertuis Charentais are in "good condition" and yet the oysters suffer from excess mortality rate. In a CESER report, it was mentioned: "shellfish farmers, by observing their products, benefit from

²⁷ The 27th of March 2019, Interview, Project Manager for the MSFD within the "Tropical Networks" group

monitoring and defending coastal water quality²⁸. Oysters are sentinel species, "whose behavior, survival and reactions are a "warning bell" for environmental disruptions"²⁹. Although the causes of oysters' death are unknown, mortality is an indicator of insufficient quality assessment. Only a few contaminants, including chemical ones present in sunscreens and excluding pesticides and micro-plastics, are monitored and measured. The products mentioned coming from human activity impact coastal waters and their effects cannot be measured nor regulated.

3.3. The Marine Protected Area: going towards a more coherent management of the "Sea-Land" interface?

The recent creation of the Gironde Estuary and Pertuis Marine Protected Area raises hopes among coastal stakeholders, particularly among shellfish farmers. The director of the Regional Shellfish Committee of Charente-Maritime points out: "[the marine park] gives them a voice, no longer preaching in the desert"³⁰. The co-financing of the AQUAECOs project gives him hopes that the Pertuis Marine Protected Area will become a key player in improving coastal water quality.

"The marine park covers a key territory, within which we are located, and its essence relies on the environmental quality and therefore the marine environment quality. We must take this opportunity. Indeed, it gathers all stakeholders, who could work collectively, discuss challenges and build a management plan or an action plan. The marine park will carry out studies and perform monitoring such as planned in the AQUAECOs project. The marine park provides partial funding to this project"³¹.

The Pertuis Marine Protected Area essence is to protect ecosystems. The marine parks were created in 2006 under the supervision of public state institution, namely the French National Agency for Biodiversity (AFB)³². They have three key objectives: the knowledge of the environment, the protection of ecosystems and the sustainable development of sea-related activities. The Pertuis Marine Protected Area located in the Gironde estuary and the Pertuis Sea was created on 15th of April 2015. It aims at promoting collaborative governance in ecosystems by gathering representatives of local authorities and state services, sea professionals (fishermen,

²⁸ CESER report, op.cit.

²⁹ <http://www.set-revue.fr/glossaire>

³⁰ Idem

³¹ The 25th of February 2019. Interview of the CRC 17 Director.

³² Law No. 2006-436 of the 14th of April 2006 on national parks, marine natural parks and regional natural parks.

shellfish farmers, port managers, aggregate extractors, etc.), recreational users (boaters, divers, fishermen, sportsmen, etc.), environmental associations, scientific bodies as well as a management board responsible for defining a territorial plan.

The first management plan dedicated to this Pertuis Marine Protected Area was adopted in June 2018³³. Thus, it is too early to observe its impacts. The Pertuis Marine Protected Area focuses, as a priority, on the coastal water quality and preserving the activities, particularly shellfish farming. To improve the functioning of the marine park ecosystems and protect the water quantity and quality, the management plan mentions the importance of strengthening the "Sea-Land" connection. This aspect is part of six key goals developed for the Pertuis Marine Protected Area. Nevertheless, the park is not competent to regulate land-based activities that impact negatively the water quality and quantity. The management plan briefly mentions principles such as raising awareness on the consequences of land activities and developing greater "cooperation" with land actors to reach "coordination". While these recommendations are fair, they do not guarantee collaboration between the Pertuis Marine Protected Area and the stakeholders. In addition, the park has no specific expertise in freshwater management. Therefore, even if the National Agency for Biodiversity implies that "the park, one of the largest marine natural parks in mainland France, responds to both natural and human challenges, while considering physical, biological, social and economic components" and develops a coherent "Land-Sea" management, its capacity of action is limited, including the degradations coming from top-down actors. This could be solved if the Pertuis Marine Protected Area promoted collaboration between coastal stakeholders and strengthened the power relationship with land actors. To date, one cannot affirm this will be the case.

3.4. Conclusion

In 1984, France adopted a coastal law to protect this fragile environment. Although the law originally contained provisions on coastal waters, they are not part of a set of public interventions. On the contrary, their management is particularly fragmented. On one hand, coastal waters, which are interfaces between fresh and marine waters, are an overlapping area between the WFD and the MSFD policies. On the other hand, coastal waters are regulated according to their uses (shellfish or bathing waters) and are mainly monitored due to public health reasons. This leads to distortion of the "good condition" or "quality" notions. While quality can be determined using standardized indicators, the preferred indicators rest on the public

³³ <https://www.afbiodiversite.fr/fr/actualites/parc-naturel-marin-de-lestuaire-de-la-gironde-et-de-la-mer-des-pertuis-approbation-du>

policy objectives and the knowledge of contaminants and their effects. Thus, with no measures connecting contaminants to the excess mortality rate observed in oysters, shellfish farmers have few resources to point out the issue and the people at fault, namely the land actors. Indeed, the waters in the Pertuis Charentais are in “good condition” and yet the oysters are dying. The recent creation of a marine natural park in the Gironde estuary and the Pertuis Sea raises many hopes. Nonetheless, no one can currently tell if this new body will reach "Sea-Land" coherence and have the power to act on land activities impacting coastal waters.

3.5. References

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