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► **To cite this version:**

Ludovic Ginelli, Sophie Le Floch. Grasping and grounding Europe through seabirds and eelgrass: Environmental policy affordances in Arcachon Bay (France). *Environmental Science & Policy*, 2021, 123, pp.58-66. 10.1016/j.envsci.2021.05.003 . hal-03255620

HAL Id: hal-03255620

<https://hal.inrae.fr/hal-03255620>

Submitted on 24 May 2023

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Grasping and grounding Europe through seabirds and eelgrass: Environmental policy affordances in Arcachon Bay (France)¹.

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Abstract

This paper draws on an empirical study to demonstrate how a ‘geographical’ work underpins the implementation of European Union (EU) directives on Birds, Habitats and Water. Indeed, this geographical work plays a key role in local institutionalizations of the EU. Our hypothesis is that social players, i.e., local actors, scientists and citizens, deploy both cognitive and material means to ‘get a grasp’ on nature in order to put environmental policies into practice. To test our hypothesis, we coupled two concepts, ‘affordance’ and ‘anchoring’, and analyzed interviews and documents relating to the implementation of EU policies in Arcachon Bay, southwest of France. Our research highlighted the importance of two affordances – ‘wetland birds’ and ‘eelgrass’ – used by social players to anchor environmental policies. Moreover, it revealed that the grasping and anchoring of nature is a social process of selection and exclusion, imposing boundaries and distributing power. For all these reasons, we conclude that ‘Europe in the making’ involves countless low and high-intensity conflicts which only locally embedded research can elucidate.

Keywords: affordance; European policy implementation; environment; stakeholders; geographical work

¹ We sincerely thank the two anonymous reviewers as well as Editors of the special issue ‘Implementing environmental Europe’ for their very detailed and constructive comments on this paper.

Introduction

The scientific literature on the implementation of European environmental policies (referred to as EEP) tends to focus on socio-political aspects of implementation, namely stakeholder relationships, institutions and instruments. In this article, we place greater emphasis on the geographical dimension of policy implementation. This has been less studied but is no less important to scrutinize non-linear processes of implementation, at a time when European Union (EU) Directives appear to be less top-down-oriented than they were formerly (Waterton and Wynne, 1996). By 'geographical dimension', we mean all thoughts, narratives, vocabulary, calculations... used by stakeholders throughout implementation, within a process of selecting and categorizing 'natural' objects, beings, and bio-physical phenomena, as well as of characterizing associated spatial issues (location, distance, mobility, boundaries, etc.) (Healey, 2004). We refer to this as 'geographical work', and contend it is part of political work, namely 'behaviour that both discursively and interactively seeks to change or reproduce institutions by mobilizing values' (Jullien and Smith, 2011). We contend it requires particular knowledge, practices and devices. Building on Barry's (2002) definition of politics as a specialist technical activity (and not only as a matter of contestation and identity), we concentrate on how actors who engage in EEP implementation come with an array of material devices and forms of knowledge which serve to define the geographical frame of political action; and how these devices and knowledge help them 'do with' the complex reality of geographical spaces and bio-physical phenomena.

To do this, we analysed a broad range of empirical material (interviews, scientific reports, local press, participatory observations) collected from stakeholders concerned with ensuring the environmental quality of Arcachon Bay (South-West France, figure 1).

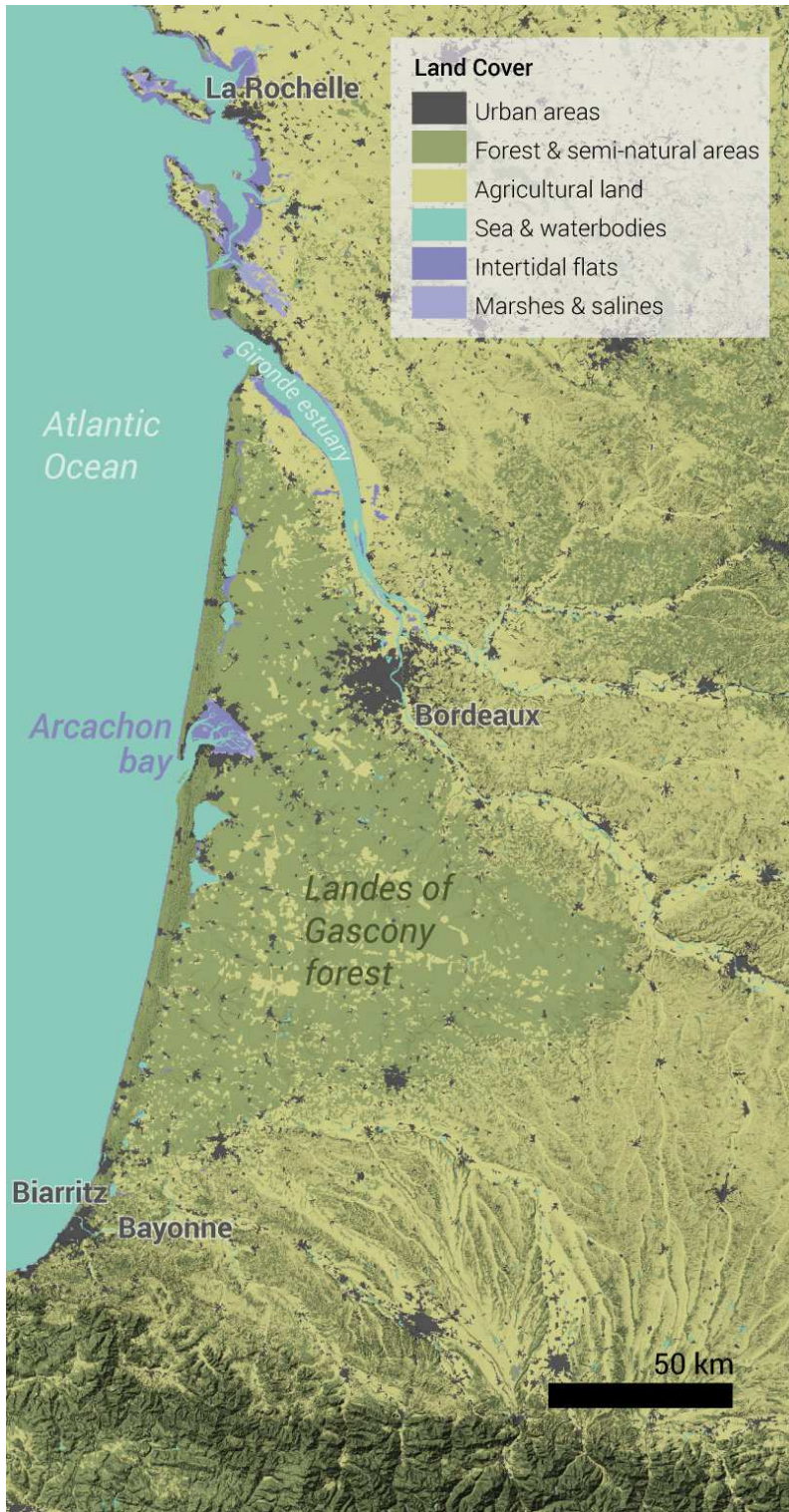


Figure 1 - Situation map of Arcachon Bay (B. Hautdidier. Sources: Copernicus (Corine Land Cover 2018), IGN (BD alti).

We examined how different local stakeholders defined two objects that were particularly relevant to them in terms of environmental issues²: wetland birds and eelgrass. We showed how these objects were first defined and subsequently deployed as means for the implementation of EEP in Arcachon Bay. Our hypothesis is that social players, i.e., local actors, scientists and citizens, deploy both cognitive and material means to ‘get a grasp’ on 'nature' in order to put environmental policies into practice. This includes considering how social players' experience of materiality can challenge previously defined categories (Jones, 2009; Lemieux, 2012), as well as help establishing (new) relationships with the bay and locally institutionalizing the EU.

To identify the characteristics of the geographical work, we developed a new ‘coupled’ conceptual tool, namely ‘affordance-anchoring’. This brings together a reflection in geography and in sociology on affordances, i.e. both cognitive and material 'grips' enabling people and the environment to interrelate. Applying this tool we contend can enable research to go beyond socio-political analyses of implementation to incorporate otherwise overlooked material and spatial components. Our key questions were: What recurring affordances can be observed in the implementation of different EEP in Arcachon Bay? How are these affordances defined and made visible by different social players, be they public actors responsible for the implementation of these policies, or others? What key interconnections do they highlight (e.g. between bio-physical components, between actors, or between humans and the environment)? How do the negotiations over their definitions and interconnections mirror changing power relationships or strategies? How do they guide actors in their efforts to define the spatial scope and limits of policies being applied?

The material analysed, gathered between 2011 and 2018, consists of face-to-face interviews among two categories of social players. First, interviews with 14 stakeholders involved in public debates on the environmental quality of Arcachon Bay (municipal authorities, State services, organized economic actors, users' or environmental associations, scientists) - some of them also involved in decisional processes. Second, interviews with 19 regular users of the bay not involved in public debates (oyster farmers, hunters, kayakers, etc.). The interview framework consisted of inviting interviewees to speak, in their own words, about what they do and observe in the bay. We gathered some 53 hours of recordings, all of which were fully transcribed. We additionally gathered documentary material: ornithological publications since the 1960s, websites, Ifremer³ reports, various studies about eelgrass beds, local press articles, and letters to local authorities.

The paper is organised as follows: we first present our conceptual framework, built around the key concepts of ‘affordance’ and ‘anchoring’, and aimed at analysing the

² This empirical material was part of a set of three local surveys that previously revealed the crucial importance of issues related to water quality and natural areas preservation, including wetlands, all threatened by intensification of human activities (urbanisation, pollution) (Le Floch and al., 2018).

³ Ifremer is the French National Institute for Ocean Science. One of its centre is located in Arcachon.

geographical dimension of the implementation of EEP. Second, through the case of 'waterfowl', we examine the construction of local affordances since the 1960s as reported by stakeholders engaged with environmental issues in Arcachon Bay. Third, we focus on the difficulty related to the anchoring of environmental policy in the case of two recent and fragile affordances, namely 'herbivorous waterfowl' and 'eelgrass beds', which compete with one another in the implementation of the EU Water Framework Directive (WFD). From this analysis, we conclude on how geographical work is a key process explaining non-linearity of EEP implementation.

1. 'Affordance' and 'anchoring': a conceptual framework for understanding the implementation of EEP

1.1. The concept of 'affordance': both subjective (intentionality) and objective (reality)

The concept of 'affordance' has its roots in the relational approach to human-environment interactions. This approach developed within certain schools of thought in geography, sociology and anthropology, acknowledges that biophysical and social realities are closely intertwined (Berque, 2000; Ingold, 2000; Picon, 1978; Barbier et al., dir., 2012; Candau et Deldrève, 2015). Authors from these different currents share the same objective, namely re-balancing bio-physical and social factors in the explanatory frameworks of their disciplines regarding human relationships to the environment.

Researchers from this school of thought have argued that relationships, socially constructed through language and practice, also always need specific environmental objects or configurations to unfold in the environment (Berque, 2000). This idea is captured in Gibson's concept of 'affordance', namely how people 'get a grasp' on nature. According to Berque, affordances refer to different possible 'grips/holds' or 'ways of plugging in' (*prises* in French) which the environment offers (*affords*) to our perception, and simultaneously the capacity offered (*afforded*) by our perception to gain hold of these grips (Berque, 2000). Affordances do not come only from the terrestrial substrate, nor do they originate from ourselves alone: they are neither exclusively objective nor only subjective, but rather imprints and matrices of our existence. What we perceive are not the properties of the object or the environment, but rather its grips or affordances, through which the subject and object interrelate (Berque, 2000). Affordances can be geographically, socially, culturally, or historically rooted. (Berque mentions the examples of the wooded mountain in China in the 4th century, the *tundar* for the Sami...).

This idea also emerges in sociology, where the concept of affordance is used in an empirical investigation into auction processes (Bessy and Chateauraynaud, 2014 [1995]; 2010). Reworked by other French authors, this concept is often associated with that of experience. It aims to understand both sensitive experiences and the complexity of their links with other forms of interpretation of material reality or phenomena (Heinich, 2009), in particular when actors articulate them through the use of regulatory instruments (Bessy and Chateauraynaud, 2010). This way of analysing affordances therefore promotes a more dynamic approach, which moves from an understanding of ephemeral 'disorder' experienced in a situation of doubt about the interpretation of material reality, to a

possible collective work of defining affordances, instruments and institutions to publicize a problem (Céfaï and Terzi, 2012).

In a similar vein, in anthropology, Ingold (2000) refers to Gibson's notion of affordance to distinguish his position from the dominant idea whereby people perceive their environment through representations which they construct in their 'mind' and which guide their action in return. Perception, Gibson argued, 'is not the achievement of a mind in a body, but of the organism as a whole in its environment and is tantamount to the organism's own exploratory movement through the world' (Ingold, 2000: 3). Such a premise, shared with the geographical and sociological approaches of affordance described above, has several implications. Perception is a means of action rather than a prerequisite for action. The knowledge obtained through perception is thus a practical knowledge: to perceive an object is to perceive what it may have to offer (what it 'affords'). 'Affordances' are therefore the particular properties of a given object, as they resonate with a user's project at a given time.

How is this concept of 'affordance' relevant when examining the geographical dimension of EEP implementation? If we consider that affordances are necessary for connecting a political vision with a given environment, implementation is not just the projection of political objectives onto objects of the environment (which would be directly modified accordingly), but rather a dynamic encounter between a bio-physical reality and an intentionality. Affordances are therefore both the means and product of political work, which is also a geographical work. By taking hold of specific objects relating to a general intentionality, actors bring out particular properties from the objects themselves. For example, through measurement devices, there may be a (re)definition of objects and spaces that stakeholders consider relevant in order to meet their management objectives. In this vein, Gosselin and Bouleau (2016) have analysed how environmental groups focused on a single species (the northern spotted owl) as an indicator of more general ecological trends. This process of selection and categorization, perfectly suited to the political cause of these groups, in turn affected all social players involved, from the scientists doing the counting to the species being counted⁴.

Through analyzing affordances relevant to the implementation of EEP, what we expect to discover is not only how 'Europe' is fashioning geographical areas through EEP implementation, but also how qualities grasped from the ground become particular spatio-temporal configurations associated to 'Europe', then contributing to its geographical definition. However, there is one piece missing in our conceptual framework to make affordances fully relevant in any analysis of EEP implementation, namely a more explicit spatial dimension. We propose addressing this challenge through the notion of 'anchoring'.

1.2. From 'affordance' to 'anchoring'

4 ... when some individuals come to take their gun to physically eliminate the 'indicator'. Gosselin and Bouleau (2016) do not use the concept of 'affordance', but their analysis comes very close to it.

Space is a fundamental dimension in any exercise of power: at the very least, there is the question of 'where' the rules apply (Elden, 2005, 2013). Governing is the process of setting rules which must be obeyed by actors, users, etc., in shared spatial surroundings. The qualities of a territory to which those rules apply may also be important (Elden, 2013). In the case of environmental policies implementation, these qualities are even more critical.

In consistency with our relational approach to affordances, we do not consider the spatial dimension of EEP as passive, fixed or *a priori* determined whereby actors' interaction is only governed by certain social rules. Instead, we consider that the spatial issues of division, delimitation, contestation and conquest, measurement and quantification, are all part of the process of implementing EEP. To exercise power, actors must designate a spatial unit in which they exert control over people, activities and phenomena. At the same time, the power they wield within and through a given space consolidates their social position (Elden, 2013; Lussault, 2009). For Lussault (2009), any practice consists in 'doing with space', and entails the mobilisation of spatial competences: implementing different technologies of distance and making use of spatial resources in general. In addition, space is a powerful and effective instrument for enhancing players' legitimacy. They may use it as an instrument to support their strategies, including those that do not intend to have spatial impacts, but which are occasionally achieved through space (Lussault, 2000).

Our argument is that the work of giving a spatial foundation to any EEP is not independent of the work of setting up affordances. Affordances connect actors with particular environmental components. When interpreting the specific components' qualities, actors unavoidably interpret the spatial characteristics that may come along with those qualities, such as 'where' they unfold, 'at what distance' of such or such geographical form (e.g. the foreshore, the high-tide line, etc.), 'where' they do no longer express themselves. In short, they define areas and draw boundaries. These scope and limits influence, in turn, the meaning of the action. For example, Cohen (2012), when analyzing change in water management, shows that as soon as water started being approached from a hydrological and ecological point of view (rather than as a mere economic resource), the spatial delimitation issue changed. Political administrative borders that once prevailed became to be seen as obstacles. New frontiers were drawn by stakeholders, defined so as to be of ecological significance as well as objectively measurable, i.e. 'watersheds'. For Cohen, this naturalization process is a means of promoting certain scales of (delocalized) governance that convey the ideologies of neoliberalism and local participation.

While the notion does not appear to be clearly conceptualized in the scientific literature⁵, we use the term 'anchoring' to describe the political and geographical process of

⁵ Only a few authors have worked on 'emprise' (in French), defined as an anchoring and/or holding process; the word is sometimes related, and opposed, to 'affordance'. For A. Berque, 'emprise' sometimes refers to the absence of distance between a living being and its environment; and it is sometimes a synonym of 'affordance'/'grip' (Berque, 2016 and 2015). According to Y. Moreau (2012), 'affordance' is built in contrast to 'holding', in the case of radioactivity due to the Fukushima disaster. In sociology, 'emprise' is

delimiting spatial extents (the flexible geometries of the 'Arcachon Bay') associated with objects constituted as affordances (e.g. 'water birds'); in the process, these areas are institutionalized as the spatial foundations of the related policies, whose legitimacy they contribute to strengthen.

We support the idea that work on and through affordances is also work on (re)defining the spatial foundations and limits of a given policy; this work is vital to localized implementation, as much as it can affect in turn the way stakeholders act upon objects and phenomena. Once they are defined as affordances, objects are important in themselves, but also as they play a significant role in providing access to a spatial extent, which then provides an anchor point for EEP.

2. A history of 'waterfowl' affordances: from participation in international ornithological inventory to local EEP anchorage

In our case study, the earliest affordances were forged in the 1960s by stakeholders worried about environmental issues in Arcachon Bay. They referred to the generic 'waterfowl' category. Below, we successively present the first waterbirds inventories carried out in the context of an international study - with the help of local volunteers - and their growing geographical dimension as the conservationist awareness of wetlands began to take precedence over bird data. Then, we analyse how European policies appear to have encouraged local actors to elaborate upon the link between these two categories, and why this process occurred much later on.

2. 1. The 'ornithologist international': an inventory perspective and its projection on the world map.

From the 1960s to the end of the 1970s, the counting of 'waterfowl' was a matter for specialists, professionals and volunteers, on the initiative of the International Waterfowl Research Bureau (today Wetlands International). This international group was composed of ornithologists from the International Council for the Protection of Birds (today, BirdLife International), as well as governmental agencies regulating hunting (*Office national de la chasse et de la faune sauvage*, for France) from Europe, the Black Sea, North Africa, and some of the western Gulf states. Locally, counting made use of basic measurement devices to determine the number of birds and their geographical distribution, hence connected these actors with the biophysical reality of certain 'natural' components and their spatial surroundings. The words 'observation', 'counts', and 'monitoring' which were associated to certain bird species transformed them into affordances; these affordances then acted as catalysts for the categorization process of certain sites, for example 'wintering areas'. Sub-categories of waterfowl were also

conceptualized in the sense of 'hold', namely the strong moral influence taken by individuals / groups over others. A takeover of the experiences of the social world by certain actors (Chateauraynaud, 2015) involves interindividual but also collective power relations to be incorporated into established motives (Bouleau, 2019).

created; they were sometimes very specialized (academic terminology), and sometimes dedicated to specific emblematic species, such as ‘anatidae’, ‘shorebirds’, ‘swans’, etc.

In the beginning, categorization and enumeration of birds and sites were the most prevalent approaches. However, the geographical dimension of these approaches had not been fully thought through. The 'sites' within which observations took place were not clearly delimited nor characterised. Because this process was not connected to any policy, the anchoring process was not of key importance. What mattered was being part of international effort to construct a map depicting bird migration, on which lines represented connections between ‘sites’. From the 1970s onwards, in the context of the centralization of counts by a scientific national correspondent⁶, anatidae counting had to be representative at regional scale to harmonize data and facilitate international comparisons. In Arcachon Bay, some ‘sites’ initially defined and prospected disappeared so that only the broader unit ‘Arcachon Bay’ remained. A new even broader geographical unit was also created: 'Aquitaine'. Nevertheless, due to a lack of time and resources, local observers hampered the collective construction of affordances. There was limited sharing of their intense geographical work on waterbirds affordances:

‘In 1974, the Banc d'Arguin natural reserve was created. An ornithologist was working there, and [the association that manages the reserve] had a boat, something they didn't have before. (...) In the early 80s, the Arguin ranger was replaced by a much less competent guy (...). There are gaps in data series. In 1984, I started working here and I thoroughly observed geese from 1984 to 1988 or 1989. I wrote down a few things about their distribution, their location according to the tide etc. (...) I have lost my notes, by the way.’ (an ornithologist from Arcachon Bay, 2012)

Documentary evidence of these counting operations appears to have completely stopped in the 1980s; data relating only to 1993 and 2001 were subsequently published⁷. Nevertheless, data continued to be centralised at national and international levels through Wetlands international counting and basic counting reports were delivered online.

At the same time, the conservationist vision, strengthened internationally in the wake of environmentalism, became broader and included local issues: for example, for Arcachon Bay, ‘anatidae in wintering period’ were counted. However, this period coincided with the hunting season, which itself was a cause of disturbance to wintering birds. More broadly, a conservationist perspective led to international awareness of ‘wetlands’, instead of a focus on birds. The original purpose of the counts, namely identifying ‘sites of international importance for waterfowl’, began to change, a slow process that would take about three decades.

In the meantime, an international project called MAR – the first three letters of the word for ‘marsh’ in French, English, Spanish and Italian – was launched (in 1960). It set the stage for the 1971 Ramsar Convention, ‘relating to wetlands, particularly as habitats for

⁶ A biologist from University of Rennes held this position for a long time, in collaboration with the French League for Bird Protection since 1987, which still carries out this role.

⁷ Source : https://www.faune-aquitaine.org/index.php?m_id=1183&item=17

waterfowl'. In this context, the term 'marsh' was changed to 'wetlands', and specific criteria were created to define it. Significantly, the 'International Wildfowl Inquiry' became the 'International Waterfowl & Wetlands Research Bureau'. All of these examples show how geographical matter was introduced into bird counting processes: spatial areas first seen as two-dimensional spaces where bird populations were located became viewed as 'living areas', referring to the inseparable relationship between birds and their geographical habitat.

The international politicization of waterfowl counts occurred in connection with another issue, that of 'marshes'. This 'ecologization' of bird counts – i.e., their reconceptualization incorporating ecological concerns (Ginelli, 2017) – was established in 1971 by the Ramsar convention, which confirmed the link between 'waterfowl' and 'wetlands'. The ecologization of bird counts not only entailed the putting in place of a relational approach when defining these two entities. It also required their quantification through internationally standardised protocols to improve the scientific value of counts for defining conservation priorities. The Ramsar convention not only reinterpreted counts from this perspective, but also identified sites where the links between these two entities would be the strongest, namely what became known as 'priority sites for the conservation of wetlands'.

However this ecological turn in respect of the 'waterfowl' affordance was far from evident in France. While bird counts had been carried out since the 1960s with support from some famous naturalists such as Luc Hoffman, France only began to (re)consider these environments and waterbirds three decades later. Importantly for this study, this occurred under the impetus of emerging EEP.

2.2. European policies: local (late) 'rediscovery' of the waterfowl/wetlands link

In line with the international movement already underway at the time, the 1979 European Birds Directive reaffirmed the link between wild birds and habitats (especially wetlands) but with a focus on birds. The European Important Bird Areas (IBA) which had been designated following inventories carried out under the Ramsar Convention (which did not lead to any specific protection measures) were to be turned into Special Protection Areas (SPAs), a label the Directive instituted. However, this was neither an automatic process (implementation was to be at the discretion of each Member State) nor a central objective. The Ramsar International Convention was ratified by France in 1986 and was not transposed into French law until 1992, when wetlands were established as remarkable ecosystems to be preserved. The French State's reluctance to embrace such an ecologization process (even when carried out by local actors) is evidenced by its (op)position to SPA. By 2009, the French government had not requested any protective zoning (SPA) for the IBAs of Aquitaine which had been identified since the 1990s. In the Arcachon Bay, what became SPAs between 1986 and 1988, *before* the local implementation of the IBA initiative, were three existing natural reserves whose creation had no link whatsoever to the 1979 Birds' Directive. These new protected areas covered a geographical unit that was not very well defined, i.e. the vague unit labelled 'Arcachon Bay and the Banc d'Arguin'.

This finally resulted in a lack of any kind of geographical affordance in the implementation of EEP, and the two affordances ('waterfowl' / 'wetlands') were kept as separate reglementary entities.

Concurrently, from the 1980s, ornithologists and hunters aware of the political importance of counting birds in the context of increased competition for the production of naturalist data (Alphandéry and Fortier, 2007a), had decided to perform their own counts and create their own protocols. However, these different methods led to enormous discrepancies between the figures provided, one method sometimes giving three times as many birds than another.

The 1992 Habitats Directive was a turning point, as the link between species and habitats began to take center stage. The relational dimension was expressed in the geographical imaginary of the Natura 2000 network, which aimed to integrate SPAs, including descriptions of environments, identification of threats and causes of degradation, in the perspective of formulating objectives. As stated above, the implementation of the Directive in France came relatively late in the day, after the strong opposition of the 'group of nine', bringing together the main representatives of the forestry, agricultural, hunting and fish farming communities (Alphandéry and Fortier, 2007b). This resulted in the classification of Arcachon Bay as an SPA in 2009, though the label was first created 30 years earlier in the context of the Birds Directive. As part of the Wetlands international network, bird counts continued to serve as references for these new zonings, which were in turn seized upon by those players implementing EEPs. In the end, this geographical work of establishing and highlighting the link between species and habitats favoured the anchoring of environmental policies.

3. 'Herbivorous waterfowl' and 'eelgrass beds': two competing affordances in the context of WFD.

If the 'waterfowl' affordance dominated the first decades of debates and efforts engaged by local actors - led by ornithologists - towards environmental issues in the bay, eventually it started to be challenged by another affordance in the mid-2000s. Part of a new generation of EEPs (Bouleau and Pont, 2014), the WFD significantly renewed the collective work of redefining affordances in the perspective of implementing EEPs in Arcachon Bay. It gave rise to geographical work through which 'eelgrass beds' progressively came to the fore. We first look back at the period when eelgrass beds began to gain in visibility from the perspective of traditional waterfowl affordances in public debates. We then analyze the non-straightforward redefinition of the 'eelgrass beds' in the context of the WFD. Finally, we examine the consequence of the construction of the 'eelgrass beds' affordance from the perspective of WFD implementation.

3.1. 'Grass', first a satellite entity to the waterfowl affordances

Although 'grass', as it is usually referred to locally, was for a long time invisible in public debates on Arcachon Bay, both the quantitative and ecological importance of intertidal (*Z. noltii* or small eelgrass) and sub-tidal eelgrass (*Z. marina* or large eelgrass) had been recognised by local scholars since the 18th century. Scientific and

administrative archives (Maritime Affairs) refer to significant fluctuations in grass quantities. Indeed, our survey revealed that users who were familiar with the environment (oyster farmers, hunters, environmentalists, etc.) referred mainly to *Z. noltii* as 'grass' and knew about its past fluctuations. But it was not until the end of the 1980s that grass beds became an object of research *per se*, as a result of pure scientific curiosity⁸. This being said, they nonetheless remained invisible to public actors in charge of environmental policy until the mid-2000s. Even the Habitats Directive, which led to active categorization work (at European and national levels) and which characterized habitats of the Atlantic coast and of the Bay in particular, did not fashion grass as a local affordance. Moreover, the 2003 international decision to include eelgrass beds in the OSPAR convention⁹ did not generate any local discussion about this specific component of the bay.

In the winter 2004-2005, different users of Arcachon Bay respectively raised the alarm about the grass on the basis of their vernacular knowledge. Two citizens, a nature guide and a retired fisherman, independently informed public officials working in the Environment Service of a municipality in the northern part of the Bay, that grass beds were becoming brown and scarce. Both that same winter and the following one, actors from hunting associations also informed local authorities about the changes they had observed during bird counting operations: dark colour of the foreshore at low tide, low sea leach stock. Their concerns were relayed to the scientist who had conducted the research previously mentioned. In 2006, representatives of local authorities, scientists from the Arcachon Ifremer site, hunters and environmentalists gathered in meetings to discuss the issue. They initiated the co-writing of a report in June 2006, which concluded that the phenomenon was simply seasonal:

In fact, in 2005, we were contacted by many people who were concerned by the rapid regression of the eelgrass beds. But it was winter time, and in winter it is normal for the eelgrass to be less flourishing. That's why I didn't particularly wonder. (biologist, interview 2011).

The report nonetheless highlighted the need to monitor the number of two species of migratory birds consuming small eelgrass, namely the Brent Goose and the Mute Swan. This proves that the link between birds and eelgrass was a key issue for the report writers at that moment. This link gained even greater credence in a work published in 2007 by local representatives of the Waterfowl-Wetlands network. The hunters and environmentalists, who together formed this network, began to define new categorizations. Eelgrass now became 'stock' and 'food'; birds were classified in distinct categories depending on their food, as 'herbivores', 'vegetarians', or 'omnivorous opportunists'. In addition, maps showed that geese used numerous scattered areas, causing a 'dispersal' effect (figure 2).

⁸ According to the biologist who carried on the research in the context of a PhD, the person in charge of the local research station proposed the idea of the research independently of any 'social demand' nor specific funding to her as a student. She finished her thesis in 1991. (interview, 2011)

⁹ The Oslo-Paris convention framed international cooperation for the protection of the marine environment of the North-East Atlantic (effective in 2008).

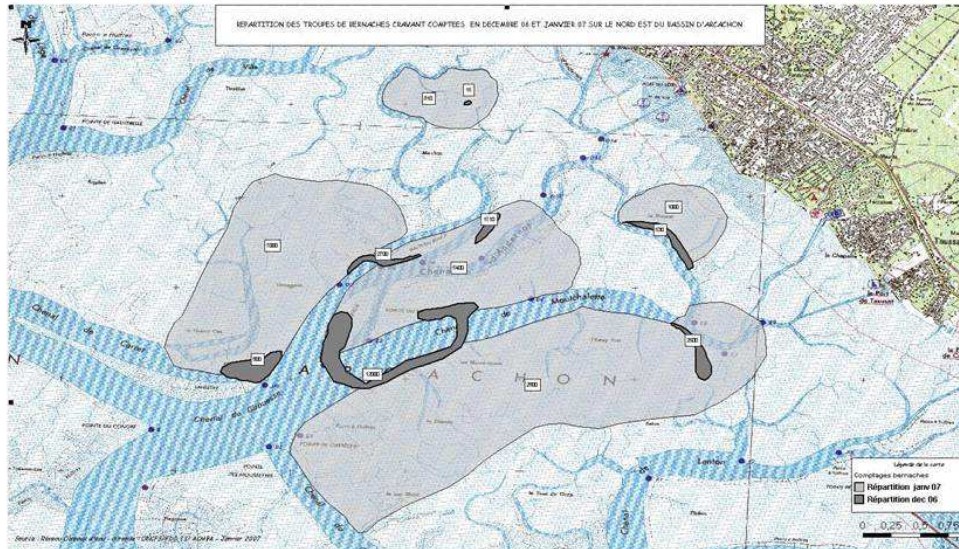


Figure 2 - The 'unusual dispersion' of geese in the North-East of Arcachon bay, as mapped by the 'Waterfowl - Wetlands' network: the degradation of eelgrass in question? (Source: J. Allou, 2007)

The behaviour of birds, whose 'number of troops' was for the first time counted by the network members, became important, and subject to greater scrutiny from a spatial point of view. Described as 'unusual' and 'mysterious', this behavioural issue - scattered instead of gathered - questioned the links between the two entities, birds and eelgrass.

Critically, these new spatial partitions mapped by hunters and environmentalists appeared to be at odds with those created by the above described anchoring process, the one realised through the implementation of the Birds and Habitats Directives. Local scientists, authorities, hunters representative and environmentalists collectively started to doubt the relevance of the affordances and of the spatial anchoring previously defined, and searched for ways to understand the regression of eelgrass beds. This work led to the formulation of a new hypothesis, namely that there was a decrease in the food stock available for waterfowl. Waterfowl has become a suspect, and bedgrass a key concern. The nature of the link between the two entities was radically changed. No longer were waterbirds in wetlands to be preserved as 'ambassadors'; instead, a number of emblematic bird species were accused of damaging specific habitats. This first step towards their construction as an affordance was going to be boosted by the implementation of a newly elaborated EEP, namely the WFD.

3.2. The 'eelgrass beds' affordance's construction: a non-straightforward process

The WFD introduced a radical break with previous policies, by integrating biology into water quality policy (Bouleau and Pont, 2014). It aimed at reaching a 'good environmental status' of water bodies according to biological, physical and chemical indicators. It entailed an *a priori* distinction of 'water bodies' and the assessment of their 'status' according to 'reference conditions'. As Ifremer was responsible for determining biological aspects, and due to the involvement of scientists working on the Atlantic coast among whom were researchers working on the Arcachon Bay, the Angiosperms criteria specifically focused on *Z. noltii* (Auby et al., 2010). In this context, Arcachon Bay was designated as 'FRFC06 coastal water body - Upstream Arcachon' and as the reference site for eelgrass. Local scientists, as ecological experts (Bouleau and Pont, 2014), were to qualify and measure this *a priori* link between eelgrass beds and the environment. When the first field surveys under the WFD were carried out, the results shocked scientists: where they thought they would find eelgrass, they only observed bare substrate.

Various interconnected and simultaneous research was commenced. First, waterbird measurement campaigns were launched, with a renewed approach involving an unprecedented level of coordination between stakeholders. The above-mentioned counting networks were merged and carried out fieldwork together. However, competition between naturalists and hunters over bird counting was revived around two issues: the reliability of protocols using bird counts to measure something new - the links between birds and eelgrass - and the impact of herbivores on eelgrass beds, a crucial element in the reworking of the spatial dimension of counting. This was the subject of several discussions including on practical implications of counting, for example whether it should be done by air, by boat or on foot. The ecologization of the 'waterfowl' affordance was evidenced by the use of the category 'herbivorous birds', based on a spatial characterization: the actors involved in counting defined six areas. As a result, counting protocols were modified. Despite the long-standing presence of ornithologists, the hunting networks eventually won the battle of data production due to their greater logistical resources¹⁰, the consequence of which was the end of this particular collaboration.

Later, Ifremer, in partnership with other regional research institutes, coordinated a program entitled 'causes of eelgrass regression in Arcachon Bay', with departmental, regional and European funds. It aimed at supporting eelgrass and bird measurement campaigns. The results published in 2011 underlined a significant regression of small eelgrass beds since 2007. Several causes were highlighted, including endemic eelgrass disease, and meteorological and hydrological factors. The authors did not draw any conclusions, except that birds were to be absolved of any blame. This marked a new reversal in the story of the bird/eelgrass link, especially around the figure of the barnacle goose. The idea that 'the goose eats the eelgrass' was replaced with 'if geese are there, then eelgrass is there'. Amid this controversy¹¹, 'waterbirds' affordance started to be

¹⁰ 'They have time and money !' (an ornithologist from Arcachon Bay, interview 2012)

¹¹ And soon after the clash over bird counting.

worked on separately again from grass. For environmentalist associations involved in bird countings, the 'exonerated' goose became an ecological emblem for Arcachon Bay.

The advent of the WFD was the beginning of a period of intense local debates. The ecological experts responsible for defining the Angiosperm criteria meant to apply to the Atlantic water bodies, namely intertidal eelgrass, came up against two major difficulties: the difficulty to 'grasp' the reality of eelgrass beds undergoing major changes; the difficulty to interpret this reality in interaction with local stakeholders who were long involved in the definition of the key affordance 'waterfowl' mobilized to anchor Bird and Habitats Directives, and who were allies one day and enemy the other day. Nevertheless, the 'eelgrass' affordance progressively became independent from the 'waterfowl' one. In the next sub-section, we analyse how the eelgrass affordance, meant to anchor the WFD, would soon become the subject of intense measurement, and challenge in turn the very meaning of this EEP in the context of dramatic environmental change in Arcachon Bay.

3.3. Questioning the local approach implementing the WFD

From 2006, monitoring of eelgrass began with the aim of calculating the WFD indicator 'Angiosperms'. Launched in 2007, the scheme was modelled on a protocol (REBENT) developed prior to the WFD to monitor *Z. marina* in Brittany. However, the two usual descriptors, namely 'the extension of eelgrass' and the 'demographic and biometric characteristics of populations', were reconceptualized. Field observations, laboratory experiments and discussions put those local scientific actors already mentioned in intense interaction with other national and European researchers. Fieldwork especially played an important role in this project. Focused on what they called 'field validation', 'field experience' and even 'field truth' approaches, scientists spent considerable time outside. 24 observations were done by 2 people, spending 95 hours of their time walking a total of 111 km just to validate the external limits of eelgrass beds.

What was at stake in efforts related to the new monitoring system associated with the implementation of the WFD was to 'grasp' a natural entity that was resisting being grasped due to temporal variation. The researchers employed two monitoring techniques: surface monitoring, whose aims were to draw the external boundaries of the eelgrass beds and to take into account their internal 'fragmentation', and stationary monitoring, designed to measure 'demographic characteristics' based on three metrics (density, biomass and area covered). Over about ten years, the protocol has undergone various adjustments. Notably, a third measurement station was added, located in a dense and homogeneous eelgrass area, and two of the existing stations were relocated. All these adjustments illustrate how materiality matters in the definition of eelgrass' properties; the process of definition consists in constant back and forth between reality and interpretation, between a property of homogeneity and one of fragmentation:

When there is no more eelgrass, do we have to stop measuring or should we relocate the measuring point ? (...) The problem is that eelgrass beds were once homogeneous, like a meadow. Now they are extremely fragmented. That's why choosing only one point of measure makes no sense. (biologist, 2011)

Because of these difficulties, the size of the spatial grid used to locate the 30 measurement points associated with each station became more flexible: the size of grid squares was reduced from 20 m to 2 m. Moreover, it was possible to adapt the shape of the grid to that of the eelgrass bed, so as both could fit. Moreover, the protocol originally included the monitoring of waterfowl. However, although the indicator remained in the successive reports, it was not updated. During this active period of the eelgrass affordances's construction, therefore, the link with the birds completely disappeared.

In the successive reports showing the results of this measurement work, scientists formulated increasing concerns about the state of eelgrass beds. The maps produced were expressive: they appeared to resemble a diseased pair of lungs (figure 3).

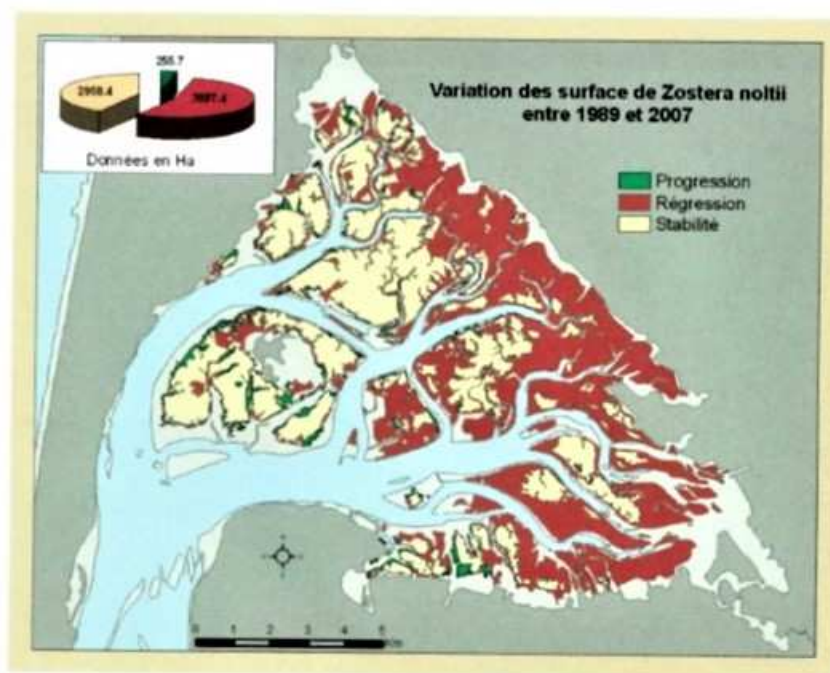


Figure 25 : Variations de l'extension des herbiers (taux de recouvrement > 25 %) entre 1989 et 2007

Figure 3 - Regression of eelgrass beds: the alarming map published in Dalloyau and al., 2009.

However, the assumption of a homogeneous eelgrass 'meadow' was still prominent and experts continued to view eelgrass regression in terms of a natural 'variability', a property they specified at different scales. These were seasonal variability; variability of the total area over the long term; spatial variability or 'mobility' (areas of bare substrate 'moving' from one year to another); and coverage variability from one place to another and from one year to another, as well as from one site to another along the Atlantic coast. All these extensive descriptions contributed to construct variability as a natural property

of eelgrass; that is why the evolution of eelgrass cover had long been considered as an inherently natural phenomenon¹².

In a first reading, we could interpret this naturalization process as an 'anti-political work', which Barry (2006) defined as a work of 'placing limits on the possibilities for debate and confrontation'. But, as underlined by this same author, the use of measurement devices do not have only anti-political effects; they may often prove to be very political too. Our analysis shows that the interpretation of the eelgrass evolution as a process of 'natural variability' is part of geographical political work. Indeed, our empirical results demonstrate that this material, cognitive and social process of defining a 'natural' entity likely to represent the Arcachon Bay as a site of reference in the end entailed change in the view both on the entity and on the Bay. As a matter of fact, experts clearly began to doubt the relevance of Arcachon Bay as a *Z. noltii* reference site, classing the water as 'average', and questioning the very notion of what constituted a 'reference site' - the very foundation of the WFD: 'We wonder if it is still relevant to consider the eelgrass beds as a reference to characterize the 'Arcachon amount water body', given their degradation' (Auby *et al.*, 2010). Slowly, experts came to suspect local environmental problems. From 2013, the idea of variability clearly began to be associated with anthropogenic causes (e.g., 'shore fishermen', 'contaminants in water'). This marks the beginning of another view on the bay that will lead to an active political debate in public space (local press, public meetings...) and, later, to many research works on air or water pollutants.

It should be noted that during this process, 'anchoring' is not particularly visible. The 'upstream Arcachon coastal water body' offered a weak grip. Its existence remained confined to technical spheres (documents defining measurement protocols) where it was barely more than an abstract category. Maps presented in monitoring reports still used background maps based on measurement campaigns carried out prior to the WFD. We therefore consider this geographical work implementing the WFD as more of an attempt to refine the internal 'texture' of the affordance than an effort to draw lines defining territorial boundaries.

The advent of the WFD, i.e. an EEP new in its object (water) and concept (biological processes prior to species or habitats) deeply challenged the construction of the 'eelgrass' affordance. Though a priori selected in the perspective of implementing the WFD, eelgrass could not play its 'grounding' role without an intense geographical work. This work proved to be a non-straightforward process governed by the powering of local actors around different interpretations of materiality, as well as by direct confrontations of expert actors with the materiality on the ground. Throughout the measurement activities, the fragmentation and scarcity of eelgrass beds came again and again, as a 'stubborn fact' (Whitehead, cited in Barry, 2006). The 'eelgrass' affordance, apparently

12 The question of 'variability' did not have the same importance nor the same treatment in the case of birds. However, it should be more important for them: they migrate, and their populations are variable from year to year, depending on a lot of factors operating at various places and scales. Moreover, as animals, they daily move.

defined in a non-political arena, would finally raise political issues about the environmental degradation of Arcachon Bay.

Conclusion

Through this empirical research, our objective has been to highlight the importance of affordances and anchoring in the implementation of environmental policies. Our analysis focused on two affordance-anchoring processes whose trajectories were very different. They can intersect or diverge with each other depending on the situation (actors involved, policies concerned, ecological states and biophysical processes, etc.), ultimately conditioning the geographical anchoring of environmental policies. Waterfowl offered a local affordance that has been used at each new political injunction, and each time it was reformulated to serve multiple interests. It often ends up bearing the brunt of numerous conflicts between social players because its appropriateness as a legitimate affordance for EEP has been the subject of considerable debate. In the case of eelgrass, the affordance was seen to circulate from one 'inner circle' of local users of the foreshore, to another, made up of scientists and experts. So far, very few people have even discussed, at least publicly, the appropriateness of this 'eelgrass' affordance when it comes to effectively evaluating environmental issues affecting Arcachon Bay. In addition, this affordance has been rarely (if at all) associated with a European environmental policy, and was designed to lend importance to the characteristics of the 'natural spatial and temporal variability' of eelgrass beds. This has resulted in the affordance acquiring an apparent a-political dimension with several consequences. Firstly, accounts by local whistleblowers in 2005 were not taken seriously by scientists. Secondly, the first signs of declining eelgrass beds observed through the WFD measurement device were not immediately considered as a major tendency, but rather a temporary situation. Thirdly, it took time for scientists to consider that there may be an anthropogenic cause behind eelgrass bed decline, and to start to explore anthropogenic factors.

In the work of implementing European environmental public policies, the constitution of affordances - meaningful connections between actors and environmental objects - and the anchoring - meaningful connections between a policy and its spatial foundation - are critical processes. Paradoxically, these processes, which almost invisibilise European institutions, are what essentially make up environmental Europe. Indeed, it could even be argued that 'wetland birds' and 'eelgrass beds', which for a long time were united in the 'herbivorous birds' affordance, are all European inventions, taking shape in a local ordinary territory. Far from the founding narratives, far from the image of Europe as simply a set of rules and regulations, as perpetuated by the media, they embody Europe, and in return give it some of the flesh without which it would simply remain an abstract entity (Bérard, 2017).

Studying implementation through the lens of geographical work therefore contributes to the scientific literature on the implementation of EEP, which tends to focus mainly on socio-political issues (i.e. stakeholder relationships, institutions, instruments) as a way of understanding non-linearity, i.e. the non-straightforward path going from objectives to intervention. Our findings suggest that implementing Europe is a non-linear process, a

characteristic that is reinforced by geographical work in which macro and micro scales are intertwined, along with rapid evolution and a number of long-term processes. This non-linearity opens the door to unpredictable implementations. Our analysis also nurtures the debate on including 'nature' in the analysis of policy implementation. Scientists/experts play an important role in transforming elements of nature into affordances as part of the implementation of EEP. However, the legitimacy of these affordances is often challenged by other stakeholders, who bring in other kinds of knowledge (practical, vernacular knowledge). Different knowledge contribute to geographical grasping and anchoring of environmental political tools, which is also a process of selection and exclusion, and of imposing boundaries. In other words, it is a matter of power. Europe 'in the making' thus incorporates countless low or high-intensity conflicts embedded in local environments.

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