The "Adaptive Management" of a New Nature along the Southern English Coastline

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Abstract

This article explores the tensions between different understandings about how best to manage a stretch of coastline that is threatened by a new piece of land that emerged out of the sea. It looks at the kinds of political worlds this environmental change has engendered and the dynamic shaping of people and places through such change. It argues that in managing the edges of the sea and land in this area, people also forge themselves as new kinds of subjects in a political landscape that is shifting and changing. Contrasting views about how best to manage these changes illuminate the politics of how best to adapt and manage different environments and the people who shape and are shaped by them.

Keywords

nature/culture; edges; adaptive management; coastal engineering; EU legislation; new political subjectivities; perceptions of environmental change; ontological infrastructure

Introduction

From one-off storms to the steady rise of sea levels, changes in the water around us are often a medium through which the message of climate change is harshly delivered. Attending to these messages, we learn of the retreat of the state, the migration and collapse of borders, human waste, and patterns of life in the nonhuman world and their sometimes invasive or unpredictable impulses. However, water is not just a vessel that delivers messages. Attending to different water ecologies also provokes us to think differently, to dislodge ourselves from our territorial perspective, and to imagine—even if just momentarily—how to inhabit worlds that emerge out of the ebb and flow of this force.

As an ethnographic object, water is often rendered as a background setting against which human life takes place. As an ethnographic subject, it provides us with a different perspective from which to look back at our territorial assumptions and experiences. Water, we will see, is an ambiguous and unstable category. Is water and particularly the sea simply "nature?" An uncontainable flux that it "out there," separate and apart from us cultured land-dwellers? Or,

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given its extensive management and human influence, is it in fact a product of our own agency, and a kind of man-made culture? As Helmreich (2011) notes, "water [is often a] cycling, hybrid substance, at once natural and cultural" (Helmreich 2011: 132), turning with the tides, from one thing into the other. Indeed, if, as this thematic collection asks, aquatic environments present us with a non-terrestrial Otherness that allows us to reflect on ourselves, then what kinds of strategies emerge at the frontiers where boundaries between water and land (or nature and culture) shift and are contested? What kinds of futures are anticipated, and how far can such anticipations be predicted, given the increasingly surprising nature of the sea and the environment in general?

In this article, I focus on a dramatically fluctuating coastal ecology experienced by people in a small village called Pagham on the south coast of England, in the UK.[2] Here, the force of water meeting land has created a massive land mass or "deltaic-spit," which has emerged out of the sea (as well as being an extension of a pre-existing spit), blocking a harbor mouth and causing rapid coastal erosion that threatens people's homes (see Image 1.).

Image 1. The newly formed spit, the proposed cut, and the precarious position of houses along the seafront

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[2]As requested by local residents, I have retained place names. All quoted interlocutors have read and commented on final drafts of this paper, contributing to its final form.

The reasons why this spit has emerged are varied, as are the responses to this unpredictable (and some would say "invasive") environment. In the following, we see that different actors have different understandings of sea / land, nature / culture distinctions, or edges, that determine different visions for cohabitation with the sea, provoking people to act and see the world in new ways. Focusing on the changing land-sea-scape of this coastal town, I ask how the agency of water is framed differently by such nature-culture distinctions. I also ask how water itself has come to reframe such nature-culture distinctions "acting back" on the adaptive management strategies that seek to control it (cf. Helmreich 2011: 133).

I conclude that for people who live in this area, holding certain definitions and distinctions in place (i.e. managing the edges between land and sea) is a distinctly political act. Fighting for a particular view of nature and culture is to fight for the need to safeguard a particular kind of environment or world, and the right to live in it for the people themselves. This is to suggest that ontological distinctions between humans and nonhumans, land and sea, nature and culture are—as we know from elsewhere—always political, having actual effects on the world. Holding these distinctions in place (or as one might say, maintaining the "edgework" between them) matters, because it allows for certain kind of knowledge to prevail over others and in doing so for certain worlds to take hold.[3] My reference to ontological worlds is drawn directly from Jensen and Morita's (2015) article on infrastructures as ontological experiments. Against the idea of ontologies as fixed, they argue that they are always dynamic and emergent rather than given and static (Jensen and Morita 2015: 82). This view fits well with the material I will present. As the coastline's physical edges are reshaped, sometimes dramatically so, metaphysical distinctions between nature and culture shift in their wake. Indeed, even the idea that certain infrastructural interventions will work better than others—how best to manage the spit—cast the agency of nature and culture in particular ways, giving rise to "forms of politics, society and environment generated by these systems" (2015: 83, italics omitted). In this way, casting judgment as to how best to manage the edges of this coastal region is always inherently political, leading to different worlds-in-the-making.[4]

Finally, it is worth noting that my reference to "edges" is, theoretically, two-fold. On the one hand, I explore the way in which distinctions between sea and land, and nature and culture are made and managed. Here, we may think of edges in terms of their physical sides or boundaries and what they hold, or keep apart. On the other hand, I use the term edges to focus not on the two sides, but on the actual edges themselves. As one of the coastal engineers commented to me, the Environmental Agency's role has been to "manage the edges," physically between the sea and land. In the following ethnography there are multiple edges being managed. There are person/public edges, local/global edges, state/citizen edges, and all the edges between

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[3] I use the term edges here rather than borders or boundaries, because, as will be explained later the term is extended to talk about the way in which things are separated and made distinct, as well as the actual edges that separate them. The term "edge" is an ethnographically-derived term used by my interlocutors when they refer to "managing the edges" between sea and land, public and private, etc.
[4] One reviewer commented on the resonance between Jensen and Morita's (2015) ideas and the "plane of immanence" discussed by Deleuze in his interpretation of Spinoza.

the different "worlds" that are being enacted. Taking this second sense of "edge" (as observing a line between one thing and another, the contour that holds two distinctions in place) into account, we may say that in asserting their different versions of this landscape, the different actors are all doing "edgework" (Lyng 1990), including, as I state at the end, the sea itself, as it acts back on the management that is held to adapt it. The term "edgework" is drawn from Lyng's (1990) analysis of risk-taking behavior, where people negotiate boundaries between chaos and order. "Edgework" is here the work of keeping sea / land, nature / culture, Britain / EU, personal / public distinctions in place—to maintain "one's sense of an ordered existence" (Lyng 1990: 857). Thinking about this as a question of shifting edges, rather than fixed dichotomies also allows me to explore a wider discussion of the idea of "extremes" (Valentine et al. 2012) and the limits to which people are willing to risk their homes for the right to implement their particular vision of where the edge should be.

Image 2. Falling rocks, unstable ground, dangerous currents

A Tale of Two Paghams

I begin by outlining two very different understandings of how this landscape came into being. One explanation, put forward by local residents, is based on the sudden withdrawal of human activity in managing the edges of the landscape. The other, suggested by coastal engineers, is based on an unexplainable natural occurrence that led to the build-up of the spit. Each of these explanations turns on a different understanding of cause and effect and of what might count as a solution. They also highlight the way in which people living here have come to accept often unanticipated changes on the edges of this landscape. In short, they recognize the agency of waves, tidal surges, and breakwaters to act and physically shape the landscape in which they live.[5]

In this sense, rapidly changing coastal regions such as that at Pagham, and the way edges between land and sea are imagined and managed, allow us to question the fixity of ontological boundaries between land-sea, culture-nature, us-them. In their mixing, and in the current era of climatic change, new natures, people and land-sea-scapes are emerging. While these spaces and environments are themselves always in motion and changing, I will explore what kinds of lives are being lived and created out of this environment of flux, even if the changes afoot can only be captured as fixed in our descriptions.[6]

Pagham 1. Local Residents

When I first met Brian he explained to me in quite stark terms the issues they were facing in his village: "The problem we've got here is the environment," he stated somewhat matter-of-factly. "The environment is being valued over humans [… and] it's not so much storm damage, or pollution that's the problem […] here, nature has emerged against humans" (Brian, 20.06. 2015). Listening to Brian, I wondered what kind of environment was emerging to challenge people's livelihoods. Friends who lived further down the coast had told me about the infrastructural challenges that the people of Pagham had been suffering, their sense of not being listened to by the local government, and of neglect. In response, the community had come together in a way that was very new for the usually sleepy seaside villages along this stretch of coastline.

To get to the area of Pagham where Brian and his friends live, you have to turn off the normal asphalt road and travel down dusty potholed and narrow passes between an intricate web of ramshackle bungalow-type houses, many having been built up around old railway carriages.[7] The houses face onto the seafront and their varied material manifestations point to people with quite contrasting political views; artists, hippies, surfers, and retired people with nationalist leanings appear to be living side-by-side, all of them protective of the ecological and

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[5] Attributing agency to non-human forms is fundamental to the theory of "adaptive management," later outlined by Roger who talks of the sea as having an uncertain agency.

[6] At the time of revising this article for publication (autumn 2016) this landscape has changed, yet again, somewhat considerably.

[7] Along this stretch of coastline, it is common to find that the larger the houses, the more robust the coastal defenses are, with the most robust having been funded privately by the home owners themselves.

relational balance that has allowed them to live at the edge of this land-sea-scape.

Image 3. Houses on the edge

The part of the village where Brian lives is based on an old spit located next to a small harbor. According to the people of Pagham, the harbor entrance (or mouth) has been maintained since 1585, allowing the beach to benefit from shingle replenishments via longshore drift, thereby weathering storms without problems. Since the Environment Agency ceased dredging the harbor delta in 2004, however, people argue that a new spit quickly emerged, blocking the harbor entrance and causing extensive erosion to the area in front of peoples' homes as the tidal water is channeled, sometimes dramatically, in new ways.

The current caused by the spit is eroding the beach so quickly that some homes are now just six meters from the crest of the beach. In turn, daily tidal movements dislodge material from one place and assemble it elsewhere, destroying the beach further along. Since this massive change in their coastal landscape began, little, they feel, has been done to support and protect their homes despite their in-depth knowledge and suggestions. Shingle replenishments, a rock revetment, sandbags, and the maintenance of existing groins implemented by the local council have been of little use.

Image 4. Sea defenses I

Image 5. Sea defenses II

In contrast, while this new environment has brought the threat of destruction to its human inhabitants, it has rapidly become a safe haven and breading ground to a diverse range of new residents. Terns, previously inhabiting an island in the harbor (now taken over by black-headed gulls) can now be found nesting here, and there is talk of a rare species of snail living on the spit (although it cannot, apparently, be fully identified for fear of disturbing its habitat). The

area has been designated a Site of Specific Scientific Interest (SSSI), as well as a Special Protection Area (SPA) with Ramsar Designation in order to facilitate the flourishing of these new species. Accordingly, the RSPB (the Royal Society for the Protection of Birds) has erected solar-powered electrical fences on the spit itself to keep foxes and other "predators" out.

Image 6. Sea defenses III Groins, sandbags and granite rock revetments

Given this precarious existence, where one kind of community is being granted the right to flourish while another is left to fall into the sea, local people have been campaigning for the spit to be cut and the harbor mouth dredged, returning it to its previous position (cf. Pagham community information sheet, Save Pagham Beach Facebook page, their website, and the

numerous television reports posted there).[8] They argue that effective intervention on the spit is the only cost effective way of managing the situation. More than this, they claim that this is a return to a position when the natural environment flourished in harmony with the community. In a sense, their position is one of ontological fixity. Despite the shifting physical and political landscape, they want to hold in place a status quo. Shifting agency from one side or another, even slightly, leads to different kinds of knowledges and the worlds they engender.

Pagham 2. Coastal Engineers
When we take the perspective of the local human residents, an aggressive and foreign landscape emerges out of human inactivity (i.e. ceasing to dredge the harbor mouth). Taking the perspective of local council engineers, however, another perspective is brought into view. Roger is the District Council's Coastal Engineer. It is worth noting here that under the Coastal Protection Act of 1949, the District Council has powers to protect land against erosion. The Environment Agency, by contrast, has powers to defend land when it is flooded. In this sense, and we will see why this is important in a moment, the Council has power—but not a responsibility—to undertake work to either side of the harbor.

　　　　Roger has been working along this coastline for over 30 years. He argues that the spit at Pagham has emerged out of a completely different process from that described by its residents. In his description, this landscape has come into being through a very different foundation myth, pointing to a different ontological ground (or baseline) from which to see the world. According to Roger, the spit is due not to any human inactivity but to a unique natural occurrence that is not fully understandable as something either complete or still ongoing. He explained: "In 2001/2 a big surge of shingle came down from Selsey Bill—from Kirk Arrow Spit—and started to build up on the spit. This was 'natural drift' and a purely—100%— natural event," therefore, "the spit is due to natural conditions not because any human arrangements have changed."

　　　　Furthermore, he assured me, the harbor mouth had never been dredged. What locals had mistaken for dredging was in fact the Environment Agency (and its predecessors) with diggers and dumper trucks taking shingle from either side of the harbor mouth to build up the spit on the Church Norton Side. They were, he claimed, simply "managing the edges." Returning to his "natural" explanation, I asked Roger why such a surge of shingle should suddenly move along the coastline in this way. He resolved that such a change was fundamentally unexplainable. "These are major fluctuations that we don't have a handle on and that we just have to manage accordingly," explained Roger. "In most other areas, you can predict with some degree of certainty what the sea will do (and implement coastal infrastructure and establish a formal plan), but not here at Pagham. You've got to work with nature and the environment as it emerges," he said, "this is what we call adaptive management."[9]

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[8] www.savepaghambeach.com, www.paghambeach.blogspot.co.uk
[9] A large part of this area is a special protected area for wildlife, and because of this, any action requires several different bodies to support it. In short, the process of granting any kind of permission for human action is incredibly complex.

Image 7. The entrance to the spit

The local authority has adopted what it refers to as an "adaptive management policy" where "nature is allowed to take its course." Adaptive management is an approach to environmental impact assessment and management that stresses the need for understanding the dynamics of ecosystems. It aims to reduce uncertainty over time, via a system of monitoring. Through this monitoring, it accrues information needed to improve future management (Holling [1978] 2005), allowing for a kind of recursive policy where changes in nature dictate, over time, how humans can intervene, if at all. Attributing non-human agency to the environment is a fundamental part of the theory of "adaptive management."

Although innovative, some, especially local residents, claim that the challenge of using this approach lies in finding the correct balance between gaining knowledge to improve future management, and achieving the best short-term outcomes for local residents based on current knowledge. Over the past few years, as the spit has grown and coastal erosion has increased, Roger has concentrated the council's efforts on small-scale, short-term measures to safeguard the houses and manage the beach. Shingle replenishments have been used to bolster the beach, and in 2013 a rock revetment was built. This occurred under his guidance in response to relatively long-period waves for this area (coming in at 16-20 seconds between wave crests) that were

eroding the beach in front of the most westerly 15 houses. Three weeks after building this revetment, however, larger storms occurred and the spit grew by one meter per day. In fact, it grew 80 meters in 80 days, causing the revetments to destabilize in places.

Image 8. The spit mouth

Here we see a different ontological ground from which the world is being observed. For the engineers, "nature" is put first and determines how humans can act, if at all. This is the opposite of the residents' views that hold that it is in fact humans who shape the environment. Managing the edges between humanly-determined environmental change, or something determined by more than human agency, the edges of the coast appear slippery and fragile, crumbling and falling away in one instance and possible to hold in place in others.

Roger reflected further on his work at Pagham: "It's been my life for the past 10 years and we've just got to manage it in the best way we can, it's not about winning against nature, nature is unpredictable […]." This unpredictability means that for engineers such as Roger, it is hard for them to gauge whether they are in a period of stability or ongoing change. "We are managing a spit which is building onto a delta […]. There is an area of seabed which is higher than the rest and this has speeded up the growth of the spit. This is an area with Deltaic effect; it is a raised deltaic bed," he commented, and then reflected somewhat metaphorically, "but the question still remains; we are trying to gauge if we are in normal conditions now with the spit

growing, and the past 40 years or so were abnormal, or if the past was normal and this new spit is abnormal. To be honest, we don't know if we're in a peak or a trough…"

This final reflection is, I think, indicative of the wider sense that pervades those who work along this coastline. There is a sense that even though they may know this coast intimately, they can never quite predict what it will show them next.[10] Like the ebb and flow of the vast tides that shape this landscape there is a back and forth of opinion rather than a singular progressive narrative and timeline. While coastal engineers devise new infrastructures to adapt to increasingly amphibious environments, such interventions fail to endure in a mobile and shifting environment that eludes such fundamentally territorialized visions. They aim to move toward more amphibious environments, which local residents feel threatened by.

At the same time, it is important to stress here that Coastal Engineers are not simply waiting to see what happens for their academic benefit. To intervene and spend public money, the Risk Management Authorities need to have certainty in the overall outcome—they have a national framework within which to operate. The system is dynamic, and so they are also tied to the idea that they should not intervene with a solution that may not be appropriate "a short way down the line." Indeed, it could be that some interventions might be "found to be abortive, wasteful or worse, counter-productive in the local or wider context."

Adaptive Management is, therefore, a route by which Coastal Engineers monitor and manage the coastal edge appropriately for the conditions at the time. Up until now, the many uncertain factors mean that they have been concentrating their efforts on safeguarding the properties on the beach. Some argue that if the Council had put that money into cutting the spit, then the community would be better off now. However, the community's efforts to cut the spit have also taken time to get to this point, and there is more to come before works might proceed. If, the Coastal Engineers argue, they had not managed the beach in the intervening time, then a number of the properties along the coastal edge would not be there now.

The story of Pagham is one of the coexistence of its human and nonhuman residents, of the people who get to decide how it should be managed through various infrastructure projects, and of the sea and its currents—currents that create something different, churning up land from one place and forcing it to surface in another, shifting distinctions between nature and culture, water and land. But it is also a tale of the clash of ontological edges and of the kinds of political subjectivities and practices emerging out of these shifting distinctions, as I will outline through four examples below. Indeed, as Jensen and Mortia (2015) highlight "ontological politics covers more than the question of how politics is embedded in technological devices, for it concerns the emergence of potentially novel political forms out of infrastructural arrangements" (Jensen and Morita 2015: 85). "Infrastructures, then, give rise to ontological experiments because they are sites where multiple agents meet, engage, and produce new worlds" (Jensen and Morita 2015: 85). It is to the meeting, emerging and engagement of these new political worlds, born out of infrastructural arrangements, that I now turn.

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[10] Here, water is flowing into land destroying people's homes. Water is also flowing in such a way as to create new land that acts as the foundation for new residents. But in so doing, this new land and its residents are a parasite on the old land and its residents.

Worlds in the Making

While different explanations exist for how the spit has come into being, its growth and impact is ongoing. The tidal force of the sea makes things appear and disappear on a daily basis, as new edges are drawn and then challenged. Within this shifting assemblage of different human and non-human actors, what kind of worlds are being lived and created (cf. Zigon 2014)?[11] I will attempt to isolate four.[12] The first of which may be referred to as a distinctly politicized view of nature.

Politicized Nature

In order to safeguard their homes, the local community has had to organize themselves to petition for certain kinds of infrastructural change. They have formed a local flood defense steering group that has commissioned a private consultancy firm to carry out an Environmental Impact Assessment to determine the effects of cutting the spit (which some estimate will cost over 800 thousand pounds). Following the submission of a Scoping Report in April 2015, ABP Mer consultants have completed an Environmental Report[13] and have recently submitted both their planning application to both Chichester District Council and Arun District Council (as the site sits astride their common boundary), and an application for a marine licence to the Marine Management Organisation (MMO).

Mobilizing themselves in this way is necessary, community residents argue, because greater designation is being granted to "the environment" rather than to people and their homes. People speak of "nature" and the need for protection as something that has been co-opted by the state and environmental bodies as an excuse to withdraw protection from elsewhere. Indeed, a conspiracy theory circulates among people who live here: the motivation to preserve the spit and surrounding area is driven not by environmentalist agendas that privilege terns and snails but rather by wider EU (European Union) legislation and funding. Protecting the spit, they argue, has been supported by the state to make up for the loss of land of natural and environmental importance further down the coast in order to develop a large container port at Southampton. That port has been built on salt marshes and in order to replace those marshes an extensive nature reserve called Medmerry, further down the coast, has been developed. Locals argue that

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[11] Much of my inspiration here is drawn from Zigon's (2014) work on world-building and attunement which, although exploring a different topic, details exactly the need to dwell in a similar kind of political ontology that I am describing here.

[12] While I don't have the space to elaborate here, a further 5th thread, as highlighted to me by Roger, would be that Coastal Engineers have an approval and consent funding framework within which to operate, creating a tension (or ontological clash) between individual people's visions and that of the greater (national) community.

[13] Which includes an Environmental Impact Assessment, a Water Framework Directive Assessment, and a Marine Conservation Zone Assessment.

the day they opened Medmerry, Pagham lost ten metres of beach, and that this kind of "off-setting" brings EU rewards to the government, but not to locals.[14]

In attending to this idea, local residents argue that the conservation of one kind of nature is being used as a guise to withdraw support for another kind of nature along their stretch of coastline. This, then, is not simply an enlightenment tale of human control over a passive nature, with infinite resources to be extracted. Instead, it is the tale of an existing co-habitation and its disruption when the state pits humans against nature in order to achieve certain financial rewards. Through these changes people in this community came to see their current struggle in relation to wider national political changes. Such a view scales their experience, so that rather than being a form of "salvage accumulation" (à la Tsing 2015) it links up with and speaks to broader national concerns and pressures, particularly those regarding EU regulation and the weakening of sovereign power (a point I return to later).

Emerging Community

The second world we may observe is that of a growing sense of community among Pagham residents themselves. For the people who live here, many of whom have, in the past, held vastly different political views, they now talk of "a growing sense of community," and of a newly felt political subjectivity. Standing on the beach in front of their houses and looking out before the sea, Brian and his friends explained that they knew that the harbor entrance would silt up the moment the Environmental Agency stopped looking after it. Their campaign to cut the spit and dredge the delta harbor has been going on for well over eight years. Through this campaign, he exclaimed:

> We've come together as a community—we're all good at the different bits […] for example, my strength has been my knowledge of the ocean and the coastline. Robin is good at dealing with the legal side. As the problem extends further down the beach, more people are getting involved.

Standing on the beach, Robin spoke to us about the group's latest plans and developments. He was clearly versed in the use of complex legal terms and joked: "the Environment Agency talk about "adaptive management," but you can use that language back at them and say "adaptive management needs to be done elsewhere." Indeed, Brian later commented to me that "soft engineering" or "adaptive management" was like "re-arranging deck chairs on the titanic; you do a small bit here and there, but it has no effect."

The people in Pagham argue that they know how to co-habit with the coast's tidal ecology. Many of them, including Brian, are surfers and spend most of their day actually in the sea, or observing it from land. They are annoyed that the state grants greater designation to protect the new environment rather than protecting existing residents and their homes. As Brian

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[14] In contrast, Coastal Engineers argue that Medmerry is in another sediment cell and will have very little (if any) impact on Pagham.

pithily surmised: "we all love nature; that's why we live here, but it's become invasive." Being subject to such flows and transformations—to "a geography of immanence" (Steinberg and Peters 2105: 248)—people have had to re-imagine their political worlds and organize themselves in new ways. Through the sea, the world they previously inhabited has blurred its edges, only to be reassembled into new and unexpected alliances.

Political Subjectivities

Living here on the shifting edge of this land-sea-scape, we also find a community engaged in new kinds of political activity. Regular activities to document the landscape, including the use of cameras and drones, bolster local knowledge about the ocean and challenge the validity of many attempts at state-sponsored "soft engineering." These documents are used to make videos that feature regularly on the community's website (and on their social media site) to highlight the changing situation. Such acts are very much born out of a wider sense of feeling trapped and of not being able to act in the current political climate. For example, while the Council is not legally obliged to act, local people themselves are not allowed to do anything either, and it is this sense of feeling unable to do anything while your home is about to fall into the sea that many people feel haunted by. Among other kinds of protest, "sometimes," Brian commented: "We say, 'Sod's law,' we're going to do it ourselves [i.e. cut the spit], with diggers that we bring down ourselves [...]. Surely every man has a right to protect his house, we will fight the law if we need to!"

People in Pagham feel they have been abandoned by the state and that their voices have not been heard. While this sense of isolation was once a position they sought and desired, it now threatens their ability to live here. Coming together as a community and learning how to mobilize themselves as political subjects is something that has been born out of a need to be resilient; to bounce back, as the state retreats. It is what Evans and Reid (2014) refer to as a new "responsibility of vulnerability," where responsibility is increasingly placed on individuals, not governments, for the provision of security.

Drawing on Evan and Reid's (2014) ideas, we may say that being a "resilient subject" is very much about cultivating the ability to withstand the kind of punctuated time that coastal floods generate, with the expectation that such events will occur again during a more protracted period of instability. This period is, of course, the age of the anthropocene, which Evans and Reid argue scales up this "politics of responsibility" from the individual's responsibility to be more resilient to something that becomes a "planetary obligation."[15] In this sense, being resilient is not something that people choose as a response but is born out of vulnerability and is actually offered by the state as the only way to act.[16] Resilience-thinking, they argue, shapes political

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[15] This scaling up of responsibility is something highlighted by Chakrabarty (2008) as obscuring the uneven geographies of risk and insecurity that are central to the functioning of late liberal capitalism.

[16] It points to a kind of "post-politics" where there is no space to challenge the status quo. In this sense, building resilient subjects is simply a method by which to forestall resistance and alternatives to the state. My thanks here to Lauren Bonilla, Rebekah Plueckhahn, Hedwig Waters, and Bumochir Dulam, from the

subjectivities because it requires people to accept insecurity as part of the "natural order of things." To "live well" in the anthropocene, then, is to accept that the world we live in is full of dangers. The onus is not on governments or other institutions to provide security; rather, individuals are responsible for developing their ability to live with precariousness and danger. And while in theory everyone is called on to become more resilient during times of austerity and cutbacks, those who are actually called are those populations that are most vulnerable to global and economic change. Those who must truly be resilient are different from those who are responsible for creating the conditions that produce their vulnerability in the first place. Living with precariousness and impending danger, the people of Pagham are forced to tread a fine line between taking the situation into their own hands and going through formal channels that will hopefully appeal to "common sense" and "logic" from their perspective. The "edgework" involved in treading this line is sometimes risky and frustrating.

As we have seen, the "new nature" that has formed at Pagham has engendered the local human community to come together and form a single political vision and purpose. New political subjectivities and practices have emerged out of shifting distinctions between human / nonhuman, land / sea. As they await the outcome of the privately-commissioned risk assessment, a new kind of human landscape has been brought into place alongside the emergence of its non-human counterpart. Resilience has grown not simply as a response to impending destruction, but has also brought very positive and generative outcomes to those who live here.

Unpredictable Nature

The final world that I shall highlight is one concerned with long-term forms of environmental change. Roger's coastal engineering vision included a broader picture of how the coast would evolve in the next 100 years. "Sea levels," he commented, "are predicted to rise by at least a meter, or a meter and a bit, in the next 80 years." Planks, groins, sea walls and other kinds of coastal infrastructure meant to keep the sea at bay are now designed to take this pending rise in sea level into account.

However, this is only the tip of the iceberg. If the spit at Pagham is the result of a purely natural occurrence, then who knows what the sea can show us next. It was, and continues to be, a very surprising nature, which can, on the one hand, "self-heal" and "rollback naturally" (to use Roger's terms); but it could equally retreat in one place and give rise to land in another. In this regard, there is a sense, among everyone (local residents, coastal engineers, and environmentalists alike), that the sea is an unknowable agent, that it is surprising what it can do, and that it is not always known what it will show to those who choose to look and observe and shape or live with its force.

ERC *Emerging Subjects* reading group where we developed and discussed many of these ideas in terms of our thematic tool kits.

Highlighting a vulnerable and unknowable ecological environment (an indiscernible edge) is reminiscent of what Chakrabarty (2008) has noted is characteristic of living in an era of anthropogenic environmental change, which requires a new way of relating to the world. On the one hand, the boundaries between humans and non-humans, society and nature are shifting, thereby collapsing long-held dichotomies between natural history and human history (Chakrabarty 2008). On the other hand, we are living in world that can no longer be defined in terms of stability (Evans and Reid 2014). Instability, uncertainty, and indeterminacy are central features of contemporary life. It is an era of "crisis ordinary," as Berlant (2011: 10) has termed it. It is for this reason that communities such as those at Pagham feel the need to "bounce back" from being subjected to environmental change and economic neglect, to secure their own perspectives and the ontological worlds they engender. That, in turn, serves to determine their own livelihoods and homes and secures, in very real terms, their own worlds.

New Natures and Old Problems

This ethnography has highlighted a contrast between the people of Pagham, who, in spite of their differences, share the view that an emerging and sometimes aggressive landscape is the result of human inactivity. In order to prevent this landscape from increasing, human intervention, they believe, is necessary. Local engineers, however, stress that the current landscape is due to a natural agency, which leads them to query whether present changes are moving us back to "a normal state," or whether the changes in this coastal region signal an anomaly and a one-off.

A surprisingly similar tension is highlighted by Jensen and Markussen (2008), in their chapter on the political ontology of coastal erosion along the Northwest coast of Jutland, Denmark. Here, coastal change threatened the collapse of a local church and its graveyard into the sea. Local people treasured this building as the embodiment of a long history of bringing the community together and campaigned for its protection. The Nature Protection Agency, however, believed that people should not interfere in the ongoing transformation of the natural environment and should "let nature take its course." In the end, innovative drainage pipes reduced the risk of deteriorating cliffs (though no one could quite understand why they worked) and part of the church is still standing.

In both of these examples, we see conflicting discourses (or ontological views) around how best to manage coastal changes through infrastructure, or, more bluntly, through human intervention (culture). These perspectives draw our attention to changes in relationships between nature and culture, and the politicization of how such relations should best be managed (see also Jensen and Markussen 2008: 131). Attending to the changes in these relationships, we see politics at work in establishing particular ontological views of "nature" and "culture," as each party grants a different kind of agency to the categories themselves. And if we stand back further and observe the way these views are mobilized in practice, we may highlight the "[…] increasingly hybridized relationships between 'nature' and 'culture' or 'the environment' and 'the political'" (Jensen and Markussen 2008:156) that are being enacted and realized.

On the one hand, local Pagham residents hold that, due to the withdrawal of human management, the sea has become a wild, uncontainable "nature" that threatens their existence and culture. Here, the sea is viewed as an unbounded zone that has to be brought under (sovereign) control. It is something that needs to be enclosed, creating a separation of nature and culture, with the sea existing somehow outside. Ultimately, this distinction seems to loop-back on itself when residents claim that it is due to the lack of human intervention (the lack of dredging and the development of a container port) that nature has become like this. Such a distinction is, however, not the only one held by local residents. For example, it is contrary to the view of the sea as a pleasurable substance that facilitates cultured pursuits, a vehicle for travel, for fishing, and for surfing. The sea as "nature" is never neutral or singular. It is at once uncontainable and threatening, something humans can contain, as well as being pleasurable and sought after. Perhaps this paradox encapsulates, in many ways, why many residents are drawn to live here in the first place.

However, the lack of human intervention on this coastline is also attributed to wider currents that extend to other imaginative horizons. From these vistas, the nature / culture distinction is scaled upward and framed on broader terms. Here, the sea is viewed as a zone where "outsiders" have come to determine the place in which people live. It is EU regulation, they argue, that prevents local action and intervention (i.e. spending cuts) and privileges nature over culture (i.e. giving sanctuary to visiting terns and snails). Such a view highlights broader fears—of the castration of sovereign power and the literal[17] collapsing edges of a nation. Indeed, it took me some time to understand what I initially saw as a jarring contradiction: that although many of the people who live here have chosen to do so because of the "alternative" lifestyle it offers, many also voted for Brexit and UKIP, being keen for Britain to leave the EU.[18] Here then is a flash point, an inflamed wound, a place where lack of state provision and support has generated feelings of resentment and neglect, a feeling that is more widespread across the country than many anticipated and was made visible in the 2016 Brexit elections. By contrast, local coastal engineers see the changes in the sea as part of wider environmental changes. They are, perhaps willingly, part of a culture of human-induced climate change that renders the sea, or nature, indistinct from land, or culture. Indeed, they dispute the need to "manage the edges" of the sea along the lines held by local residents, and they cast the formation of such distinctions along different temporal terms that hold a longer stretch of time in view. In these differences, we can see how water overflows the pair nature / culture, acting as a "theory machine" stimulating theoretical formulation of its own edges. Indeed, through these different formulations, we see that "the ocean is not, for many of us a quotidian presence but, rather a space of imagination" (Helmreich 2011: 137).

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[17] I use the term "literal" deliberately, since my interlocutors find the edges of their country to be disappearing and collapsing into the sea.

[18] This view of what I saw as a deeply conservative and protectionist did not seem to combine easily with those who aspire alternative lifestyle choices. However, it transpired later that this was not at all a particularly strange marriage for many Brexit voters, many of whom felt that it was exactly their lifestyle choices that were being constrained and consistently curtailed by EU legislation.

Born very much out of these different imaginative formulations, I have outlined four ontological worlds-in-the-making. These include: 1) an increasingly politicized view of nature, 2) questions concerning what binds together a community or enable it to cohere, 3) the specification of particular forms of political subjectivity, and 4) issues of dealing with nature as an unpredictable set of forces. Attending to these highlights a wider pattern. In the political struggles to get their different voices (and worlds) heard or seen, people engage in work to retain the edges of certain distinctions over others. Indeed, water is not a fluid, open-ended metaphor as opposed to a territorially fixed one. It is always highly controlled and considered. Recourse to one understanding (or formulation) over another has different political implications for who you are as a subject and how you believe this area of the world should exist. In short, the edges of such distinctions matter because they establish ontological distinctions that frame worlds. Looking at the way in which people come to understand the causal relations that have made this landscape into what it is—the different assemblages of knowledge, so to speak, which include human and nonhuman actors—we see how they come to bring into being different landscapes. Diversity exists within polar opposites to create "pebbled," "muddy," or "amphibious" ontologies of variegation and difference, where humans, waves, tidal surges, groins, shingles, EU regulations, snails, long shore drift, and sand bags all come to impact and shape the environment in which they live.

Recognizing this diversity is important. Simply shifting between water to land as two different ontological perspectives does serve in many ways to reinforce the distinction rather than transcend it. This dilemma is similar to those faced by scholars of economic geography in their characterization of some economies as capitalist and others as "alternative to capitalism," thereby reinstating the homogeneity of one against the other. For example, the very use of the term "alternative" assumes and reifies a strong and homogenous mainstream against which alternatives emerge. Roelvink, St. Martin and Gibson-Graham (2015) have attempted to go beyond this dualism by foregrounding the way that assemblages of objects and practices, including economic research and representation, both enact the economy and contain the performative potential to constitute the economy as other than itself (2015:8).

In an analogous way, this article has critically explored the development and implementation of a new infrastructural project in Pagham, following changing political relations between amphibious and terrestrial ontologies. In focusing on new (and exported) approaches to amphibious environments (such as "adaptive management" techniques (à la C.S. Holling 1978), I find that retaining water and land distinctions—as two opposing environmental worlds—does more to reinforce their differences than transcend them. Instead, I have attempted to go beyond this dualism by foregrounding the way that assemblages of objects and practices, both economic and infrastructural, contain water and are constituted by it as something other than itself. Here, diverse edges of variegation, alternation and difference exist (where there is neither flow nor fixity, smooth nor striated space—*pace* Deleuze and Guattari), as water-land collects, moves over, and rests in-between these domains and gives rise to an environment constantly in the making. Studying how such edges are constituted also allows us to see how people (as well as nonhuman actors) put those distinctions into place, literally building the edges of their worlds. As Lyng

suggests, such "edgework involves […] a general ability to maintain control of a situation that verges on total chaos" (Lyng 1990: 871). "What can be felt as well as intuited" (Valentine, Olson, Battaglia 2012: 1011) by local residents and engineers alike is a fear of being on the edge of an extreme recalibration of nature / culture, us / them. Indeed, a fear of some "externality" extending in our midst is both a physical and a political fear that haunts this landscape on the edge.

Concluding Remarks

Along the southern English coastline that I have been describing, individuals are required to be resilient in securing a landscape that can house them while accepting wider political and ecological changes in the environment at large. Radically different infrastructure projects have been implemented to protect homes according to people's individual wealth. While some may critique the very idea that security is now something to be expected (Mitchell 2014), the continued human and non-human existence along this coastline has become something of the norm in the past few years. This is not to say that everyone is united through a "shared sense of catastrophe" (à la Evans and Reid 2014), but that there is a sense that wider changes are abreast that challenge received ideas about human / nonhuman agency. And it is not entirely clear what this will mean for the future of the human and non-human inhabitants who live here.

This focus on the need to be resilient echoes studies of those who live on the margins of the state in late industrial capitalism (cf. Han 2012, Fortun 2014, Biehl 2005).[19] Yet one critique of these kind of studies is that a focus on such "suffering subjects," to use Robbins' term (2013), united through a "shared sense of catastrophe" often obscures the ways in which people imagine and act in the world in ways that can open up new possibilities and potentialities. Indeed the focus on suffering, insecurity and precariousness often ignores the attempts people do make, on a daily basis, to prefigure new futures and exist with the changing ecologies (environmental, political and economic) that they find themselves in. This leads me to my final point, which is about temporality. The human residents of Pagham are positive that they can continue to live here, alongside the other non-human residents, as long as they can intervene in the near future, changing the environment according to their knowledge of the sea. In contrast, the council's adaptive management approach has tended toward a more medium-term solution, where specialists are able to observe and reflect whether the current spit formation is the start of something bigger, or the end of something known. For the environmentalists, their vision is more long term, focusing on securing habitats for non-human species that are threatened in the long term. From their perspective, nature is diminishing as a resource, even thought it appears, in the short term, to be growing as a threat for others. In the push and pull of these different temporal (and tidal) trajectories, we can observe very different ways of living in this environment. The

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[19] This is a characteristic of what Fortun (2014) has termed "late-industrialism," the "Deterioriating industrial infrastructure, landscapes dotted with toxic waste ponds, climate instability, incredible imbrication of commercial interest in knowledge production, in legal decisions, in governance at all scales…" (2014: 310).

extent to which such trajectories can co-exist without colliding remains to be seen, but for now they appear to be able to hold each other in place and allow new worlds to flourish. One may speculate that aquatic environments actually engender this co-existence, and that it is precisely because of the promise of their ever shifting and changing form that different agents choose to inhabit this space.

While many Pagham residents appear to be territorially focused, the "worlds" that I have described are born out of dramatic shifts in edges. It is precisely because of their experiences of a rapidly changing sea that wider changes in the community have occurred. These changes go well beyond their relation to land/sea distinctions, and extend to how they see themselves in relation to the wider state and to the country in which they currently live. In this sense, their current world is not so much antithetical to but rather born of the water with which that they cohabit and by which they are shaped. Indeed, if we shift our perspective to the way that water comes to shape land, then there might just be space for us to consider the idea that it is in fact the land-dwellers who are being "adaptively managed" and shaped by the sea that surrounds them.

This somewhat provocative final point brings me back to my deliberately ambiguous title; "The 'adaptive management' of a new nature." Why, we might ask, are there quotation marks around the term "adaptive management," and according to whom is this a "new nature?" I will tease out some possible interpretations. Firstly, is this a "new nature" from the perspective of the coastal engineers? They claim that it is new insofar as they are unsure whether it is the start of something new or an anomaly that needs to be adaptively managed in order for them to find out more. Secondly, the term "new nature" may refer to the one formed through the withdrawal of human activity, something promoted by local people. This, they believe, needs to be managed to fit the current situation—i.e. they need to cut the spit. Or maybe the term points to a third perspective? That "new nature" is, in fact, the constellation of the new political subjects that have formed out of the experience of their changing environment. Namely, that their focus, what has brought them together as a community despite their differences, is their shared encounter with a shifting and changing ecological environment, to which they have, in effect, had to adapt.

For a long time humans have used the natural environment as a resource. This has had its impact, from plastic pellets in the sea to chemicals in our soils. Now, in this era of anthropogenic climate change, we must learn to adapt to and manage the edges of new nature that we have ourselves shaped as it reaches into our own bodies and extends, with each tidal storm, closer to our doorsteps. The edge between human-induced changes in the sea and changes due to "purely natural" occurrences appears to be blurred, both forms mutually co-dependent (cf. Moore 2015). As such, they focus our attention on the way people feel the need to keep things distinct and separate. This is to recognize the ongoing need to manage such edges, as much as recognizing the multiple edges that manage us.

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Unpublished and Web-based sources

Pagham Community Information Sheet

Save Pagham Beach Facebook Site: https://www.facebook.com/SavePaghamBeach/

Save Pagham Beach Website: http://www.savepaghambeach.com/