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Article:
van der Voet, R. (2021) Experiments in sandscaping : liminal entanglements on the Norfolk and South Holland Coast. Book 2 0, 11 (1). pp. 95-106. ISSN: 2042-8022

https://doi.org/10.1386/btwo_00046_1

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Experiments in Sandscaping – Liminal Entanglements on the Norfolk and South Holland Coast

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Acknowledgements

I would like to thank both my supervisors, Adam Piette and Michael Kindellan, for their support and feedback on earlier drafts of this article. I would also like to thank my funders, the White Rose College of the Arts and Humanities, Prins Bernhard Cultuurfonds and Hendrik Muller Vaderlandsch Fonds, for supporting my research. Finally, I would like to thank the editors and peer-reviewers of Book 2.0 for their work on this issue, as well as for their ongoing support during these challenging times.

I. The Zandmotor, South Holland

She remembered the beach as it had been before the Zandmotor was created. Flat and neat, a long stretch of sand, brownish grey when it was raining. It was among the quietest stretches of the South Holland coastline, the only place she had occasionally seen a seal swimming close by the beach. Her friend's dog would stare at his marine counterpart with big eyes, and they would have to restrain him from swimming out to join it. The dog of the sea's black eyes would look at him with pity. Kept on a lead, the dog would utter high-pitched cries, seemingly lamenting his landbound form. But in the spring of 2011 the beach was closed for the construction of the Zandmotor, a 'sand engine' – an enormous artificial peninsula of sand as a new measure against coastal erosion. To her it was an extreme annoyance. What was that 'sand engine' supposed to be anyway? It did not really interest her teenage self. It was no more than a pile of 21.5 million cubic metres of sand, serving to maintain the coastline at the level of 1990, conceding not another grain of sand to the sea (Janssen et al. 2015: 316). The waves and wind would slowly spread the sand evenly along the coast, making additional suppletion of the coast between Hook of Holland and Scheveningen unnecessary for the next 20 years (Tonnon and Nederhoff 2016: 5).

When it was first constructed, the sand engine was a sandflat stretching two kilometres along the coast and a kilometre out into sea, but soon it looked completely different, the sea playing with it at unexpected speed, creating lagoons, dunes and valleys (EcoShape n.d.: n.pag.). Today, it looked to her like a long dune landscape, marram grass covered and flowing, on the edge of a feeble sea, only disturbing the massive weight of sand with a small swell. In the middle of the sand stood the Argusmast, a mast equipped with cameras that constantly monitored the movement of the sand engine, registering the migration of each handful of sand drifting along the coast. If the mast had not have been there, from the look of it a visitor might have reasonably assumed the sand engine to have been a natural creation, some kind of micro-Wadden landscape on the coast of Holland. Yet the sand engine was not there to stay – it was a temporary intervention, which would eventually dissolve in the process of achieving its aims.

When the beach opened again she had moved away. She only saw the result of the construction several years later, when the sand engine had already drifted into a miniature dune landscape with lagoons and estuaries, creating a liminal, constantly shifting landscape which belonged neither to the land nor sea. Some of the valleys of the Zandmotor now reminded her of the nearby land artwork 'Celestial Vault' by James Turrell, a green artificial crater in the dunes near Kijkduin (Den Haag Official Website n.d.: n.pag.). Although it had been there since 1996, she had only discovered it recently. Fascinated by the tangible presence of light in the dunes, Turrell wanted to create a place for

sky-gazing. Lying at the bottom of the crater, the sky appeared to her a great blue dome as artificial as the crater itself. Crawling up the sides of the crater and stretching out her arms, she felt she could touch the edges of the sky-dome, feeling the smooth transparent sand-glass under her fingers.

Lying on the sand in a dried-up valley of the Zandmotor, the sky a similar dome above her, now perfectly azure by definition rather than exception. The overcast grey skies that had been the scenery of her childhood now seemed an anomaly due to the changing climate and the lack of airplanes during lockdown. The sand she lay on, taken from the bottom of the North Sea and deposited on the coast, had created a tangled landscape. Blending seabed material from various eras, the sand engine had become a unique, geologically fused environment. Some of the sand had been part of ancient seabeds and giant boulders crushed into sand by glaciers. It had been roamed by Irish elk and stamped upon by mammoths. The sand engine was not just an engine driving the sand along the coast, but an engine fuelling time-travel, making relics of different worlds emerge. The time machine of sand attracted many fossil enthusiasts, who took home petrified mammoth teeth and spearheads sharpened by ancient people. Where the pre-existing dunes met the sand engine, she discovered an egg case of a thornback ray. Completely dried out and shrivelled, turned brown by exposure to the sun, she estimated it was at least ten years old, older than the sand engine itself. It had been deposited on the bottom of the sea by the mother, pointed horns of the egg case neatly secured in the sand. Before it had the chance to hatch, it was hauled up and dumped on the shore by a bulldozer for the construction of the sand engine. The baby ray was left to be pecked out by the seagulls, evident from the large hole in the middle of the egg case. The little ray, currently classified as a near-threatened species, became a nameless, involuntary sacrifice to the creation of the sand engine (The Wildlife Trusts Website n.d.: n.pag.). She imagined it embodied the death of numberless seabed-dwelling creatures unexpectedly lifted out of their worlds and unloaded onto the beach for the great sand experiment.

First and foremost, the sand engine was presented as a great example of contemporary Dutch water management. Instead of building walls against the advancing sea, which had been necessary in the low-lying North Sea area ever since it had been inhabited, the Dutch government now prided itself on building with water rather than against it (Soens et al. 2019: 688). Rather than having to dump sand on the shore every five years to maintain the coastline of 1990, the creation of the sand engine made nature itself do the work for the coming decades (De Zandmotor Website n.d.: n.pag.). The project also created more space for coastal recreation as well as flora and fauna, thus combining the efforts to flood protection, nature conservation, and tourism (Janssen et al. 2015: 316-317). However, she wondered about what Gerard M. Janssen, specialist in the ecology of sandy coasts and Wadden at the Vrije Universiteit Amsterdam, had said in a lecture on beaches in the Netherlands – sand suppletions serving to maintain the 1990 standard disturbed the coastal ecosystem, making it more artificial with every load

of sand added (Janssen 2008: 6). ‘About the consequences of covering the seabed or the beach with sand suppletions I can be brief,’ he had said, ‘Everything is covered and dies’ (Janssen 2008: 19, translation added). Not only did sand suppletions disturb animals such as birds that might be nesting on the beach, but by covering the existing beach in a layer of sand, all life on the beach, visible or invisible, was suffocated. From microbes, to plants, to sand fleas and insects, the entire beach ecosystem was reset to point zero. On an undisturbed beach, the waves and tides sort the grains of sand, which means sand grains of similar size lie together. This element of sorting creates a maximum amount of space between the sand grains, allowing for microbial life to flourish. Sand suppletions disturbed this equilibrium, reducing the living space for microbes (Janssen 2008: 20). Due to the amount of sand suppletions on the coast of the Netherlands, the many cafes and restaurants that emerged each summer, the drilling of poles and the constant filtering of the sand by council cleaners, Janssen argued that Dutch beaches had become permanent construction sites (Janssen 2008: 6).

The day after she had read the lecture, she walked to the beach. Gazing out over the sand, she could not believe she had not thought of the beach as a construction site before. In front of her were masses of monotonous grey sand constantly adjusted by people. She imagined the sand fleas, the microscopic water bears, the communities of invisible creatures she had never heard of, all swept away in the single movement of a bulldozer. The microbial communities now structurally declining due to decades of suppletions and sand-filtering, the space between the sand grains dramatically reduced. Apart from the beach restaurants, which had been built this spring regardless of closures due to the pandemic, hundreds of bins had been drilled into the sand. The high orange poles with signs of apples, pears and other fruit, serving as orientation points for lost children, littered the coastline as far as she could see. The bright colours did not disguise the landscape of death, the millions of sacrifices that had been made for even one pole. The beach, between the sea and the dunes, now seemed to her the area where there was the least space for nonhuman life – a cultural zone in between two areas where people did not have as much authority. In his lecture, Janssen had mentioned the Zandmotor as a striking metaphor with which the government managed to gain enough support for policies that work ‘with nature’ (Janssen 2008: 6). But it was evident he did not believe that it went any further than a good metaphor – before its creation, Janssen had already defined the sand engine as nothing more than an intervention in an existing construction site, one link in an ongoing project of artificialisation. According to him, the coast of Holland had practically even been given up on as a normally functioning ecosystem (Janssen 2008: 23).

And yet, as she looked out over the constantly shifting sand of the Zandmotor, she wondered if this was all there was to it. She was sitting in one of the dried-up valleys, legs digging into rippled sandscapes that the wind and long-gone waves had sculpted out of the damp sand. The sand

formations around her were part of an enormous artificial construction, intended for human gain. But what she saw in front of her was more than a construction site, more than just a clever metaphor. Now that the Zandmotor had been planted, it was free to grow, to shift, to wind itself around the coastline, unrestricted by the people that had created it. The other beaches were constantly being reconstructed, never standing a chance of developing in their own ways. On the Zandmotor, however, human interference had started and ended with the construction of the sand peninsula. Human influence, of course, stretched out beyond that, and well before it, with issues such as pollution, rising sea levels, nitrogen emissions, all impacting the area. Nevertheless, the movement of the sand was now left to the wind, the tides, the waves.

The Zandmotor was free as an entity, to go where it pleased, to slowly spread itself along the coast. To create beautifully sculpted valleys, unexpected lagoons, new miniature estuaries, cutting effortlessly through the coastline. The autonomy of the enormous mass of sand was real, while simultaneously a stunning metaphor, which was far from empty in itself. The 'building with nature' idea, embodied in the freely shifting sand, inspired people, made them question what boundaries meant, forced them to consider the coast in new ways. It made them see the true nature of any coast – a liminal space between land and sea, ever-shifting, governed by the timeless factors of wind and waves, embodying endless different meanings. The sand that she was sitting on was a symbol of coastal artificialisation, a time engine, a powerful metaphor of building with nature in flood protection, an autonomous mass of shifting sand, a strange liminal space between land and sea, and so much more.

II. Sandscaping Scheme, Norfolk

The Zandmotor on the coast of South Holland had so far yielded promising results, with the project potentially making additional sand suppletions unnecessary for 50 years, much longer than the initially predicted 20 years (Tonnon and Nederhoff 2016: 5). The project had been so successful that a smaller version of it was constructed on the coast of Norfolk over the summer of 2019 (Royal Haskoning DHV Website 2019: n.pag.). Standing on the Zandmotor, gazing out over the sea in the direction of the north-west, she imagined the land that lay far beyond the horizon. Though she longed to see it with her own eyes, continued lockdowns meant she had to rely on her imagination. On blurry images on google earth, online articles, photographs, videos, on her mind's capacity to travel over the North Sea, for hours and hours, watching the mass of dark water pass by before her. To finally make it to the other side of the North Sea, where there emerged another area of low-lying land, similar to her own home, barely keeping out the advancing sea. Rivers meandering into streams, into ever smaller veins of water, cutting

through the Norfolk coast, outstretched estuaries creating beautiful marshlands. As opposed to her own coast, some areas of the Norfolk coast consisted of cliffs of chalk and clay. With the sea crashing ever harder into the cliffs, the soft material was absorbed at alarming speed, slopes collapsing, requiring people to move their homes further inland (Carrington 2014: n.pag.).

On the coastline of Bacton and Walcott, where communities saw the beach growing smaller every year, a sandscaping scheme based on the Zandmotor had been constructed to protect the area against coastal erosion: a smaller version of its Dutch counterpart, with not so much sand stretching out into the sea. As opposed to a sand peninsula extending into the sea, the Norfolk sandscaping project looked rather like an extended beach, expanded tens of metres seawards. While the Zandmotor connected to a vast dune landscape, its sand drifting not just along the submerged coastline, but also into the dunes, strengthening natural dune function, the Bacton beach connected directly to villages and infrastructure. Without the natural protection of dunes, the local communities could have seen their dwellings invaded by the sea in a matter of years. Though the sandscaping project was intended to prevent this, it was uncertain how long it would manage to do so. A costly and temporary solution, critics argued it bought local residents some time, but would ultimately not prevent them from having to relocate (Brown 2019: n.pag.). Given that nearly three quarters of the 20 million needed for the project were financed by the Bacton gas terminal, it was questionable if the scheme was really an effort to save the local residents' homes rather than just the terminal (Morelle 2019: n.pag.). The nationally important gas terminal, owned among others by Shell, was situated right behind the beach, and was thus threatened by coastal erosion just as much as the local communities were. Though she could not reduce the whole question to this, she could not help but wonder what would have happened to the locals had the gas terminal not been situated on the gradually disappearing coast.

And yet, here too the sandscaping scheme embodied a shift, not just in coastal management, but also in people's relationship to their surroundings. No matter that it had been made possible by a fossil-fuel-burning multinational, the very nature of the sandscape spread awareness of coastal dynamics, of the way entire coastlines were shifted, destroyed, created, by the slow and simple movement of millions of grains of sand. The project embodied a break from building seawalls, from hard defences against the sea, with the newly added sand in constant dialogue with the crashing North Sea waves. Instead of sea spray, houses now emerged from storms covered in sand (Anon 2020). She imagined the strange lives that people lived, on the edge of the land, sand driven into their homes by wind and waves, slowly creeping over their doorsteps. Finding its way in through the tiniest cracks, the granular substance haunting the margins of people's lives. Temporarily forgotten, but always again emerging with a gust of wind, crawling out of corners, from under skirting boards. How shifting sand-

sculptures would slowly encompass the locals' whole world. How the liminality of the sea and sand, the unidentifiable area between solid land and liquid sea, slowly drifted into the homes of the people.

Similar to the Zandmotor in the Netherlands, the sand for the creation of the sandscaping scheme had been harvested from licensed dredging areas not far from the coast. Imagining she was standing on the Bacton sandscape, she could see the sand stretching out into the sea, slowly dissolving into the dark cloak of seawater. Imagining it became transparent, just for a moment, she could see the submerged sandbanks near the Norfolk and Suffolk coast, composed of material that had been part of the land, just some centuries ago. Sand that had once formed part of majestic cliffs, supporting ancient settlements, old villages that met a similar fate to some on her own side of the North Sea, drowned by the advancing waves. Many were not remembered, though it was known that land and villages were lost to the sea already in Roman and Mediaeval times (The Crown Estate and British Marine Aggregate Producers Association 2015: 5). Roman West Caister harbour, Newton Cross, and the mediaeval version of contemporary Dunwich, all lay submerged, covered by the ever-flowing North Sea waves (The Crown Estate and British Marine Aggregate Producers Association 2015: 5).

She wondered about the many more villages, towns, cities, whose features might one day be erased by those waves. On either side of the North Sea, the same risk of rising seas prevailed. It seemed counterintuitive that the soft and permeable sandscapes would halt this, and yet she knew that an enormous mass of sand had the power to shift entire coastlines, to alter the course of oceans. If enough sandscapes were created, perhaps it would work. She imagined beautiful, artificially created salt marshes stretching out beyond the low-lying coasts on either side of the North Sea. Planted samphire holding onto the sand with tiny tangled roots, small saltwater streams cutting through the marshland. Brown-grey sand interrupted by spots of green, orange and pale yellow seaweed, seabirds foraging, taking off. Experiments with such salt marshes or 'kwelders' were already taking place on the coast of the Netherlands, and so far presented a promising solution to sea-level rise by creating a natural buffer zone between land and sea. A sustainable adaptation to climate change, at the 2021 Climate Adaptation Summit the kwelders were presented as a new 'building with nature' solution (Havermans 2021: n.pag.).

In times of rising Anthropocene seas, it was easy to forget that the North Sea had already been rising for many thousands of years. Ever since the last Ice Age of about 20,000 years ago, the North Sea area started its slow development from Arctic tundra to the sea we know today (The Crown Estate and British Marine Aggregate Producers Association 2015: 4). The sand and gravel used for the Norfolk sandscaping scheme had been dredged from the seabed near Great Yarmouth, which consisted of Ice Age river floodplains of the ancient river Yare (The Crown Estate and British Marine Aggregate Producers Association 2015: 5; Barkham 2019: n.pag.). Where there was now outstretched sea, there

once flowed a river, meandering into little streams, part of a fertile estuary inhabited by ancient peoples and mammoths. Much older than the sandbanks which formed part of the coastal erosion process, the ancient floodplain sediment still remained in the same spot where it had been deposited aeons ago, gravel and sand glued to the seabed, unmoved by underwater currents (The Crown Estate and British Marine Aggregate Producers Association 2015: 7). Until it was suddenly hauled up to the surface, sucked into the hold of a dredging ship, dragged from its resting place. Disturbing millions of small seabed-dwelling creatures, a recent study had concluded that the impact of dredging on such fauna was discernible much longer than the few years generally assumed, depending on the intensity of dredging. Though too small to be visible within the enormous mass of sand and gravel, whole macrobenthic communities perished in the process of dredging. It took them many years to recolonise dredged areas, beginning with a few surviving larvae, tentatively settling in the newly exposed sand (Boyd et al. 2005: 155).

Transported away from the area, the sediment the creatures had been sacrificed for suddenly formed part of a beach, in constant contact with air, wind and tides. After many thousands of years of inaction, covered by the blanket of North Sea waves, the ancient deposits lay exposed on the Norfolk coastline. Fossils and ancient stone tools now emerged from the Bacton sandscape, local enthusiasts scanning the beach, digging up heritage. New projects were set up to catalogue the finds, fuelling collaborations between locals, scientists and stakeholders (Pathways to Ancient Britain Project Website n.d.: n.pag.). Just like the Zandmotor, the sandscape became a time engine, making remnants of ages past come up to the surface. Making the past flow into the present, the ancient objects wiped clean by contemporary hands, taking their place on window sills, in cabinets. No matter how long the darkness, however deep they might be buried, there was no telling when such relics would experience the light of day again. She wondered what kinds of objects from her time might be dug up enthusiastically one day, perhaps by humans, perhaps by a different species. Which items would make these future beings wonder, inspire them, which would uproot their assumptions about people of her time. She could not help but think that too much would survive of people like her, plastic objects forever emerging from ancient seabeds, stuck to deep-sea rocks and vegetation, floodplains of long-gone rivers littered with colourful rubbish. That there would be a time when relics of ancient times would not be met with wonder, but with disgust and ennui at the vast scale of Anthropocene pollution, at the monotony of the identical objects that kept surfacing.

In materials dredged from the ancient Yare riverbed, flint hand axes had recently been found, made by people 250,000 years ago (The Crown Estate and British Marine Aggregate Producers Association 2015: 6). At the time these people sharpened the edges of the flint rocks, the North Sea consisted entirely of dry land, crossed by the river Yare. Mammoths and aurochs roamed the estuary,

as did communities of people. Many thousands of generations later, their descendants would start to adapt to changes in the area, to the warming climate, the advancing sea. Until the sea finally isolated the British islands, cutting the continent away. Imagining she was standing on the sediment of an ancient riverbed, sculpted into a sandscape on a newly extended Norfolk coast, she looked out over those North Sea waves that had swallowed rivers, communities, entire species. However unchanging they seemed to her, she knew that one day they would part again. That one day some tectonic shift would change the course of those seemingly timeless waves. The image of the coast as she knew it, relatively stable over the course of her life, was subject to slow geological processes. Like the sandscape, it was forever flowing, slowly creeping and shifting, entering the lives and dwellings of people, for their entire lifetimes, but really only for a while, never settling.

III. Liminal Entanglements – Making Kin in Contaminated Diversity

On her own side of the North Sea, she was lying on her back in one of the valleys of the Zandmotor. She could see one of the lagoons ahead, an almost perfectly round pool of water, slightly fluorescent green at the edges. A bevy of swans was foraging on the lake, diving, necks twisting underwater, searching. She had never before seen swans on the beach, although they were abundant in freshwater lakes and ditches in the area. The swans had somehow adjusted to life between land and sea, combining life on the lagoon with their usual habitat further inland. When the sand engine was created, no one knew how it would develop. All depended on the sea and wind. Certainly no one had planned for a colony of swans to adapt to the new circumstances and make their entrance on the beach. The swans and the lagoon were an unexpected combination, created by the interplay between the human construction of the sand engine, the wind, the sea, and the resilience of the swans.

It seemed to her that the sand engine was neither a perfect ‘building with nature’ example, nor a mere artificial construction site where nature did not stand a chance. Instead, it seemed exactly the kind of landscape for Donna Haraway’s idea of ‘staying with the trouble’ (Haraway 2016: 4). According to Haraway, we should neither hope nor despair in times of environmental crisis. Instead, we should focus on the present and stay with the trouble. Alone, as individuals, we never know enough: staying with the trouble means focussing on each other – across species boundaries – and engaging together in unexpected collaborations and combinations (Haraway 2016: 4). It is within these strange combinations, such as a swan and a sand experiment, that new ways of living are created which may emerge beyond the current crisis. The first step to engaging with such collaborations was to see the nonhuman world around her – the matter, the plants and animals – as kin rather than strangers (Haraway 2016: 4).

Making kin means giving and receiving, often failing, but sometimes making fruitful connections (Haraway 2016: 10). It is not about harmonious collaborations, but about finding inventive ways of being together in a contaminated world, creating the possibility of some form of multispecies flourishing despite global warming, oceanic pollution and mass extinction (Haraway 2016: 29). She needed to become aware of the various tentacles with which to tell the story of today, viewing the ever-dominant anthropo-narrative as just one of these tentacles, re-noticing other creatures around her as they were disappearing (Haraway 2016: 31). Haraway proposes the image of the Medusa as a symbol of tentacular thinking beyond anthropomorphic and anthropocentric paradigms, which will help to create rich multispecies assemblages that include people (Haraway 2016: 52).

Gazing up to the sky-dome, she imagined she became part of the unexpected sand engine combinations, making kin with the lagoon-dwelling swans, the washed up jellyfish, the pecked-out thornback ray. Making kin did not change the fact that trillions of creatures had died for the creation of the sand engine, and that the long-term measures against coastal erosion had artificialised the landscape to such an extent it may have been unrecognisable without them. It did not change that she was complicit as one of the guilty ones either. She did not have to ignore this to pay attention to the strange liminal entanglements at the sand engine – the interplay between sand and sea creating a new landscape in which seabed-dwelling creatures such as the Baltic clam and the bristle worm Pygospio elegans, which usually only inhabited the Wadden, made their unexpected appearance (De Zandmotor Website 2020: n.pag.). Where the swans adapted to a life between land and sea and the seals returned despite the disruption of the sand experiment's construction. Where relics of different times emerged. Where people, inspired by the liminality of the landscape, developed sense-altering art projects, walking around the sand engine with strange installations on their heads, installing metal sculptures to hear the music made by the sand and wind, and burying luminous vibrating relics in the sand to be dug up by those who managed to locate them by ear (Eek n.d.: n.pag.; iii Website n.d.: n.pag.). A strange sand experiment which inspired sandscaping schemes on the other side of the North Sea, fuelling new liminalities, new time engines. Similar yet infinitely different from the original, in Norfolk, too, the sandscape opened up unexpected opportunities between land and sea. With its strange assemblages of fossils, relics, people, sand-covered dwellings, material of Ice Age floodplains, making kin took on new, endlessly diverse meanings. There was no telling what would emerge from that mass of ancient sand and gravel, nor what kinds of effects it would have on the ecosystem, the local communities, and the collaborations they would develop.

Both sandscapes are characterised by what Anna Lowenhaupt Tsing calls 'contaminated diversity' – they are troubled, inharmonious landscapes, commonplace in their contamination, unique in their liminality, and diverse in the unexpected assemblages that emerge from them (Lowenhaupt Tsing

2015: 30). Purity is no option – any collaboration always involves some degree of contamination (Lowenhaupt Tsing 2015: 27). She should therefore not wish for a harmonious world in which nature lay undisturbed, in which people had never intervened in coastal erosion, in which no towns had ever been drowned by the advancing sea, and in which no gull ever had to peck out a baby ray. Instead, she imagined the strange assemblages the sandscapes had created, and the ways she herself was entangled with these. Curling up into an almost perfectly round ball, for days, for weeks, she felt the tentacles of the landscape entangling her. The drifting sand forming a layer over her body, the marram grass starting to grow in the shelter of her boulder-form. The sand engine was a place where creatures like her emerged in unpredictable ways, showcasing their resilience, never bending to pre-existing expectations. It was a landscape unlike any other, an experiment for making kin with strangers. Before long, the strange assemblages, the unexpected entanglements, the time engine, and the water management symbol would be fully dispersed along the coast, leaving new remnants and new time-travel openings. Swept away by the sea completely, the relics of the sand engine would become part of a coast of entangled natures.

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