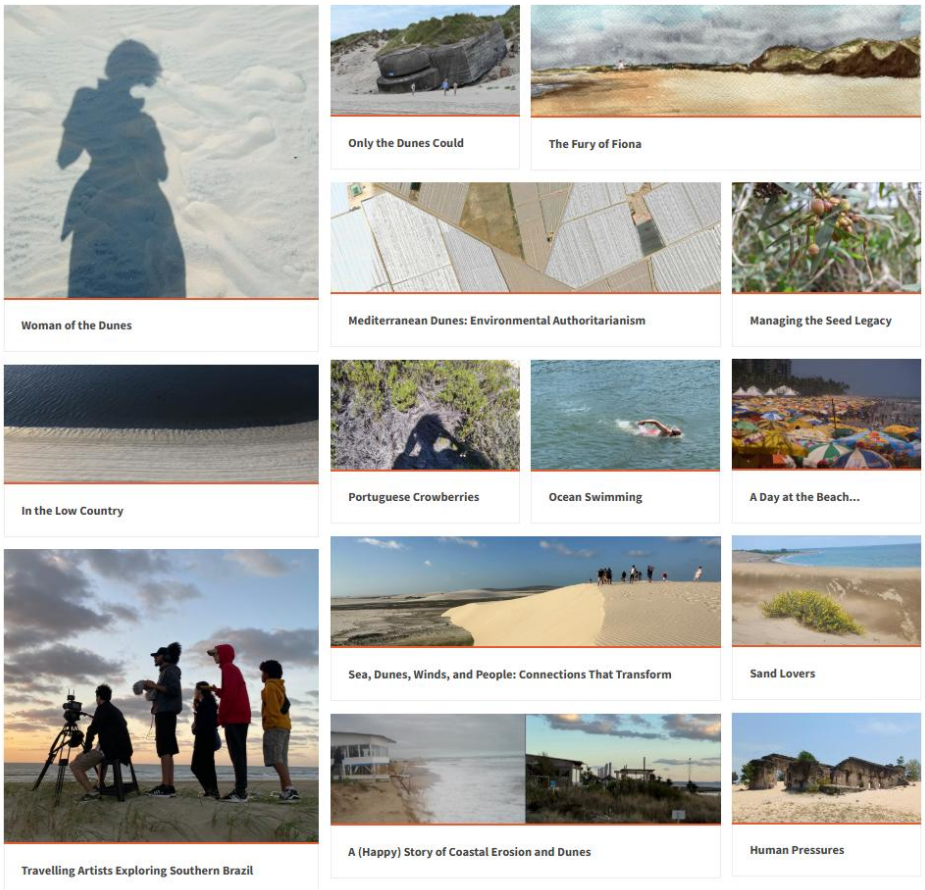
Once Upon a Dune: Coastal (Hi)Stories

Joana Gaspar de Freitas, André Kirouac, Barbara Palmer Rousseau, Antonio Ortega Santos, Liliana N. Duarte, Nicholas Allen, Margarida Vale de Gato, Steve Mentz, Carlos Pereira da Silva, Raquel Ferreira, Ana Luiza Souza, Miguel Albuquerque, Davis de Paula, M. Luisa Martínez, Celso Aleixo Pinto, and Ruwan Sampath.

In April 2024, during a workshop at the School of Arts and Humanities of the University of Lisbon, specialists from different countries and backgrounds talked about dunes. In addition to the scientific topics presented, we discussed how to make our work more compelling and accessible to a wider audience. We wanted to share our plural views on coastal issues and the importance of taking this diversity into account when managing for the future, because beaches are made up of sea and sand, but also of people's expectations and choices. This exhibition is our way to do this. Each of us has chosen an image/object that represents our personal connection with the coast. We do not want to present results or conclusions; as in a museum or art gallery, it is up to you to find meaning and to write your own script based on your impressions.



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Woman of the Dunes

Twenty years have passed since I first started looking for dunes in the archives. I have not always worked specifically about them, but the sea, the sand, and the people are present in all my writings. Lately, the dunes have become my main focus as a coastal historian, to the point that some colleagues call me a "Woman of the Dunes."

Feeling the dunes. Fieldtrip in Jericoacoara, Brazil, 2022. Photo by Joana Gaspar de Freitas. CC BY 4.0.

Dunes are an unlikely subject for a historian. Made of sea, sand, wind, and vegetation, dunes are usually studied by natural scientists interested in their forms and characteristics, their role in the beach system, and their flora and fauna. In the dust of a library room, however, I discovered that dunes have stories, forged over time through their relationships with humans.

These stories link actors, institutions, political and economic interests, cultural values, and animal and plant species across oceans and continents, from Europe to the Americas, southern Africa, and Oceania. The most fascinating part of this work has been learning about the many reasons why people fear or value the dunes, the uselessness or uses they attribute to sand, and the actions taken to eliminate what some consider wasteland—while others fight to preserve what they perceive as fragile, fluid ecosystems. Behind these multiple views of the dunes, I encountered the historical complexity of humanity that I as a historian had been trained to uncover.

I have spent years gathering information, talking to experts, going to beaches; to present facts, to provide explanations, and to write narratives that help to understand the world better and give it some kind of meaning. This is a difficult task because it often feels like we are nothing more than sand in the wind. But I come to believe that, if we pay attention and care, together we can be a dune. Dunes are powerful systems made of tiny individual efforts that can withstand storms.

—Joana Gaspar de Freitas

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Only the Dunes Could

German Bunker fallen on the beach near Dunkerque, France. © 2023 Communauté Urbaine de Dunkerque (CUD) Used by permission

I grew up in L'Islet-sur-Mer, a village in Québec populated by hundreds of sailors through the past centuries. In Canada, my village is known as the Sailors' Homeland. Many of these sailors fought in the Atlantic, the English Channel, and the Mediterranean between 1939 and 1945, and they came to influence my life and my career in museology. They told me about their fears and their joys, their inner battles like those against the German *U-Boote*. They sank many of them but lost hundreds of their friends. From the cliffs of France, they were cannoned by seemingly indestructible German batteries. Shelled non-stop during the Normandy landings. Allied bombs barely damaged their structures. In my travels, I've seen these Atlantic Wall bunkers. I walked the beaches of Normandy, took dozens of photographs, recalling the stories of my old friends. I saw them at sea again, imagining them disembarking from landing crafts.

I have seen these bunkers up close, in ruins, sagging at the bottom of sand dunes. Lying like memories that don't want to disappear and must not, if the memory of horror is to live on. Collapsed, fallen, useless! Not by bombs, but by the movement of the dunes, which have succeeded in doing what the fighting could not. Claude Prelorenzo points out that "the vestiges of horror are part of the memory of societies." Unesco has inscribed on the world heritage list a number of testimonies to human folly, regardless of their architectural or urbanistic interest, which is often weak or non-existent. In fact, everything can be destroyed. Again, dunes can succeed where bombs could not. Where humans fail, nature reclaims its rights in the face of horror, leaving us with witnesses that echo the words of my sailor friends… *No more war*.

—André Kirouac

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The Fury of Fiona

Living on Prince Edward Island, Canada's smallest and only island province, I'm never far from the sea, and at our summer home, only steps from its breathtaking coastal dunes on the Gulf of St. Lawrence. In the five years that I've lived on the Island, I've seen it through two hurricanes—Dorian, in early September 2019, and Fiona, in late September 2022—numerous winter storms, and rapid change.

The dunes at St. Peters Harbour, Prince Edward Island, October 2022. Watercolor based on a personal photo. Original artwork by Barbara Palmer Rousseau.

Just as I was narrowing down the topic of my Master's thesis at the University of Prince Edward Island to the ecosystem services and resilience of our coastal dunes, Hurricane Fiona arrived and took large chunks out of the Gulf shore. Already trimmed and washed over by winter storms, as climate change reduces the protective sea ice, the north winds and storm surge at high tide carried an estimated 40 percent of the mass of the dunes out to sea. At our beach at St. Peters Harbour, illustrated above, the larger dunes had been sheared, the smaller dunes had been breached in several places, and the beach seemed twice as wide.

But my subsequent historical research, as well as my engagement with the DUNES project, has shown that the island's sandy coast has always shifted, and indeed, some of the dunes only exist as a result of human infrastructure. The sand that washed out to sea is gradually coming back—maybe not in the same place, given the prevailing longshore drift—and the sand that washed inland is doing what it's supposed to do in the face of rising sea levels. It's only humans that want it to stay in the same place.

—Barbara Rousseau

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Mediterranean Dunes: Environmental Authoritarianism

Plastic sea (greenhouse agriculture) on dune landscape. El Ejido-Cabo de Gata (Almeria). © Google and Airbus.

Throughout the twentieth century, dunes have been subjected to an intense process of destruction by human action. The Cabo de Gata dunes constitute an ecosystem of high-socio-environmental vulnerability. Cabo de Gata is located in the province of Almeria, in the Andalusia region of Southern Spain, a beautiful protected area known for its volcanic landscapes, pristine beaches, rugged coastline, and traditional fishing villages. Situated right along the Mediterranean Sea, it is one of the driest and sunniest places in Europe.

During the Francoist dictatorship, in the second half of twentieth century, a new model of land management was implemented to expand the agricultural frontier, incorporating croplands under a plastic-based mode of cultivation that was intensively extractive in material resources and water matrix. The dunes of Cabo de Gata then underwent an intense process of ecosystem modification, as their sand was extracted and transported inland to create artificial soils in plastic greenhouses. These plastic-covered crops were intended for intensive vegetable and horticultural production to supply the Spanish food market. Throughout the 1960s, 70s, and 80s, this agricultural frontier expanded to increasingly supply the rest of Europe. The result was a reduction in the area of coastal dunes, which were also under pressure from the growing tourist industry. Since the 1990s, with the advent of democracy and the establishment of autonomous regional governments, sand extraction from the dunes in Andalusia has stopped. This shift was the result of the implementation of environmental conservation policies, which included the designation of the entire dune area as a National Park and a Natural Reserve.

Nevertheless, in the last 40 years, industrial agriculture has been developed in this arid agroecosystem, especially in the Almeria area, affecting the dunes and community fishing practices. Such extractive examples of high-yield agriculture can be qualified as ecocide; the loss of biocultural knowledge of sentient-thinking communities.

—Antonio Ortega Santos

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Chapter: Mediterranean Dunes: Environmental Authoritarianism
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Managing the Seed Legacy

Nature's tools in action: biocontrol galls replace pods on golden wattle (*Acacia longifolia*), reshaping the story of invasive plant management. Vagos dunes, Aveiro, Portugal, 2024. Photograph by Liliana N. Duarte. CC BY 4.0.

Portuguese coastal landscape changed considerably in the twentieth century with the forest regime expanding afforested areas to counter coastal dune encroachment. Dunes were stabilized using a seed mixture of native and alien plants, including *Acacia longifolia*, also known as "golden wattle," a shrub or small tree that occurs naturally in Southeast Australia. *Acacia longifolia* has become one of the most widespread invasive alien plants along the Portuguese coastal dunes, promoting significant negative impacts on biodiversity, ecosystems, and human activities. After being cut, this species has limited resprouting capacity, yet it accumulates a persistent soil seed bank that germinates when disturbed. Therefore, management with manual and mechanical control methods is often compromised when long-term follow-up controls are not assured.

To curtail the seed bank and *Acacia longifolia*'s ability to spread and reinvade, the Australian bud-galling wasp *Trichilogaster acaciaelongifoliae* was introduced as a biocontrol agent. This wasp reduces pod formation, thereby decreasing seed production and limiting plant growth by inducing the formation of galls in the golden wattle. *Trichilogaster acaciaelongifoliae* was first released in Portugal in 2015 along the coast and is now widespread. In my research, I have been studying the effect of this biocontrol agent on the seed dynamics of *Acacia longifolia* in coastal dunes, including the seed rain (i.e., seed production) and the seed bank accumulation. As expected, seed production has largely decreased, and, five years after establishment, the accumulated seed bank is showing signs of stabilization. These results are encouraging for the recovery of coastal dunes invaded by *Acacia longifolia*, emphasizing the urgent need for an integrated strategy and increased investment in biocontrol to improve the management of invasive alien plants in Europe.

—Liliana N. Duarte

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In the Low Country

Borderland. Photograph by Nicholas Allen. CC BY 4.0.

Borderlands have influenced my work from the beginning. I grew up in the city of Belfast, a city of sleech and mud built on stilts and culverts. The shipyard was its failing heart, its traffic the ferries that took the fleeing generations to Glasgow, Liverpool, and London by way of Cairnryan and Stranraer. Those watery transits met hard reality in the daily news, the bombs and shootings there like shoals beneath the surface. Later, I left for Dublin, Galway, and the American South. Always the coast stayed with me, and with it a sense of the necessity to find new ways to think and write about those water margins where the land and sea have share their sovereignty.

I have followed this impulse through studies of Irish and archipelagic literature, and though friendships and the exploration of coastal places wherever I have lived. With it has come a fascination for birds and small boats, the threads of water through the salt marshes of the coasts of South Carolina a particular favourite. I grew up in a seascape where the land was here and the water there, sand dunes like drumlins rolling to the beach. Further south the salt marsh is a marginal savannah, a grassland salted by the tide, the mud bed unsteady ground. Further out the beach shelves off in shallow waters, the shore birds flitting over the rippled plain, clouds and light changing with the season. My photograph suggests something of this transition of life in the tide, the rhythms of light and water like those of literature and experience, always changing.

—Nicholas Allen

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Portuguese Crowberries

Corema album (also *camarinhas* or "Portuguese strawberries") at Praia da Vigia, Melides, Portugal. Photograph by Margarida Vale de Gato. CC BY 4.0.

Before the mists of sea
amidst tenacious wattles
and crowns of thistles
with prickles strewn
in shrubs, they sprout

firm sperm drops
on vast dunes—
zest-flooding
thirst-quenching
I gorge and swoon

I bite and sip
with greed and stealth
and in-between the teeth
the seeds grit
which back at you I spit.

for all composure
meek and mild
these white berries
and wild—
endemic bareness.

Frente às brumas marinhas
entre tenazes acácias
e coroas de cardos
despontam nas silvas
de picos estreladas

brincos firmes, esperma
sobre dunas ermas—
sumo abrindo feixes
saciando sede
trinco onde floresce

sorvo e deliquesço
carnuda ganância
entreabertos dentes
macerando a polpa
cuspo-te sementes

por tanta temperança
branda e anémica
esta fruta branca
e selvagem—
a nudez endémica.

—Margarida Vale de Gato

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Ocean Swimming as Eco-Meditation

Steve Mentz swimming in Short Beach. Photograph by Olivia Mentz. CC BY 4.0.

I swim in the ocean to encounter an alien environment with my skin. The practice involves two things: *feeling* and *form*. These actions each support meditation in two different senses.

Feeling first of all means sensation, the friction and temperature exchange of water touching flesh. When I swim in the sea, my small individual body encounters the world's largest enveloping body. My meditations start with that mismatch and that wet touch. Swimming away from shore, the sea's alien pressure threatens me and lures me on.

A secondary sense of feeling activates my emotions and the surge of connection that, at the best moments, links me to sea and sky and universe. Sigmund Freud famously describes an "oceanic feeling" at the basis of human psychology and religious intuition. I don't quite believe in Freud, but when I swim in the ocean, I feel what I feel. Physical feeling pushes onto my body in ways that generate surges of emotional feeling.

Form comes next, in patterns I create through the motions of arms, legs, and body. As a child I was taught, and later taught others, a set of patterns—crawl, breaststroke, backstroke, butterfly. These bare forms make up my meditations.

Active strokes, the forms of my swimming, call up an inverse pressure that shapes me, like a formal mold that captures limbs and torso. To be in the ocean's heavy grip means to assume a form, to be formed, to move slowly but buoyantly, becoming a body that can't move as freely as I'm used to in the thinner sea of air.

Ocean swimming teaches me how to live in a wetter, alien, intermittently threatening world. These are good lessons for the Anthropocene.

—Steve Mentz

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A Day at the Beach...

Boa Viagem beach, Recife, Brazil, 2018. © 2018 Carlos Pereira da Silva. CC BY 4.0.

My interest in beaches lies in understanding them beyond their beauty, exploring the complexity between their natural appeal and human use. Beaches are unique spaces where human recreation and natural environments intersect. Understanding their optimal use is crucial for effective management. I am particularly interested in the concept of "carrying capacity"—how much human activity a beach can sustain without compromising its ecological integrity, aesthetic value, and user comfort.

Carrying capacity is used as a tool to evaluate the impact of tourism and recreational activities on coastal environments. The research question "How many are too many?" aims to identify the thresholds at which beach crowding begins to compromise the comfort of visitors and the sustainability of the ecosystem.

Comfort on a beach is subjective, yet it is significantly influenced by crowd density, the availability of space, and access to amenities. Through surveys, observational studies, and spatial analysis, I seek to understand how density impacts the visitor experience. For instance, at what point do crowds make a beach feel overcrowded, reducing its appeal? Similarly, how do perceptions of crowding vary between different user groups, such as families, tourists, or residents?

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Integrating qualitative data (visitor satisfaction surveys) with quantitative methods (mapping and density calculations) makes it possible to develop models that estimate the ideal balance between usage and comfort. Effective management strategies, such as zoning, visitor education, waste management, and infrastructure planning are important for maintaining this balance.

Studying these dynamics can provide valuable insights to policymakers and planners, offering tools to ensure that beaches remain enjoyable, accessible, and environmentally healthy, helping the management of these spaces responsibly.

All this merges my passion for coastal environments with a commitment to sustainability, ensuring that beaches remain vibrant and accessible for the next generations, protected from overuse while fostering a shared responsibility among stakeholders.

—Carlos Pereira da Silva

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Travelling Artists Exploring Southern Brazil

In *Théorie du voyage: Poétique de la géographie* (2007), the philosopher Michel Onfray highlights how travelers use various techniques to aid their memory. Describing various practices, Onfray illustrates how a traveler acts like a cartographer, recording details to create physical, mental, and emotional maps. This approach is similar to that of artist-travelers, as both aim to capture and preserve the memories of their journeys. But what sets them apart? The practices of an ordinary traveler may seem similar to those of an artist-traveler, who also notes, sketches, photographs, types, and records their pilgrimage. However, their intentions diverge: while the everyday traveler seeks to protect and preserve memories, the artist-traveler reshapes them into material for expression, using them to convey their vision to the world.

Travelling Artists Exploring Southern Brazil. Photograph by Cláudia Feltrin. CC BY 4.0.

From this perspective, the photograph presented here reveals the process of creating the documentary *Cine Dunas*, produced by students of the Cinema Workshop of the OfCine Audiovisual Production Studio, at the Federal Institute of Rio Grande do Sul, where the dunes of the Cassino balneary, situated in southern Brazil, are the protagonists. In this film, which portrays the story of the last sidewalk movie theater on Cassino Beach, a narrative and aesthetic choice was made to begin and end the documentary in the dunes, who give the cinema its name. Its creation involved journeys through the Pampas landscape, forming a textual-imagery-poetic territory in the coastal zone. This journey embraced the littoral as both destination and pathway—a route that reveals our essence, leading us downward to where the earth begins. In this descent, we continue looking further south, reaching points of both endings and beginnings, and renewing our perspective in the spirit of "moving toward the south."[1]

—Raquel Ferreira, Ana Luiza Souza, and Miguel Albuquerque

[1] Goncalvez et al, "sulear," in *Verbolário da Caminhografia Urbana*, edited by Eduardo Rocha and Taís Beltrame dos Santos (Penha: Editora Caseira, 2024).

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Sea, Dunes, Winds, and People: Connections That Transform

Sand dune tourism in Jericoacoara National Park, Ceará, Brazil. Photograph by Davis de Paula. CC BY 4.0.

Ralph Alger Bagnold, in his work *The Physics of Blown Sand and Desert Dunes* (1941), defines dunes as forms resulting from the dynamic interaction between wind and sand in coastal or arid environments. They are shaped by the aeolian transport of particles through saltation or rolling. Bagnold highlighted processes such as dune migration and morphology, linking phenomena observed in deserts and coastal areas, thereby contributing significantly to the understanding of aeolian geomorphology.

Dune systems provide numerous ecosystem services, including coastal protection against erosion and storms, aquifer recharge, barriers against saline intrusion, and habitats supporting biodiversity. They also hold sociocultural value as spaces for cultural, religious, sporting, and leisure activities. On the coast of Jericoacoara, in the Brazilian municipality of Jijoca de Jericoacoara, Ceará, coastal tourism is the main economic activity linked to these landscapes. However, unregulated tourism can cause significant environmental impacts. Trampling and vehicle traffic damage sand-binding vegetation, accelerating sediment transport and dune migration. Other issues include erosion from sand extraction, pollution from solid waste and effluents, and habitat fragmentation due to tourist infrastructure, undermining the ecological functionality of the coastal zone

The disappearance of the *Duna do Pôr do Sol* (Sunset Dune), Jericoacoara's most popular postcard image, exemplifies how intensive and improper use can lead to the loss of iconic landscapes. In 2023, several media reported that the emblematic Sunset Dune was about to disappear. For many years, thousands of people have gathered there to watch the sunset, celebrating life, rites, beliefs, and cycles of transition. The dune was a symbol of encounter, spirituality, and belonging—a sacred space in the landscape and in collective memory. Its disappearance is the result of a series of factors, namely sea encroachment, intensive trampling, and increased urbanization, which have altered the natural dynamics of the local dunes and compromised the sand supply that sustained their existence.

Sustainable management is essential to mitigate these impacts, balancing tourism with environmental preservation to ensure the continued provision of ecosystem services and the cultural value of dunes.

—Davis de Paula

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Sand Lovers

Chamaecrista chamaecristoides (sand lentil), a sand-loving plant. Photograph by M. Luisa Martínez. CC BY 4.0.

Sea, sand, and sun tourism has become increasingly popular over the last decades. Coastal tourism drives millions of visitors to the sandy coasts and generates millionaire earnings. But before humans, a specific group of plants colonized the coastal dunes, which, besides being beautiful, represent a very harsh environment for the flora and fauna, with extreme temperatures, drought, shifting sand, and limited availability of nutrients. Worldwide, an interesting group of plants, with varying evolutionary histories, has developed adaptations to thrive and successfully live in mobile coastal dunes. They are known as "psammophilous" plants. The term comes from the Greek *psammos* (sand) and *philos* (love). Literally, then, they are sand-loving plants. These plants come in different growth forms (herbs, grasses, shrubs, and even trees) and belong to several plant families: legumes, grasses, composites, and *euphorbiaceae* among others.

The image shows *Chamaecrista chamaecristoides* (sand lentil), a sand-loving plant endemic to Mexico. It is one of the first mobile dune colonizers, mostly abundant on the mobile coastal dunes of the Gulf of Mexico. A combination of attributes makes the sand lentil a superb psammophilous plant. The flat-shaped squared seeds are not buried by the shifting sand; instead, they move on the sand surface with the blowing wind. They are efficient sand surfers. These seeds are known as hard-coated, which means that they need an external stimulus to germinate. In the case of the sand lentil, fluctuating temperatures (which occur on the sand surface) can break the dormancy. The juvenile and adult plants are equally tolerant to the coastal dune environment. The roots are a nutrient factory, thanks to the association with nitrogen-fixing bacteria and microscopic fungi that help retain phosphorous and water. When buried by sand, this photsynthetic machinery is stimulated and the plants grow better and faster.

—M. Luisa Martínez

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A (Happy) Story of Coastal Erosion and Dunes

When I took the first picture (left) in 2008, this beach bar in Costa de Caparica, Portugal, was severely threatened by coastal erosion. However, against all expectations, a picture taken in the same place after sixteen years (right) shows that the beach bar is still there, but now surrounded by a large and robust dune… So, what happened in the meantime? That's the story I want to tell.

São João da Caparica (Almada, Portugal) beach-dune system in 2008 and 2024. Photographs by Celso Pinto. CC BY 4.0.

After the storm, coastal authorities agreed to proceed with a previously scheduled beach nourishment programme, comprising the placement of large quantities of good quality sand, from the regular dredging of the navigation channel of Lisbon harbor, to mitigate coastal erosion. This was done in 2008, 2009, 2014, and 2019, followed by the analysis of the performance and lifetime of these interventions. After the 2014 intervention, sand fences and vegetation were introduced in this area under the *ReDuna* restoration project, developed by the municipality of Almada. This intervention, in compliance with aeolian processes that mobilized sand from the previously nourished beach, led to an *in situ* growth of the dune both in terms of height and of volume, progressively shifting the coastline approximately 30 meters seaward to date.

This "new dune" acted as a sand buffer, improving protection to upland structures and infrastructures from the effects of storms, while also restoring and preserving environmental and recreational values of this valuable beach-dune system.

Evolution of coastlines is uncertain and hard to predict. The default position is to assume that present day coastal change will persist in the future, most likely exacerbated by climate change effects—namely sea level rise and increased "wave storminess."

This story brings us another perspective: instead of fighting against nature we can *build with nature* using its own resources (e.g., sand) and its natural forces (such as the wind) to temporarily buy time for a battle that, in the end, is unlikely to be won.

—Celso Aleixo Pinto

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Human Pressures on Mobile Coastal Sand Dunes in Manalkadu, Sri Lanka

26 December 2004 was the most tragic day in the recent history of Sri Lanka, as the devasting Indian Ocean tsunami hit almost the entire coastline. This coastal disaster sparked my interest in studying its management. At the time, I was studying wave run-up over coastal structures for my Master's degree, using self-designed models at the Fluid Dynamics Laboratory. I therefore had the opportunity to lead several research teams to conduct tsunami run-up surveys. During these field visits, I found that hotels and other infrastructure built by cutting into the dunes had been completely destroyed.

Ruins of the Manalkadu Dutch church destroyed by mobile coastal sand dunes in the 1950s. Photograph by D. M. R. Sampath.

When, in 2024, I visited the mobile coastal dunes of Manalkaadu in the Jaffna district, the abandoned buildings reminded me of the damage caused by the Indian Ocean tsunami. In the 1950s, these dunes had migrated and destroyed the settlements along with an old Dutch church. According to the Coastal Conservation Department, dune mobility was due to unregulated human activities, including the removal of the dunes' vegetation cover. But, other than declaring the ruined church an archeological reservation, there was no effort to manage this environmentally sensitive coastal zone with its high biodiversity. The area had been identified as a potential "Special Area Management site" in the Coastal Zone Management Plan of 2018, but the proposed program was suspended due to financial constraints in 2022.

Currently, as there is no harbor, hundreds of fishing boats are pulled ashore and launched from the beach into the sea, causing damages to the dunes. Other human pressure on the dunes include grazing by cattle and goats, burning of trees, littering, sand mining, the use of dunes as a cemetery, and driving off-road vehicles. These dunes are still migrating landward, which has prompted the construction of fences to protect the houses and agricultural fields.

—Ruwan Sampath

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About the Exhibition

In April 2024, at a workshop at the School of Arts and Humanities of the University of Lisbon, specialists from both hemispheres and diverse fields—from the arts and humanities to earth and life sciences—gathered to discuss dunes. Despite different scientific languages, we found our perspectives complementary, as dunes are shaped by both natural forces and human values and actions. As sea-level rise and erosion threaten coastal livelihoods, vast resources are invested in some regions in preserving dunes as vital ecosystems and natural flood defences, while in others they continue to be destroyed by urbanization, tourism, and the use of sand as a raw material. In the face of environmental crisis, thoughtful choices must be made. Our interdisciplinary insights offer a unique vision of the dunes as a shared hybrid heritage, demonstrating the potential of including contributions from the sciences and the humanities in a rational and equitable adaptation to the coastal areas of the future. To involve you, dear visitor, each of us has chosen an image or object that reflects both our emotional and professional connection to the dunes—inviting you to think about it for yourself.

As you browse the exhibition, you will find the name of the contributors on the right-hand side along with short biographies.

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