

## Nature is a matter of design now

2023 OBEL AWARD FOR ADAPTATION: LIVING BREAKWATERS

**We need to design the natural systems of the future, according to landscape architect and winner of the OBEL AWARD 2023, Kate Orff. Her radical, collaborative approach to climate adaptation activates both human and non-human life in the design process.**

“The notion of beauty needs a reboot, especially with regards to the landscape. Our current conception of beauty and pretense of control of nature has really worked us into a corner and threatened our ability to adapt to a changing climate,” says OBEL AWARD 2023 recipient Kate Orff.

Orff is a landscape architect and founding principal of SCAPE, a design-driven landscape architecture and urban design studio based in New York. The Living Breakwaters project – an innovative blue-green infrastructure project – won the OBEL AWARD 2023 as the best example of adaptation in the built environment.

### Oysters – a critical piece of infrastructure

When Kate Orff moved to New York City, she realised that unlike where she grew up, in Maryland near Chesapeake Bay, New York had lost its relationship to the water. So, she began studying the bays and the rivers, rather than focusing on the land or the parks as a typical landscape architect would do. Her research taught her about the importance of thriving landscapes as a form of protective climate infrastructure.

“Coastal ecosystems in the form of dunes, maritime forests, wetlands, and reefs all have incredible protective benefit. And all of those landscapes are in perilous decline. Rather than rush to erect vertical seawalls and barriers that aim to solve one threat, and create myriad new problems, we advanced a holistic approach of risk reduction, rebuilding ecosystems, and fostering coastal habitat. Oysters and community members became our engineering and design partners. Oysters can clean and filter water, they can build protective reefs, and they can help restore intertidal habitat and marine life. I started thinking about the oysters as to be essentially a piece of critical infrastructure that not only buffers waves, but brings people together with a shared purpose,” she says.

The Living Breakwaters span 2,400 linear feet off the South Shore of Staten Island, New York. The breakwaters consist of a mix of stone and ecologically-enhanced concrete units shaped like small tide pools. By attaching spat (baby oysters) to the reef structure, the goal is for these oyster reefs to encrust the breakwater and for the tide pools to become completely filled with algae and critters, explains Orff. In this way, the oysters serve as a sort of biological glue and actually enhance the ability of the breakwaters to slow the movement of water and reduce shoreline erosion, while also increasing habitat value.

### Design that begets life

The Living Breakwaters are literally living and growing with marine species, which form part of the design. The project represents Orff’s approach to landscape architecture and design, in which human and non-human life intertwine in a continuous process, interweaving social and ecological infrastructure.

“The design is a collaboration between human hands and the harnessing of natural processes. There are moments where you see the obvious sculpting of a reef street or the synthetic curve of a manufactured tide pool, but over time, these things will blur into a hybrid of constructed and natural forms coming together,” Orff says.

“We have to move past this notion that design is a trendy object or a signature building or an Instagram moment. We have to think about design at a holistic, planetary scale, and think about mending the fabric of life on earth. In order to repair our living systems and to truly adapt, we have to know how species connect and interact, and we have to design systemically to tie the pieces back together. And that is an incredibly bold, creative act,” she says.

And what about beauty? Orff doesn't hesitate:

“I find the Living Breakwaters to be incredibly beautiful. Because you can see the many formerly fragmented pieces coming together. It's not about the thing itself, it's about the long-term reclamation of coastal culture, livelihoods, and a revitalized harbor. We've seen bald eagles, seals, and whales nearby. It's a design that begets life. And life is beautiful.”

### **Fabricated vulnerability**

Orff's speech quickens when she describes the many ways in which humans have destroyed the natural systems – to their own detriment.

“The physical landscapes that have sustained us since the beginning of time are imperiled around the world. In the past decades, we've dredged our water bodies, destroyed protective coral reefs, and we have built in vulnerable areas, on sandy barrier beaches, in wildfire-prone hillsides. We have manufactured the risks that we are facing now through burning fossil fuels and increased that risk exponentially by destroying landscapes. Buffered by insurance and driven by real estate speculation, we've fabricated the very conditions that are threatening us now,” she says.

The destruction has been so comprehensive that Orff is dismissive of the idea of passive rewilding.

“We cannot assume that somehow nature will just take its course and “come back.” We've so profoundly altered our water quality, our air quality, our soils, that all of these elements need to come together and be reset. Nature needs to be actively cultivated and actively stewarded over time. It takes a lot of effort, design, collaboration and leadership. Nature is a matter of design now,” she says.

### **Bridging to the future**

The good news is, humanity already has all of the tools to design for adaptation, from agriculture, from indigenous practices, and from science and computer modelling. We only have to join those tools. But Orff insists that before considering adaptation, the first thing we need to do is stop burning fossil fuels and decarbonize our economy. Because adaptation does not eliminate risk; it only reduces it.

When done well, adaptation according to Orff is also about raising awareness of risk. A significant part of the Living Breakwaters project has been about involving people and providing space for political engagement and learning. The team worked with their partners at the Billion Oyster Project to develop a curriculum around the Living Breakwaters and worked with local schools on afterschool design charrettes, shore walks, and seining to discover what organisms are living in local waters.

“Adaptation is not a thing. It is not a solution or an object. Adaptation is a process, one that involves physical change or a physical piece of infrastructure but also a cultural and social transformation. It's about putting into motion an adaptive process where people and natural system are in constant relationship to one another,” Orff says, adding:

“I never describe the Living Breakwaters as a “solution.” I talk about it as an initiative that's building a bridge to the future. It is going to help us adapt, buffer the shore, buy us time, and bring our harbor back to life. Over time, the shoreline will be replenished with sand, the beaches will be built back, the shoreline grasses will come back, the marine life – the oysters, the shellfish, the fin fish – will come back. And over

time, people will be reconnected to the shore and understand the risks that we face. The project is not a singular gesture; it's part of a process that's unfolding in time and which will put us on a different, more sustainable path."

### **New signs of life**

The Living Breakwaters team did extensive digital modeling but also large-scale, physical modelling. They built a 1:20 scale model of the breakwaters in a wave tank the size of an Olympic swimming complex. This allowed them to test the design in different conditions to understand how all the elements would behave in different scenarios and wave velocities. Each rock and e-concrete element was painted a color to make it clearly visible to test which elements could withstand the waves, and which ones could not.

The design of the Living Breakwaters was modified over many years based on all the digital and physical tests. Now, the project is nearing the completion of construction, and already there is tangible evidence of a return of wildlife.

"We have a resident bald eagle and a cormorant colony, which is a sign of a lot of vibrant sea life below the surface. We also have oysters and clams and a whole range of intertidal life. Seals are hauling out on the breakwater rocks. And that's exciting because it's a sign that water quality is improving, as a testament to New York's long-term efforts to manage pollution and sewage," Orff says.

### **Coral reefs, eelgrass, and mangroves**

Getting the innovative blue-green infrastructure project through politically was difficult and took over eight years of hard collaborative work. There are many laws in the United States that make it difficult to build in, around, and near the water, Orff explains.

"The Living Breakwaters project is unique in many ways because it is construction within our water bodies. We had to jump through many, many hoops and navigate sometimes hostile bureaucracies which have been built up to keep things separate. It was a challenge to keep the social, ecological, and risk reduction facets of the project moving forward in tandem. I hope this project is also a pilot for a process of how to mode, test and implement large-scale coastal infrastructure in urban areas around the world," she says.

The project is designed and adjusted meticulously for a specific geographic context, but its core idea and vision are very much relevant to other contexts globally. The key premise of Living Breakwaters is that adaptation is both social, ecological, and physical. And that approach is highly replicable.

"In the New York Harbor, our coastal infrastructure may be oyster reefs. But in Belize, it might be coral and eelgrass, and in Kolkata, mangroves. This protective form of coastal ecological infrastructure needs to be paired with schools and social life and other forms of social infrastructure – and of course designed for protective value," Orff says.

### **Awarding systems repair**

Orff hopes that the recognition by the OBEL AWARD can help accelerate the rebuilding of coastal ecosystems as infrastructure and push the design of the future towards systems repair.

"Winning an architecture prize is important for a project like this which involved so many different people working together with a shared purpose. It is a true encouragement for community members, elected officials, landscape architects, ecologists and engineers to come together and develop coastal adaptation projects wherever they are," she says. "The time is now."