



Nature-  
based  
**Future**  
Challenge

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## Nature-based Future Challenge

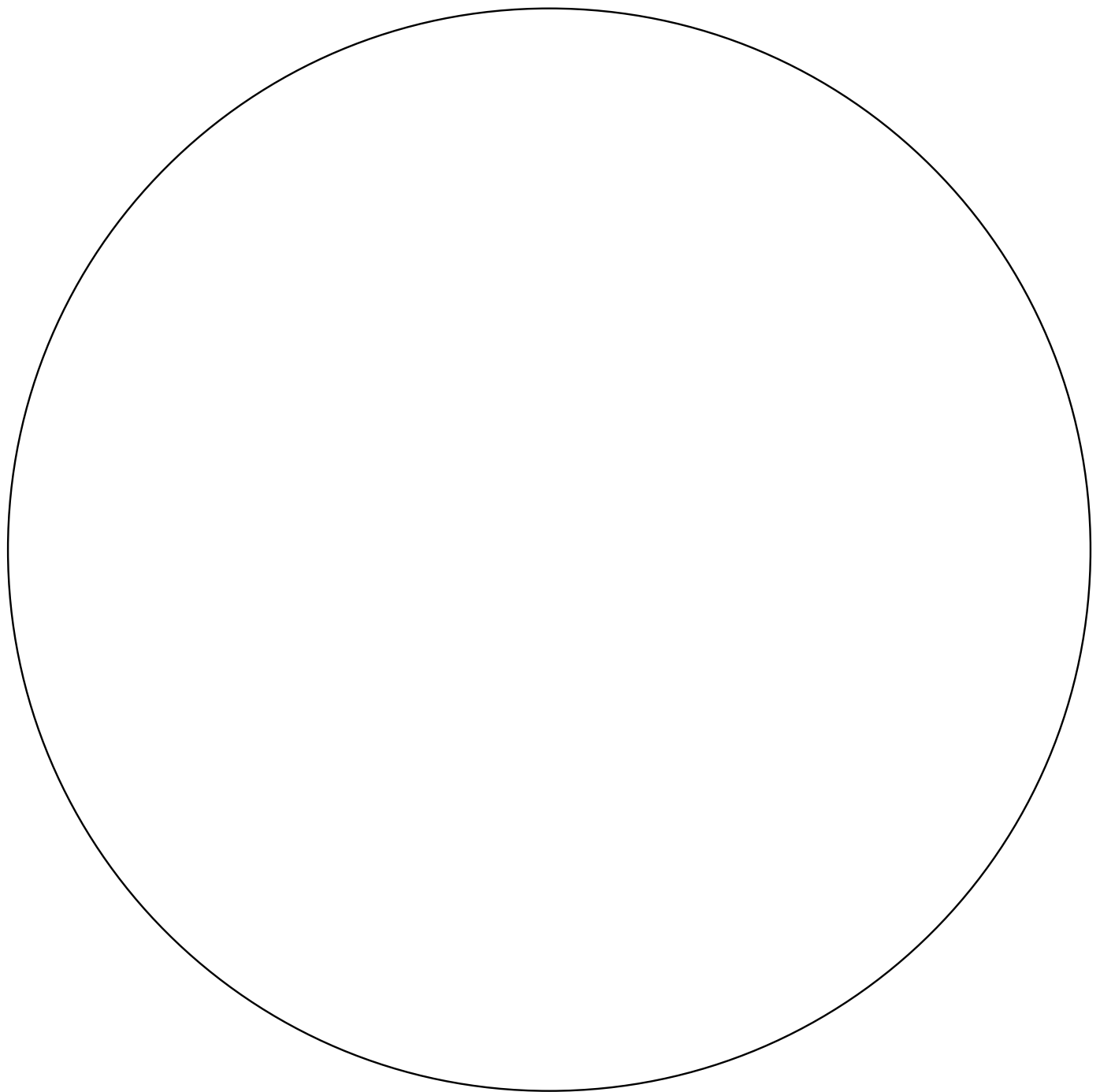
Create a brighter future for the Mississippi River Delta



WUR Student  
Challenges







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# Nature-based Future Challenge

Create a brighter future for the Mississippi River Delta

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# Word from the Rector

## **A region under pressure**

The Mississippi River Delta stands at the frontline of some of the most pressing challenges of our time. Long a source of ecological richness and economic vitality, the region today faces a converging crisis of environmental degradation, climate change, and social inequality. Coastal land loss, intensifying storms, and persistent socio-economic disparities place immense pressure on both landscapes and communities - yet it is precisely here that the urgency and opportunity for transformative change become most evident.

## **Nature-based solutions at the core**

This second edition of the Nature-based Future Challenge engaged a new generation of thinkers and doers in imagining alternative futures. By working with natural systems - through wetland restoration, coastal protection, and ecosystem regeneration - participants showed that nature-based solutions are not only environmental interventions, but foundational strategies for safeguarding livelihoods and building climate resilience. The proposals in this edition reflect a growing recognition that sustainable futures must be built on the interconnectedness of ecological integrity, climate adaptation, and social equity.

## **Educating responsible changemakers**

At Wageningen University & Research, our mission is to educate responsible changemakers for science and society. Initiatives like this Challenge are a direct expression of that mission: they connect education, research, and real-world impact, encouraging students to combine scientific knowledge with creativity and a deep sense of responsibility. I'm always inspired by the energy they bring. This second edition united 561 students from 249 universities in 58 countries—and while we could only feature the top 10 finalist teams, the depth of innovation across all entries was remarkable.

I sincerely thank all students, partners, experts, and colleagues who contributed to this Challenge. I hope the ideas presented here will inspire continued dialogue and action - not only for the Mississippi River Delta, but for vulnerable regions around the world facing similar challenges.

**Prof. Dr. Carolien Kroeze**

*Rector Magnificus*

Wageningen University & Research



# Nature-based Futures: Inside the Challenge

During the Nature-based Future Challenge, students from around the world explored what it means to design with nature instead of against it. Over the course of six months, they developed future visions for one of the most complex and vulnerable landscapes on Earth: the Mississippi River Delta.

## Nature-based Futures

At the heart of the challenge lies a simple but urgent idea: nature is not separate from the systems we depend on, it is the foundation of them.

As Tim van Hattum emphasised during the Kick-off, climate change and biodiversity loss are not isolated crises, but deeply interconnected. Wetlands, forests, soils, and water systems are not just environments to protect; they actively regulate climate, store carbon, and reduce risks. When these systems are degraded, the consequences ripple through economies, communities, and ecosystems alike.

Nature-based solutions, therefore, are not about single interventions or quick fixes. They require long-term thinking, an understanding of natural dynamics, and close collaboration with

the people who live within these landscapes. Designing with nature means working with complexity, rather than trying to control it.

## The Challenge

This perspective formed the basis of the Nature-based Future Challenge. In total, 561 participants from 59 countries and 249 universities across six continents joined the programme, bringing together a wide range of disciplines, from ecology and engineering to social sciences and design.

Working in interdisciplinary teams, participants were asked to develop future-oriented strategies for the Mississippi River Delta, a region facing rapid land loss, rising sea levels, and increasing storm risks. Their task was not only to propose solutions, but to rethink how land, water, and communities can coexist in a changing environment.

The challenge unfolded over six months, guiding teams from initial exploration to more defined concepts. As the process progressed, ideas were refined, tested, and reshaped. From the initial group of 41 teams, 20 advanced to the next phase, and ultimately 11 finalist teams were selected to present their visions at the Grand Finals.



## A Network of Expertise

Throughout the challenge, students were supported by an international network of experts. During studio sessions, specialists from different fields shared insights into the ecological, social, and technical dimensions of the Mississippi River Delta, helping teams better understand the complexity of the region.

In addition, coaches from leading organisations worked closely with the teams, offering feedback and guidance as ideas developed. Their role was not to provide answers, but to challenge assumptions, sharpen thinking, and help translate ambitious concepts into grounded proposals.

This combination of global expertise and local context was essential. The Mississippi River Delta is not defined by a single issue, but by the interaction of many: subsiding land, disrupted sediment flows, economic pressures, and deeply rooted cultural connections to place. Navigating that complexity required more than technical knowledge alone, it demanded collaboration, openness, and the ability to work across perspectives.

From early concepts to final proposals, the challenge became a space where ideas could evolve through dialogue, testing, and iteration, reflecting the very nature of the systems it set out to address.

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**“Nature is not a ‘nice to have’.  
Wetlands, forests, soils, and  
water systems are the foundation  
on which our societies and  
economies depend.”**

Tim van Hattum

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*Student teams presenting their preliminary ideas on stage during the Kick-off.*



*Tim van Hattum giving a speech during the Kick-off of the Nature-based Future Challenge.*

# A Fragile Giant: Challenges and Opportunities in the Mississippi River Delta

At the southern edge of the United States, where the continent meets the Gulf of Mexico, lies one of the world's most dynamic and troubled landscapes: the Mississippi River Delta. Once a land of abundance, this vast region of wetlands and waterways faces a crisis that is as much cultural as it is environmental.

Every hour, Louisiana loses about a football field of land to the sea. The causes are layered: rising seas, sinking ground, hurricanes, industrial canals, levees that starved wetlands of sediment. And yet, amid this slow-motion catastrophe, there is also resilience, creativity, and the possibility of a nature-based future.

For this year's Nature-based Future Challenge, students from around the world were invited to grapple with these very questions: How can we protect communities, ecosystems, and cultures in a delta that is literally disappearing?

To better understand both the complexity and the opportunities of the region, we spoke with two experts who know Louisiana's coast intimately: Krista Jankowski, a geoscientist and strategic planner at Arcadis, with over a decade of experience in climate resilience, and James Karst, communications director for the Coalition to Restore Coastal Louisiana (CRCL) and a former Pulitzer Prize-winning journalist.

## Living on the Edge of Water

"Louisiana is unique because the ground here is sinking while the sea level is rising," Jankowski explained. "That combination makes it one of the most vulnerable places in the world."

Subsidence, land sinking as sediment compacts, would be a manageable challenge in some parts of the world. But in Louisiana, where there is little solid rock and almost no elevation, the effect is catastrophic. The river once carried sediment south, replenishing wetlands and creating new land each time it shifted course. Human efforts to control it, with levees, canals, and floodwalls built for navigation, agriculture, and safety, have stopped that process. "The river built our land," Jankowski said. "Our levees turned off that land-building machine."

The result is a coast without its natural defences. Wetlands that once absorbed storm surge now erode into open water. Saltwater pushes inland, threatening drinking supplies and crops. And hurricanes, supercharged over the hot Gulf, reach New Orleans and its suburbs with fewer miles of marsh to blunt their force.

## Culture at Risk

For Karst, who has lived in New Orleans for 25 years, the struggle is personal. "New Orleans is a magical place with a distinct culture, and it is worth preserving," he said. Jazz, Mardi Gras, parades, Creole cuisine, these are not just cultural exports but living traditions rooted in the delta.

Yet communities along the coast are fading away. Insurance premiums have risen beyond affordability, yet heavy storms repeatedly leave behind damaged homes. Families whose parents and grandparents lived by shrimping or oystering are leaving. Houses are sold off not to new neighbours, but to weekend visitors who use them as fishing camps. "It degrades the culture," Karst said. "Communities are not the same when people no longer live there full time."

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"Louisiana is unique because the ground here is sinking while the sea level is rising. That combination makes it one of the most vulnerable places in the world."

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*Biodiversity in the wetlands of the Mississippi river delta*



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“New Orleans is a magical place with a distinct culture, and it is worth preserving.”

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*Oyster Shell Recycling Program led by the Coalition to Restore Coastal Louisiana (CRCL)*

The loss is slow and uneven, often without fanfare. Cemeteries slip under salty water, citrus orchards become oyster beds. In Leesville, once home to over a thousand residents, only a handful of families remain.

### **Working With, Not Against, Nature**

The fight to slow this loss has taken many forms. Since 2007, Louisiana’s *Coastal Master Plan* has guided restoration with a principle that might seem obvious but is radical in its context: work with natural processes rather than against them.

Among the most ambitious are sediment diversions, gated openings in levees designed to allow the river, during high flows, to carry water and sediment into starving wetlands. They are an attempt to replicate the river’s ancient land-building function. “It is about letting the river do what it wants to do,” Jankowski explained. Controversial with shrimpers and oystermen who fear short-term disruption, diversions remain one of the only large-scale interventions capable of sustaining the delta over the long term.

Other approaches are smaller, but no less vital. CRCL’s Oyster Shell Recycling Program is deceptively simple. Since 2014, the organisation has collected millions of pounds of shells from New Orleans restaurants, cured them in the sun, and stacked them along eroding shorelines in heavy mesh bags. Over time, they become living reefs: baby oysters attach to the shells, filtering water, growing vertically with rising seas, and buffering the coast from waves.

“It interrupts the water, slows the erosion, and provides habitat,” Karst explained. Volunteers, students, families, retirees, help carry 30-pound bags into place, turning last night’s dinner into tomorrow’s defence. The scale is modest compared to the immensity of land loss, but the principle is powerful. Sometimes resilience starts with what you already have.

In cities, green infrastructure offers another lens. Bioswales and water gardens hold stormwater during heavy rains, easing the

strain on pumps and pipes that constantly drain New Orleans. Even discarded Christmas trees have been bundled and dropped into wetlands, forming makeshift breakwaters where fish and crabs take shelter.

“These projects show what is possible when you look at natural systems as allies,” Jankowski said. “It is not about fighting the water, it is about working with it.”

### **Listening to Communities**

Both experts stress that no project can succeed without the people who live here. “Any instance you get to listen to folks about how they are really experiencing the coast, do it,” Jankowski urged. “Be open to having your assumptions challenged.”

Karst added: “You cannot just tell people, ‘Why don’t you leave?’ People do not want to leave. This is their home, their livelihood, their culture.”

The tension is real. Some communities welcome relocation, while others cling to traditions rooted in the bayou. Some projects face fierce opposition from fishers who fear losing their grounds, even as scientists argue the same projects will save the coast for future generations. Politics, funding, and trust are as central to this story as sediment and storms.

“There is no silver bullet,” Karst said. “Many creative ideas have to work together, and soon.” It is a reality that reflects the broader challenge of the delta itself.

There is no single solution that will save the Mississippi River Delta. Instead, its future depends on a delicate balance of approaches, each shaped by the realities of ecology, economy, and culture. Large-scale engineering projects, community-led initiatives, and nature-based strategies all have a role to play, but none can stand alone. What emerges from Louisiana’s coast is not a story of easy answers, but of continuous negotiation: between land and water, between tradition and change, between human ambition and natural forces. In that tension lies both the challenge and the opportunity, to rethink not only how we protect landscapes, but how we live within them.

# What could the future of the Mississippi River Delta look like?

Rather than starting from solutions, student teams in the Nature-based Future Challenge began with a different task: learning how to read the landscape. The Mississippi River Delta is not a static place, but a system in constant motion, and understanding that became the starting point for how teams approached their ideas. As their proposals developed, clear patterns began to emerge in how they interpreted both the challenges and the opportunities of the region.

## A landscape in motion

One of the most striking shifts was how teams are approaching the delta itself. Rather than treating flooding, biodiversity loss, and land subsidence as separate problems, many saw the region as a connected, living system shaped by the movement of water and sediment, and by the communities that depend on it.

“The strongest projects framed the delta as a living system with dynamic processes that must be understood and respected,” says Eric Harris, member of the selection committee for the TOP 20 teams. This perspective shifts the focus from resisting change to working with it, allowing teams to design strategies that operate across scales, from coastlines to cities.

## Working with nature on different terms

While teams share a nature-based approach, their interpretations differ. Some proposals take a long-term, transformative perspective. Team Reboot, for example, explored what it would mean to allow the Mississippi River to follow its natural course,

gradually shifting development towards areas where new land is forming. This approach reflects a broader willingness among teams to think beyond short-term fixes and consider how large-scale change could be anticipated and guided.

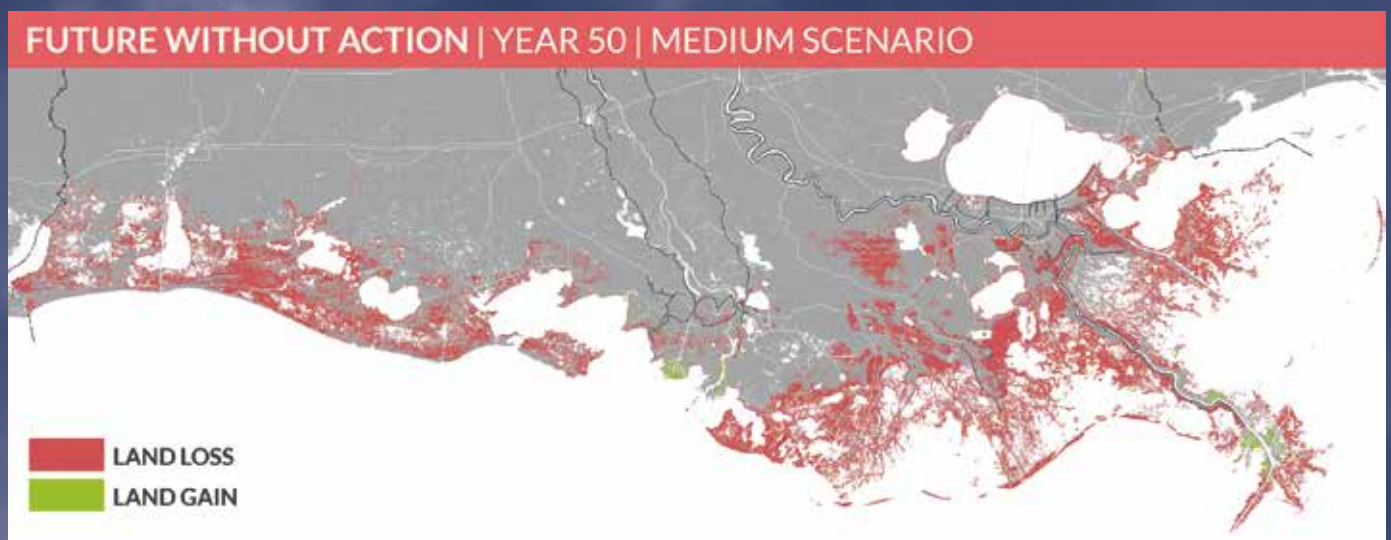
At the same time, other teams focused on strengthening what already exists. Studio Bayou, one of the few teams based in Louisiana, combined wetlands, oyster reefs, and urban green infrastructure to protect communities in place. Their connection to the region shaped their perspective. For them, resilience is not only environmental, but also social. “Without the community, there is no project. These are our communities, so their input and involvement are essential to making any solution work,” says Studio Bayou.

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“Instead of trying to resist nature, we use it as a teacher, guiding us towards where we need to go.”

**Yarnick Zoetekouw, Reboot**

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### Not one solution, but many layers

Across the top teams, resilience was rarely framed as a single intervention. Instead, teams designed layered approaches in which different nature-based solutions reinforce one another. Coastal ecosystems such as wetlands and barrier islands reduce wave energy and storm surge, while inland strategies, such as green infrastructure and water storage, help manage flooding and improve everyday living conditions.

These interventions often serve multiple purposes at once, linking environmental restoration with economic opportunities, public health, and long-term resilience. “The teams demonstrated a strong understanding of nature-based solutions and explored creative ways to apply them to complex challenges,” says Gregory Grandy, from the selection committee.

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“We grew up here, we live here, so we have a higher stake in it. We want people to feel safe and not have to worry about losing everything after the next hurricane.”

Studio Bayou

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### Moving from big ideas to specific fixes

As teams refined their thinking, many began to move from broad ideas towards more focused proposals, zooming in on specific locations and interventions. This shift helped them identify where their ideas could have the most meaningful impact.

“We started with very broad ideas across the whole delta, but the challenge helped us really narrow down and focus on where we can have the most impact,” says Studio Bayou.

At the same time, several teams were confronting difficult realities. Not all land can be preserved, and adaptation may be necessary in some areas. Proposals like Reboot’s reflect this shift, exploring how communities could adapt to change while maintaining cultural and social continuity.

Across these different approaches, one thing became clear: designing for the Mississippi River Delta is not about finding a single answer. It is about learning how to work within a system that is constantly changing, where ecological processes, human decisions, and cultural values are deeply intertwined. The students’ proposals reflect this understanding, not as finished solutions, but as evolving ways of thinking about what a future with nature could look like.

# Meet the Jury



## **Gregory Grandy - Louisiana Coastal Protection and Restoration Authority**

Greg is a Coastal Resources Administrator at the Louisiana Coastal Protection and Restoration Authority, where he helps lead efforts to strengthen and restore Louisiana's coast. With more than 25 years of experience in coastal protection across the Gulf of Mexico, he has managed complex restoration and protection projects and guided multi-agency teams in delivering barrier island and marsh creation initiatives.

*"It's been an honor for me to participate in the Nature-based Future Challenge this year as a jury member. As someone who has worked for more than a quarter of a century as an ecosystem restoration practitioner in the Mississippi Delta, it's been a learning experience to see how students who are a generation younger than me and from different areas and backgrounds view the Mississippi Delta and how the teams have communicated their inventory and analysis in ways that are instructive to me. Nature-based solutions are an important component of Louisiana's Coastal Master Plan and should be for any coastal area facing challenges today and in the future. Participating in the 2026 NbF Challenge as a judge gives me great confidence about the next generation of practitioners and their ability to confront the challenges that our coastal areas will face in the future."*



## **Jaap van der Salm - H+N+S Landscape Architects**

Jaap is Associate Partner and Project Leader at H+N+S Landscape Architects, where he works on large-scale water, landscape, and rural transition projects in the Netherlands and abroad. With a background in landscape architecture, he is passionate about combining innovative design with ecological restoration, water safety, and opportunities for communities and regional development.



## **Victoria Elema - Embassy of the Kingdom of the Netherlands**

Victoria Elema is team lead international water affairs at the Ministry of Infrastructure and Water Management and responsible for the Netherlands International Water Ambition. In this role, she works on strengthening international collaboration and advancing the Netherlands' water strategy worldwide. She brings together governments, businesses and knowledge institutions to address water and climate challenges and promote innovative and resilient water management approaches.



### **John Reich - Foundation for Food & Agriculture Research (FFAR)**

John is Scientific Program Director at the Foundation for Food & Agriculture Research (FFAR), where he develops cross-sector research initiatives that drive equitable economic development and nutrition security. With a background in science and lived experience, he champions collaborative, long-term solutions to complex challenges in food and agriculture.



### **Simone Maloz - Restore the Mississippi River Delta**

Simone is Campaign Director of Restore the Mississippi River Delta, where she leads efforts to build a just, climate-resilient coast where people and nature can thrive. With more than 20 years of experience in coastal advocacy, policy, and restoration, she is a leading voice in Louisiana's coastal future and a strong champion of large-scale nature-based solutions.

*"Nature-based solutions aren't just good for Louisiana's coast—they're essential to its future. By working with the Mississippi River that built our region, we can restore our valuable wetlands and use natural systems to protect vulnerable communities, support our working coast, and sustain our unique culture for generations."*

# Colours of the Mississippi River Delta





# The Hidden Role of Coaches

When teams develop their ideas in the Nature-based Future Challenge, what becomes visible is often only the final version: strong visuals, clear storylines, and carefully constructed visions for the Mississippi River Delta. What remains largely unseen is everything that comes before: the first uncertain brainstorming, ideas that did not work, group discussions that went in circles, deadlines that suddenly felt close, and the many small decisions that slowly shape a concept into something stronger.

This is where coaches make a difference. Throughout the Challenge, professionals from partner organisations support teams behind the scenes as they work on one of the world's most complex landscapes. Their role is not to hand out answers or redesign a project for the students. Instead, they help teams ask sharper questions, challenge assumptions, and think more critically about where their ideas could lead.

## More questions than answers

Many people imagine coaching as giving expert advice. In reality, it is often about knowing when not to give the answer too quickly. Martine Roseboom, who coached this year alongside colleagues from Witteveen+Bos, says the most valuable moments often came when students had to work through uncertainty themselves. "You only see the pitch at the end," says Martine. "You don't see the struggle that comes before it."

Rather than telling a team what to do, coaches help students test their own thinking. Who benefits from this solution? What happens elsewhere in the system? Is this realistic? Is it bold enough? "As a coach, you shouldn't take over the design," Martine explains. "You help by asking the questions that move students forward." She noticed that once teams were given space to reflect and rethink, progress often came quickly. What looked stuck one week could suddenly become clear the next.

## Thinking beyond the technical fix

This year's Challenge asks students to imagine the future of the Mississippi River Delta, a place where ecology, economy, infrastructure and local communities are deeply connected. Because of that, a strong proposal needs much more than one clever technical solution.

David Mornout and Maud Vink, both working at GOPA MetaMeta, coached a technically strong team this year. Their role was to help students widen the frame of their thinking. "The challenge is not about one solution for one problem," says David. "It is about understanding the whole system."

That meant asking students to look beyond engineering alone and consider biodiversity, climate adaptation, livelihoods, and how one intervention might affect another part of the Delta. For many teams, this systems thinking can be one of the hardest parts of the Challenge. Students often begin with the logic of their own discipline. The Challenge asks them to step outside it.

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"You only see the pitch at the end. You don't see the struggle that comes before it."

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“As a participant, I knew how much work happens between meetings. As a coach, I saw that process from the outside.”

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### Serious challengers returning

David and Maud brought a particularly valuable perspective because both know what it feels like to be on the other side of the table. David previously took part in an earlier WUR student challenge focused on nature-based solutions. Maud was part of the winning team in the very first Nature-based Future Challenge two years ago, and later also won the Biodiversity Hackathon. Between them, they know exactly how intense, rewarding, and unpredictable these programmes can be. “As a participant, I knew how much work happens between meetings,” says Maud. “As a coach, I saw that process from the outside.”

That experience matters. It means they understand the pressure of deadlines, the uncertainty of not knowing if an idea is strong enough, and the long hours teams invest between official sessions. It also helps them recognise when students need practical advice, encouragement, or simply reassurance that struggling is part of the process.

### Learning goes both ways

Coaching is not only valuable for participants. Several coaches described learning from students as well. Martine says working with younger teams reminded her how refreshing open-minded thinking can be. In professional life, people often become focused on their own area of expertise. Students are more likely to ask bigger questions and explore ideas before habit tells them something cannot be done.

For David and Maud, coaching was also a chance to reconnect with the energy that first drew them into student challenges themselves. The curiosity, ambition, and willingness to try new things are exactly what make these programmes special.

### Beyond the Spotlight

When looking at the ideas that emerge from the Nature-based Future Challenge, it is easy to focus on the final proposals. But behind many of them is another layer of work: a coach who challenged an assumption, a conversation that shifted direction, or a better question asked at exactly the right time.

Coaching rarely takes centre stage, yet it shapes the process in essential ways. It is present in the moments where ideas become sharper, where uncertainty turns into direction, and where students learn not just what to design, but how to think.



# Aqua-Verde

Reimagining the delta as a living system shaped by water, sediment, and community adaptation.

## A dynamic delta

The Mississippi River Delta is a landscape shaped by water, sediment, and time, but today these processes are disrupted. Over the past century, nearly 2,000 square miles of land have been lost as levees restrict sediment flow, wetlands erode, and subsidence and sea-level rise accelerate change. At the same time, canals and infrastructure fragment ecosystems, increasing vulnerability for communities concentrated along narrow ridges.

## Designing with natural systems

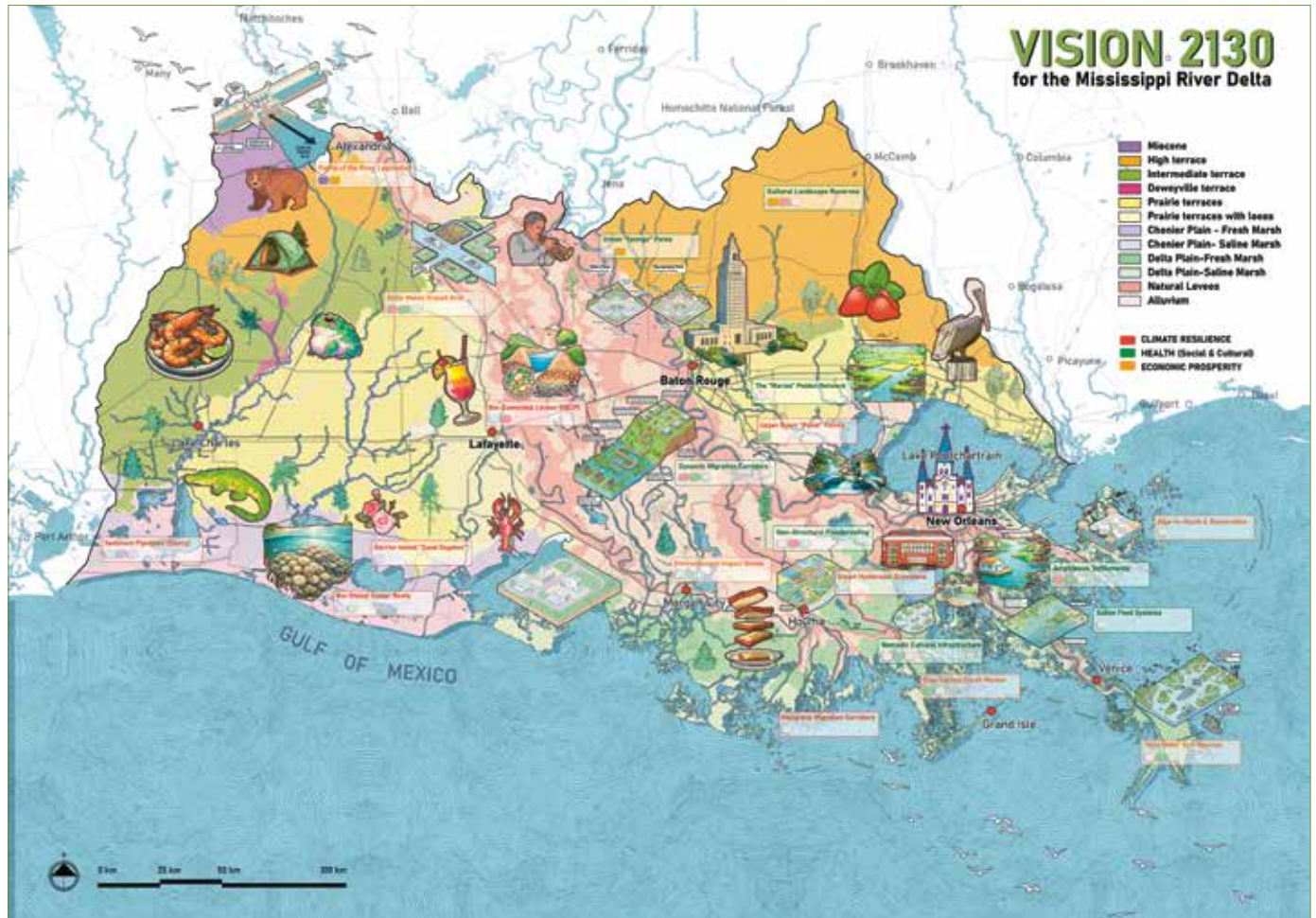
Aqua-Verde reimagines the delta as a system that works with natural dynamics rather than resisting them. Sediment diversions restore land-building processes, while oyster reefs, sand engines, and wetlands create living shorelines that adapt over time. By strengthening ecological systems, their approach provides natural protection against storms while supporting biodiversity and long-term resilience.

## Communities in transition

In this vision, communities evolve alongside the landscape. Amphibious housing, floodable public spaces, and elevated settlements allow people to live safely with water while maintaining cultural connections. Where risks become too high, planned relocation corridors enable communities to move together, preserving social networks and local identity.

## A regenerative system

Beyond the coastline, the proposal connects environmental and economic systems. Food production shifts towards salt-tolerant crops and aquaculture, while bayous become water-based transport routes. Former oil platforms are transformed into offshore wind hubs and artificial reefs, supporting a regenerative blue economy. Together, these strategies create a delta that is adaptive, biodiverse, and resilient.



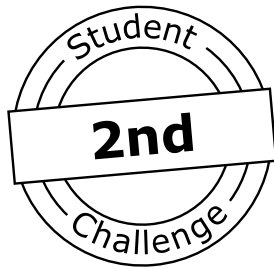


Md Arefien Razi, Abrar Faiaz,  
Ifanul Alam, Azmain Tahmid,  
A. A. M. Rownak Shahriar Ruhan,  
Sumaiya Rahman Tanisa,  
Nusrat Jahan, Nadia Rahman Alin

Bangladesh University of Engineering  
& Technology  
Khulna University of Engineering and  
Technology



“The most unexpected learning was how much interdisciplinary collaboration improves solution quality, combining data, design, and stakeholder perspectives led to more practical and impactful outcomes.”



“The Urban Greenhouse Challenge was a very intense yet rewarding and fun experience.”



# HydroSoilSense

Designing a network of region-specific systems that connect water, soil, and agriculture across the delta.

## A delta of shifting systems

The Mississippi River Delta is not one uniform landscape, but a collection of distinct subregions shaped by sediment flows, water movement, and human intervention. Over time, levees, canals, and infrastructure have disrupted these natural dynamics, contributing to land loss, saltwater intrusion, groundwater depletion, and habitat decline. These pressures are deeply interconnected, affecting agriculture, ecosystems, and communities in different ways across the delta.

## Designing by subregion

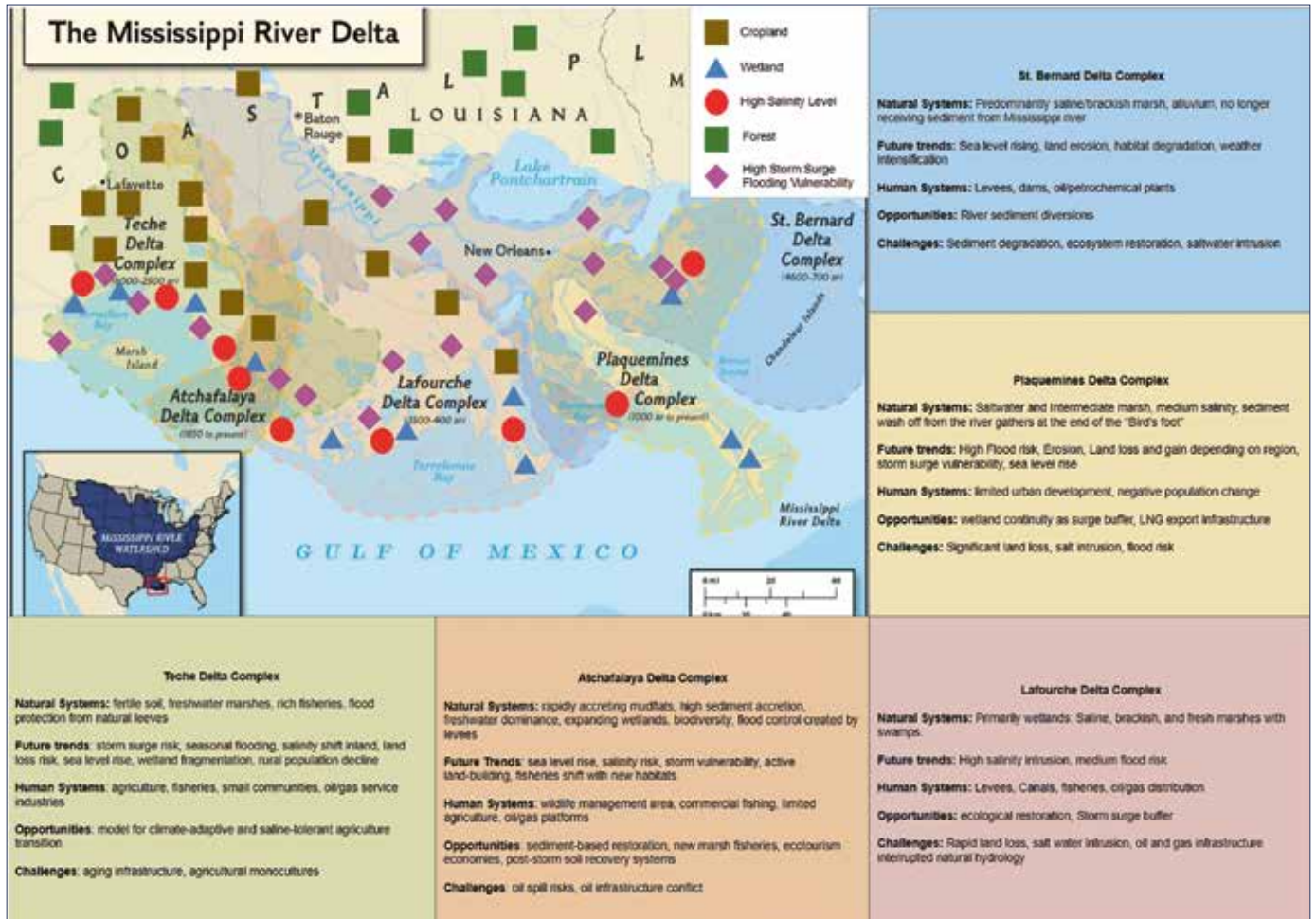
HydroSoilSense responds to this complexity by dividing the delta into five subregion systems, each with its own role. Their approach moves away from one-size-fits-all solutions and instead works with local conditions. The Atchafalaya becomes a sediment engine through controlled diversions, while the Plaquemines region acts as a surge buffer with mangrove marshes. In St. Bernard, oyster reefs function as living breakwaters, restoring habitats while improving water quality.

## Smart agriculture and water systems

At the core of the proposal is a nature-based smart irrigation strategy. In the Teche Delta, "smart agriculture zones" combine precise water management, salt-tolerant crops, biodiversity corridors, and agrivoltaics. These systems allow agriculture to adapt dynamically to changing salinity and water conditions, supporting food production while reducing pressure on freshwater resources.

## Adaptive landscapes and livelihoods

Other regions evolve in different ways. The Lafourche Delta, for example, integrates floating bio-islands with aquaponic systems that filter water, produce food, and protect infrastructure. Across all subregions, the proposal connects ecological restoration with economic activity, allowing landscapes and livelihoods to adapt together. Rather than holding the delta in place, HydroSoilSense presents a system that evolves with natural processes, which are flexible, regionally tailored, and built to respond to change.





Yeji Kang, Kaidin Sheehan-Davies,  
Tavleen Sihota, Amalya Drysdale,  
Hieu Tran

Simon Fraser University



“My biggest unexpected learning was learning how to think out of the box and find solutions that might not be straight forward but can make large impacts when they are part of a system.”

“To think of a specific problem, you have to start broad and narrow down your scope to find the solution.”

**The Mississippi River Delta**

Map showing the Mississippi River Delta region in Louisiana, including the Gulf of Mexico, Lake Pontchartrain, and various delta complexes: Teche, Atchafalaya, Lafourche, Plaquemines, and St. Bernard. The map also indicates current river flow, agriculture, house as natural levees, elevation, and land loss.

**St. Bernard Delta Complex**  
Vision: Oyster reef protection

**Plaquemines Delta Complex**  
Vision: Mangrove marsh buffers

**Teche Delta Complex**  
Vision: Precision Agriculture and nature based solution

**Atchafalaya Delta Complex**  
Vision: Deep rooted native plant seeds inside biodegradable coir logs

**Lafourche Delta Complex**  
Vision: Floating bio-islands

# Living Downstream

Rethinking the delta through equity, water systems, and the impacts of upstream decisions.

## From upstream to downstream

The Mississippi River Delta is shaped not only by natural processes, but by decisions made far beyond its boundaries. Land use, infrastructure, and resource extraction upstream influence water flow, sediment distribution, and environmental conditions downstream. These cascading effects often leave coastal communities facing the greatest risks, as flooding, salinity, and ecological degradation reshape both landscapes and livelihoods.

## Designing with the river's logic

Living Downstream approaches the delta by working with its natural dynamics rather than resisting them. Sediment diversions rebuild wetlands and support vertical land growth, while sponge landscapes and controlled flooding zones absorb and filter water. Mangrove expansion stabilises coastlines, creating natural buffers that strengthen resilience while restoring ecological systems.

## Keeping communities rooted

Instead of displacement, the proposal focuses on adaptation in place. Elevated and amphibious housing allows communities to remain along bayous while responding to long-term environmental change. Mobility systems shift toward water-based transport, aligning with the delta's hydrology, while cultural identity and local ways of living remain central to the design.

## Linking ecology, economy, and equity

Across the delta, environmental restoration is directly connected to economic opportunity and social wellbeing. Food systems adapt through saline-tolerant agriculture, aquaculture, and oyster farming, supporting livelihoods while improving water quality. By treating climate adaptation, biodiversity restoration, and social justice as interconnected goals, Living Downstream presents a future where resilience is shared and where no community is left to face the consequences alone.

“A solution is only truly sustainable if it is practical, culturally appropriate, and supported by the people it impacts.”

“Effective environmental solutions are not always the most complex or technology-driven, but often the ones that align closely with natural systems.”





Leisha Dogra, Tiya Sanghvi,  
Aayushi Gupta, Swarnim Waingankar

D.Y. Patil Deemed to be University



## LIVING DOWNSTREAM SCHEMATIC PLANNING MAP



# Mississippi Beavers

Building a self-generating coast through small, connected nature-based interventions.

## Learning from nature's engineers

Inspired by beavers as natural ecosystem builders, the team approaches the Mississippi River Delta as a system that can be shaped through many small, interconnected interventions. Rather than relying on large-scale infrastructure, their concept draws from how natural processes gradually build, adapt, and strengthen landscapes over time.

## A system of layered defenses

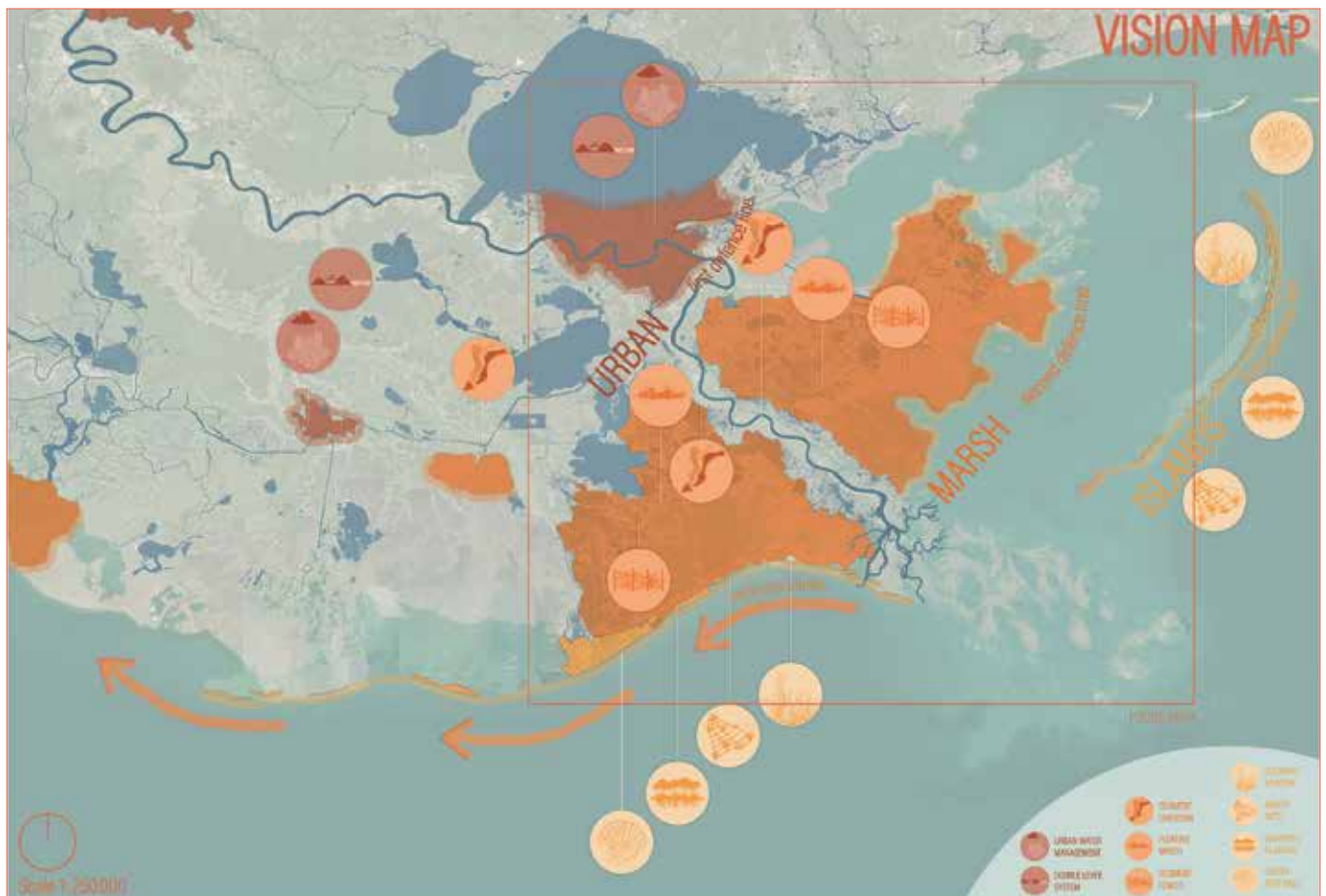
The proposal introduces three interacting lines of defense that together form a cohesive protection system: barrier islands, marshes, and urban areas. Instead of resisting land loss entirely, the strategy allows for controlled retreat in certain areas, while using the Mississippi's sediment to rebuild land elsewhere. This reactivation of natural processes supports coastal protection while reducing issues such as hypoxia.

## Balancing environment and economy

The delta is not only an ecological system, but also a place shaped by livelihoods, industry, and cultural identity. The team recognizes the importance of sectors such as fisheries and energy, while addressing the environmental degradation caused by infrastructure, pollution, and saltwater intrusion. By restoring ecosystem functions, their approach supports both economic stability and environmental recovery.

## A self-sustaining delta

In the long term, the vision is a coast that generates its own resilience. Wetlands provide natural protection, ecosystems support biodiversity, and the region becomes a productive space for fisheries and ecotourism. By combining small-scale nature-based solutions into a larger system, Mississippi Beavers present a future where the delta is not held in place, but allowed to evolve: adaptive, regenerative, and shaped by the same processes that once built it.





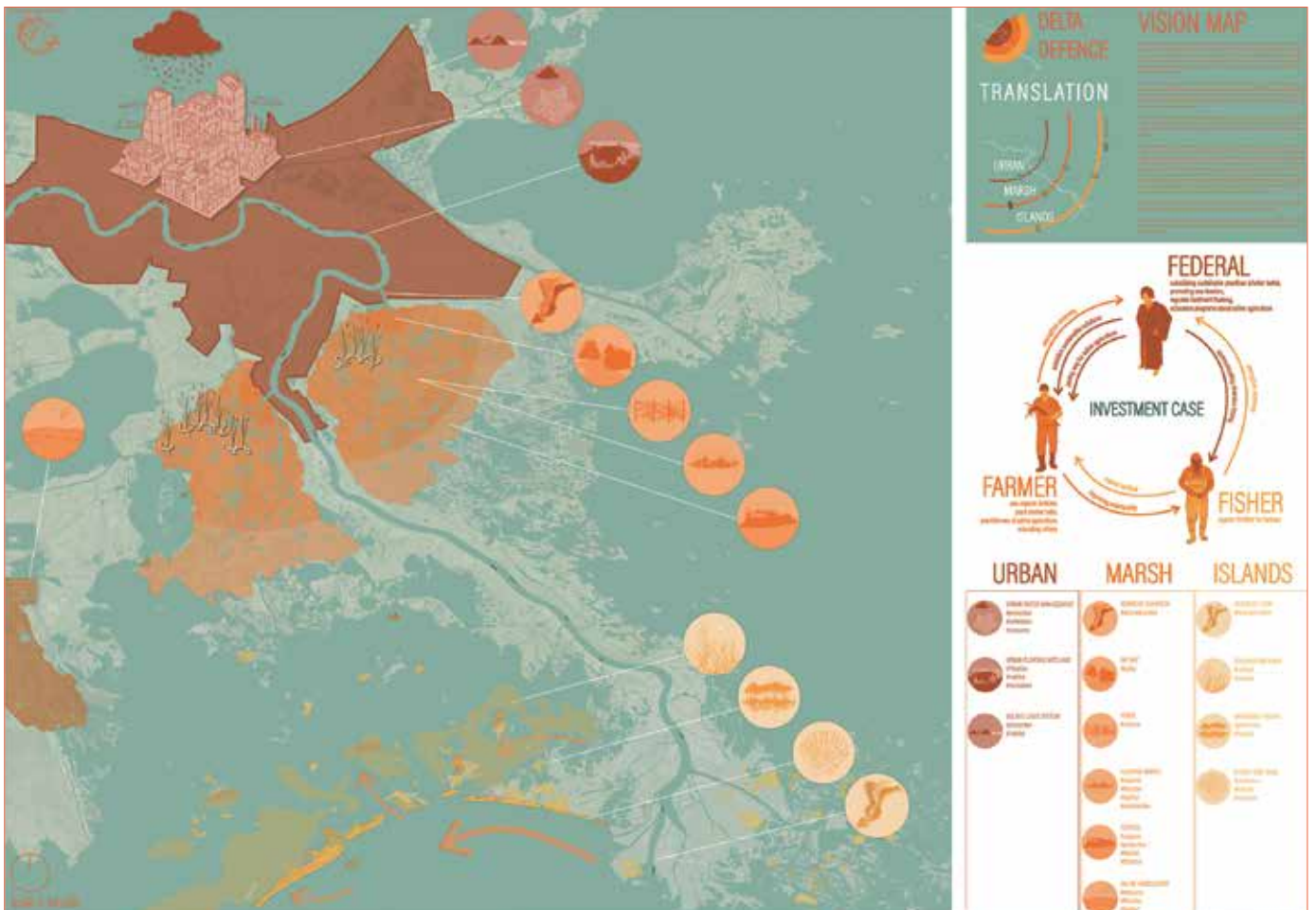
Matilde Clara Di Vita,  
Kinanthi Maheswari, Jule Menzel,  
Timo Fehr, Nadine Ventura

University of Amsterdam,  
Wageningen University & Research,  
Technical University of Munich



“At their core, nature-based solutions  
are solutions for people.”

“I learned how to act on my own  
initiative and how to manage a group.”



# PULSE

Restoring the natural rhythm of the river to rebuild a self-sustaining delta.

## A disrupted rhythm

The Mississippi River Delta was once shaped by the natural pulse of water, sediment, and seasonal flooding. Today, this rhythm is interrupted by levees, canals, and extraction, cutting off sediment flows and accelerating wetland loss, subsidence, and saltwater intrusion. What was once a self-sustaining system has become increasingly fragile, with both ecosystems and communities under pressure.

## Letting the river pulse again

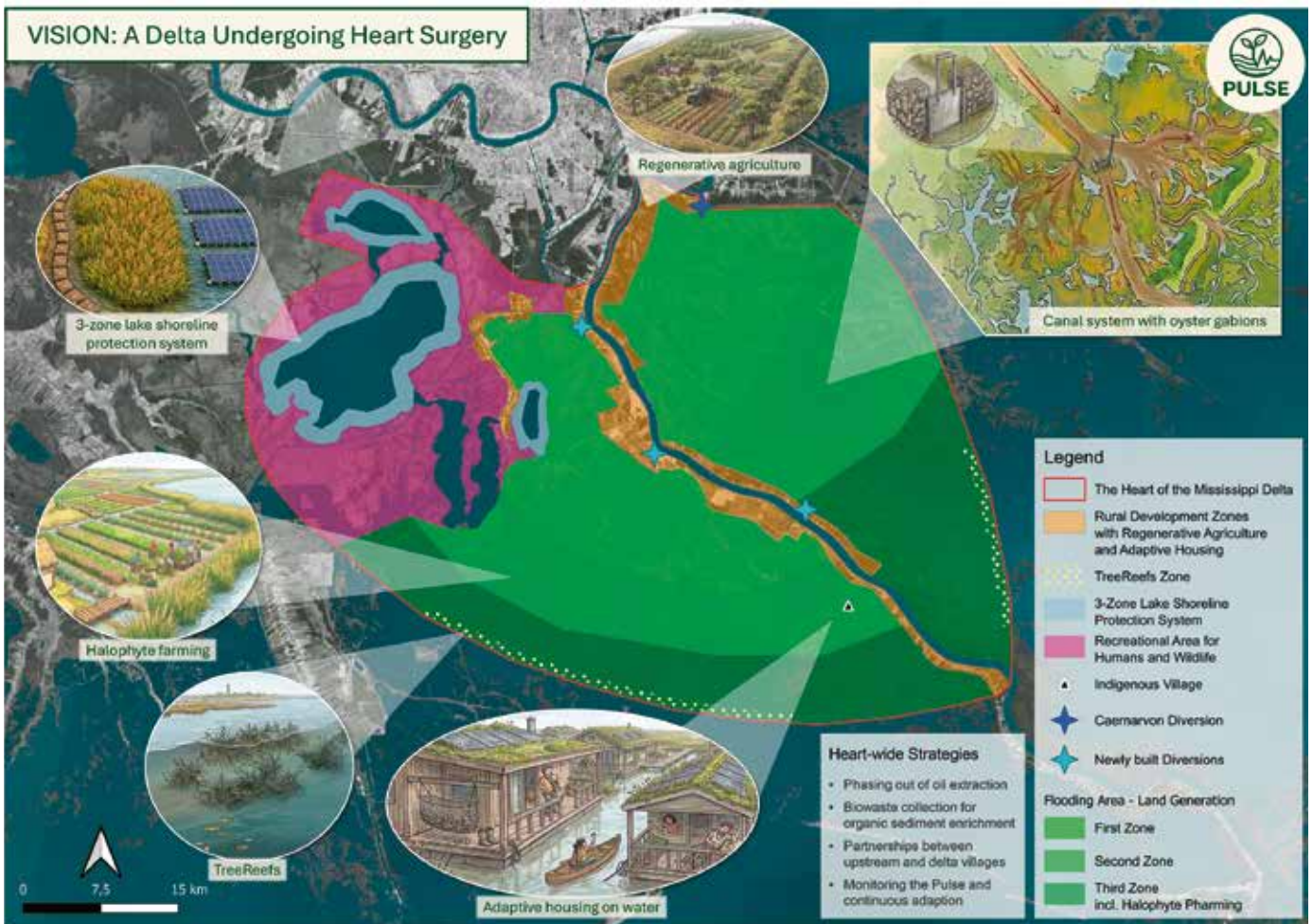
PULSE reimagines the delta by restoring its natural dynamics. Controlled flooding allows the river to spread sediment and nutrients, rebuilding marshes and reconnecting wetlands. Former oil canals are closed, and ecological processes are reactivated, enabling the delta to gradually regain its capacity to grow, protect itself, and regulate water systems.

## Living from the delta

In this vision, communities are not separated from nature, but supported by it. Food systems shift toward regenerative models, including aquaculture, algae-oyster systems, and water-based agriculture that actively contribute to ecosystem restoration. These cycles strengthen local economies while reinforcing the health of the landscape.

## An adaptive and just future

Infrastructure evolves with the environment through floating energy systems, water-based mobility, and settlements designed for changing water levels. At the same time, the proposal emphasises equity, with Indigenous knowledge guiding stewardship and shared responsibility across communities. By reconnecting ecological processes with social systems, PULSE presents a delta that is not only resilient, but alive. A landscape where the rhythm of water once again shapes a sustainable future.





Eric Shulman, Anika Pahl,  
Marie Basmer, Flora Heckner,  
Amelie Franklin, Clara Cecil

Utrecht University,  
Technical University of Munich,  
Wageningen University



“Nature-based solutions aren’t just “going back” to a previous state. It entails critical consideration of invasive species and social and political realities.”



“I did not expect to learn so much about the complexity of long term strategy. Any time there were unique ideas brought to the group they had to be scrutinized from a very large number of lenses and perspectives, which was a wonderful skill to develop”



# Reboot

Letting the river lead by restoring its natural course and land-building power.

## A delta shaped by restriction

The Mississippi River Delta is a landscape caught between natural dynamics and human control. While the river once built vast areas of land through shifting flows and sediment deposition, levees and infrastructure now restrict these processes. Combined with sea-level rise, storm surges, and economic dependence on fossil industries, the region faces accelerating land loss and increasing pressure on both ecosystems and livelihoods.

## Letting the river decide

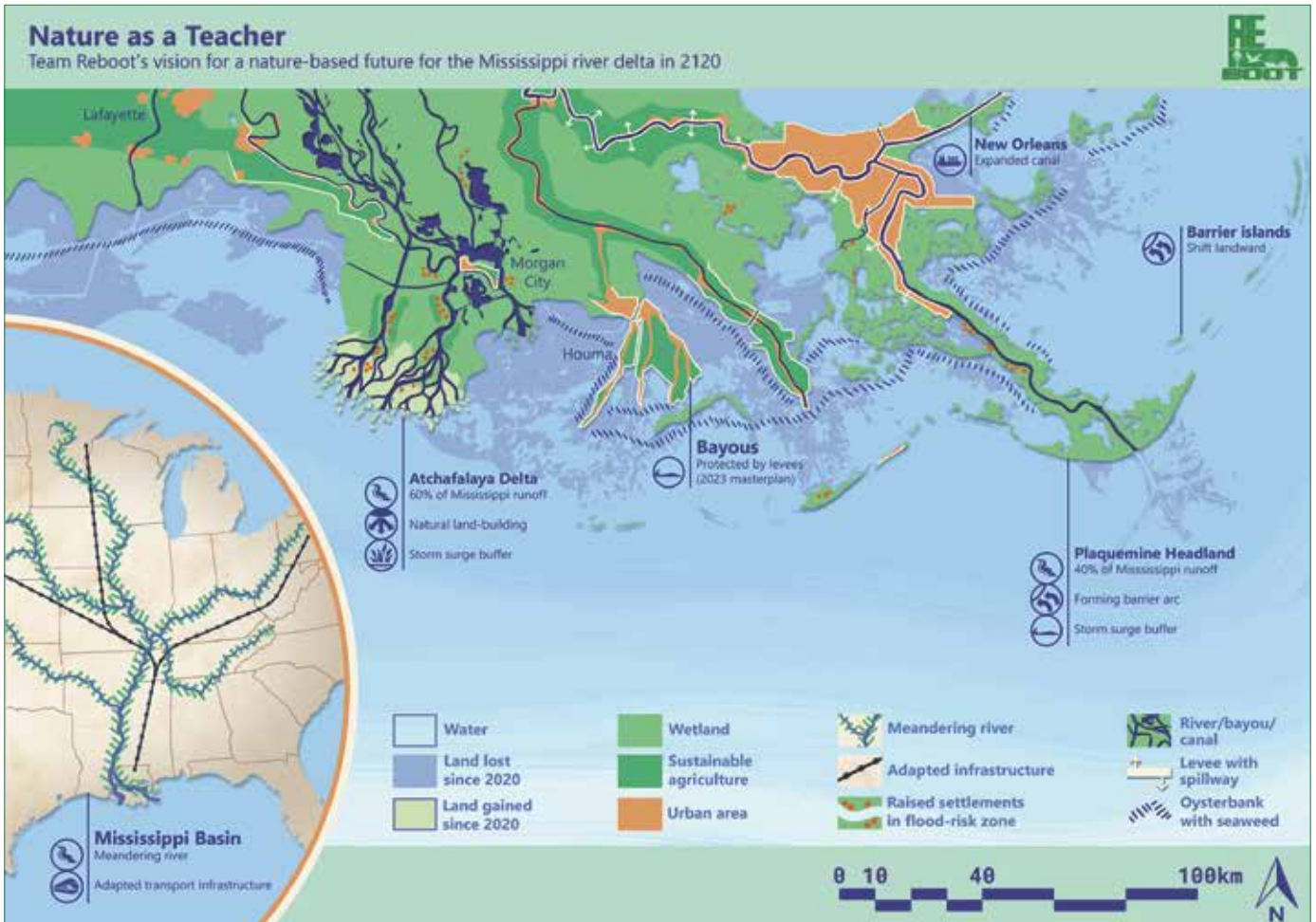
Reboot takes a radically different approach by treating nature as a teacher rather than something to control. Instead of forcing the Mississippi along its current path, the proposal allows it to follow its natural tendency toward the Atchafalaya basin. This shift reactivates the river's land-building capacity, while the existing Plaquemines delta gradually transforms into a protective barrier arc that reduces storm surge impacts.

## Reshaping communities and systems

Allowing the river to move brings significant change. Some settlements would need to adapt, relocate, or be reshaped to align with a more dynamic landscape, while existing urban areas remain protected and evolve into sponge cities. At the same time, infrastructure adjustments, such as maintaining navigation routes, ensure the region remains connected and functional.

## A transition beyond fossil dependency

As the delta transforms, so does its economy. With oil and gas resources expected to decline, the proposal highlights opportunities for low-carbon industries, fisheries, agriculture, research, and tourism. By working with natural processes rather than against them, Reboot presents a future in which ecological resilience, economic potential, and cultural heritage are sustained together, even as the landscape itself continues to change.





Yarnick Zoetekouw, Ian Witte,  
 Noémie Renouil-Hata,  
 Michael Hendle, Isa Tiebosch,  
 Demi Wiskerke, Gwendolyn van  
 Herpen, Ahmed Baqai, Taofiq Yusuf

University of Amsterdam,  
 Wageningen University & Research,  
 Technical University of Berlin,  
 Louisiana State University



“Biggest takeaway: There is always multiple ways to examine a problem, each and every actions have consequences.”

“I think it really encouraged me to find novel, out of the box perspectives and just generally to think more creatively”



# Rivierita

Using data, sediment, and governance to transform the delta into a living system.

## A delta at risk of disconnection

The Mississippi River Delta was built over millennia through sediment deposition, creating a rich network of wetlands, swamps, and estuaries. Today, these natural processes are disrupted. Levees, canals, and extraction have disconnected the river from its floodplains, accelerating land loss, subsidence, and saltwater intrusion. In places like Venice, these changes threaten both ecosystems and the livelihoods that depend on them.

## Sediment as a design tool

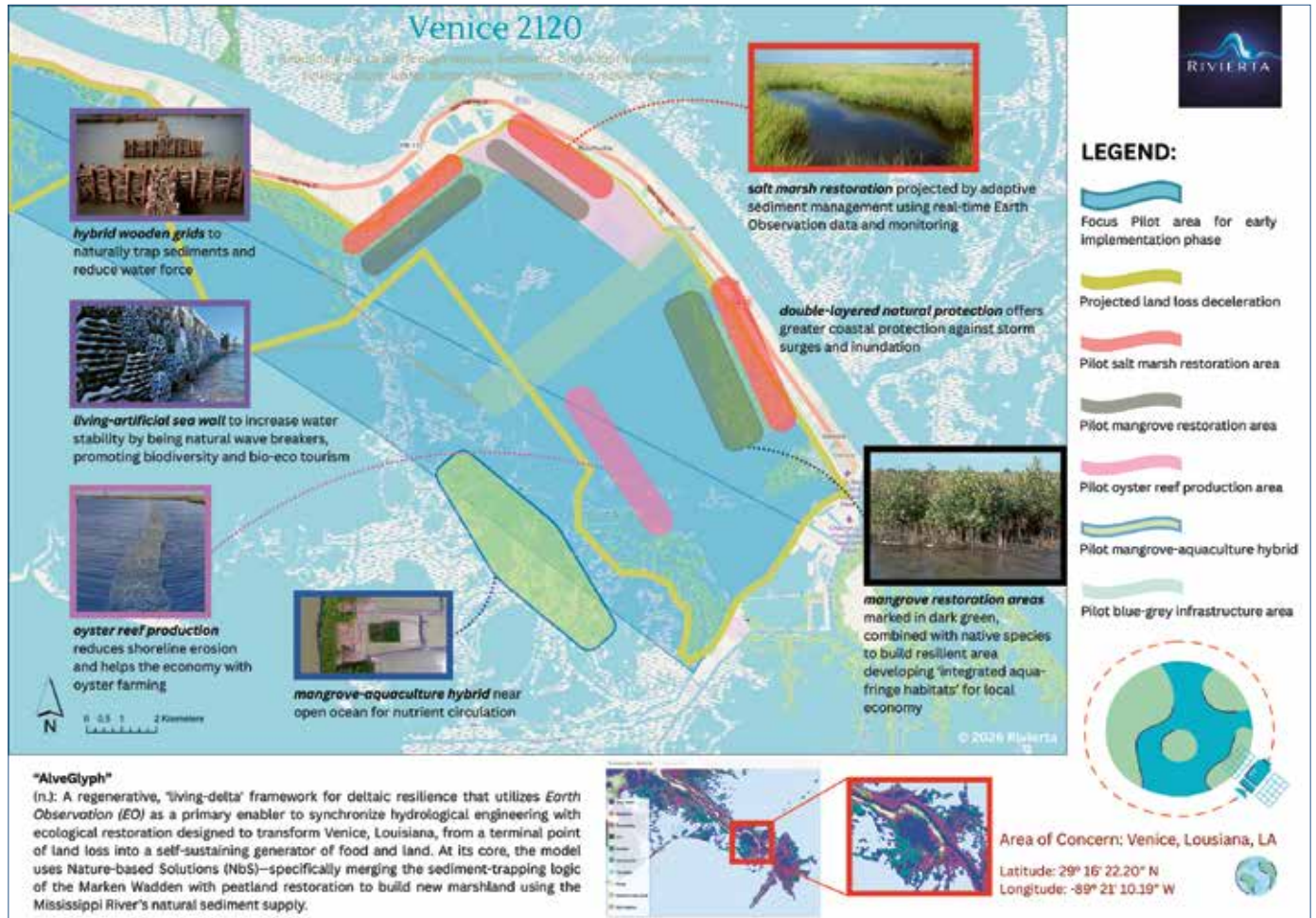
Rivierita's vision centres on reusing sediment as a key resource for regeneration. Through the AlveGlyph model, Earth Observation data guides targeted interventions, allowing sediment to be captured, redirected, and used to rebuild land. Strategies such as sediment trapping and peatland restoration restore natural processes, while oyster reefs and mangrove-aquaculture systems strengthen ecological health and coastal protection.

## From control to adaptive governance

Beyond physical interventions, the proposal rethinks how the delta is managed. Instead of centralized decision-making, Rivierita introduces a co-management approach that combines local knowledge, Indigenous identity, and scientific expertise. Education and "Delta-Expert" training play a key role in preparing communities to actively manage and adapt to the delta's changing conditions.

## A living laboratory for adaptation

By linking ecological restoration, data-driven planning, and community governance, Rivierita envisions the delta as a self-sustaining system that evolves over time. Venice becomes more than a vulnerable endpoint as it transforms into a testing ground for climate adaptation, where natural processes, technology, and local communities work together to shape a resilient future.





Abyan Nauli Harahap, Lukas Keizer,  
Ajeng Putri Andani, Ayu Cahyani,  
Gita Amalya Chairinida, Armadhani  
Zula, Martina Afida Prayitno

Wageningen University & Research,  
Bandung Institute of Technology



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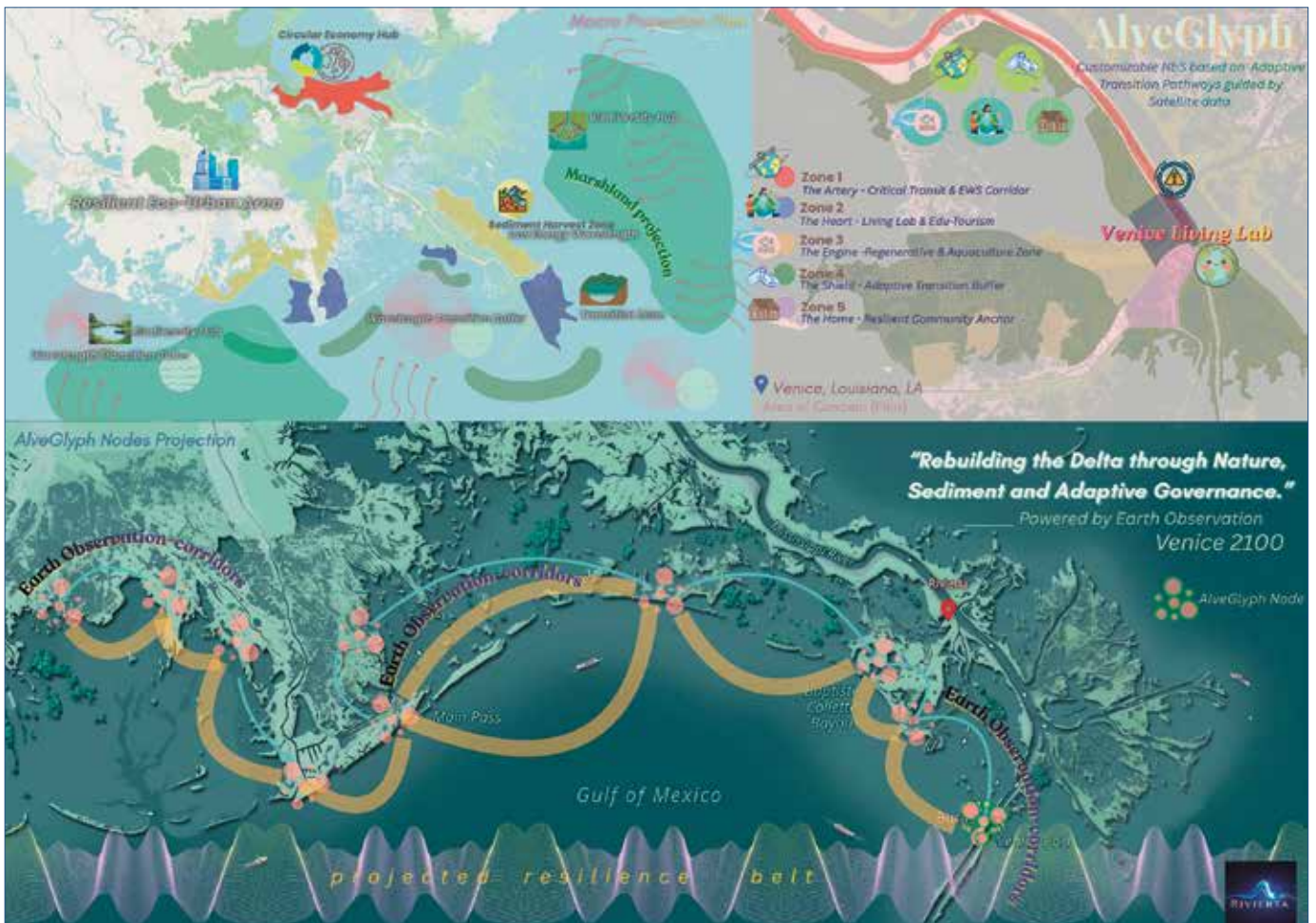
"I learned a new skills regarding the topic. I study ecology  
but I have created an idea about aquaculture which I  
never learned before but I really like to make a new idea,  
concepts, and research"

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"I learn a lot about combining different practices into ideas that  
work"

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# RiVival

Reviving the delta through hybrid nature-based systems that restore land, water, and community.

## A delta under pressure

The Mississippi River Delta is increasingly constrained by human intervention. Levees, dams, and industrial canals disrupt sediment flows, accelerate subsidence, and enable saltwater intrusion that destroys wetlands. These environmental changes are closely tied to social inequality, as land loss and climate risks disproportionately affect lower-income and indigenous communities, particularly in vulnerable areas such as the Houma-Terrebonne corridor.

## Water as a creative force

RiVival reimagines water not as a threat, but as a driver of regeneration. By removing restrictive infrastructure and introducing bio-engineered sediment capture using willow and fascines, the river is able to rebuild land naturally. Oyster reefs and restored wetlands strengthen coastal protection, while freshwater storage and aquifer recharge systems help stabilise the broader hydrological balance.

## Living with a changing landscape

In this vision, communities adapt alongside the environment rather than resisting it. Elevated and floating housing allows people to remain connected to the delta, supported by eco-mobility hubs and living infrastructure such as “Baubotanik” bridges. Cultural identity remains central, with local traditions and ways of living continuing to shape how space is designed and used.

## A regenerative and just future

The proposal connects ecological restoration with economic transition and social equity. Renewable energy, carbon credits, agroforestry, and regenerative aquaculture create new livelihoods, while participatory governance empowers indigenous communities as key stewards of the land. By linking environmental processes with social systems, RiVival presents a future in which the delta is not only restored, but rebalanced ecologically, economically, and socially.





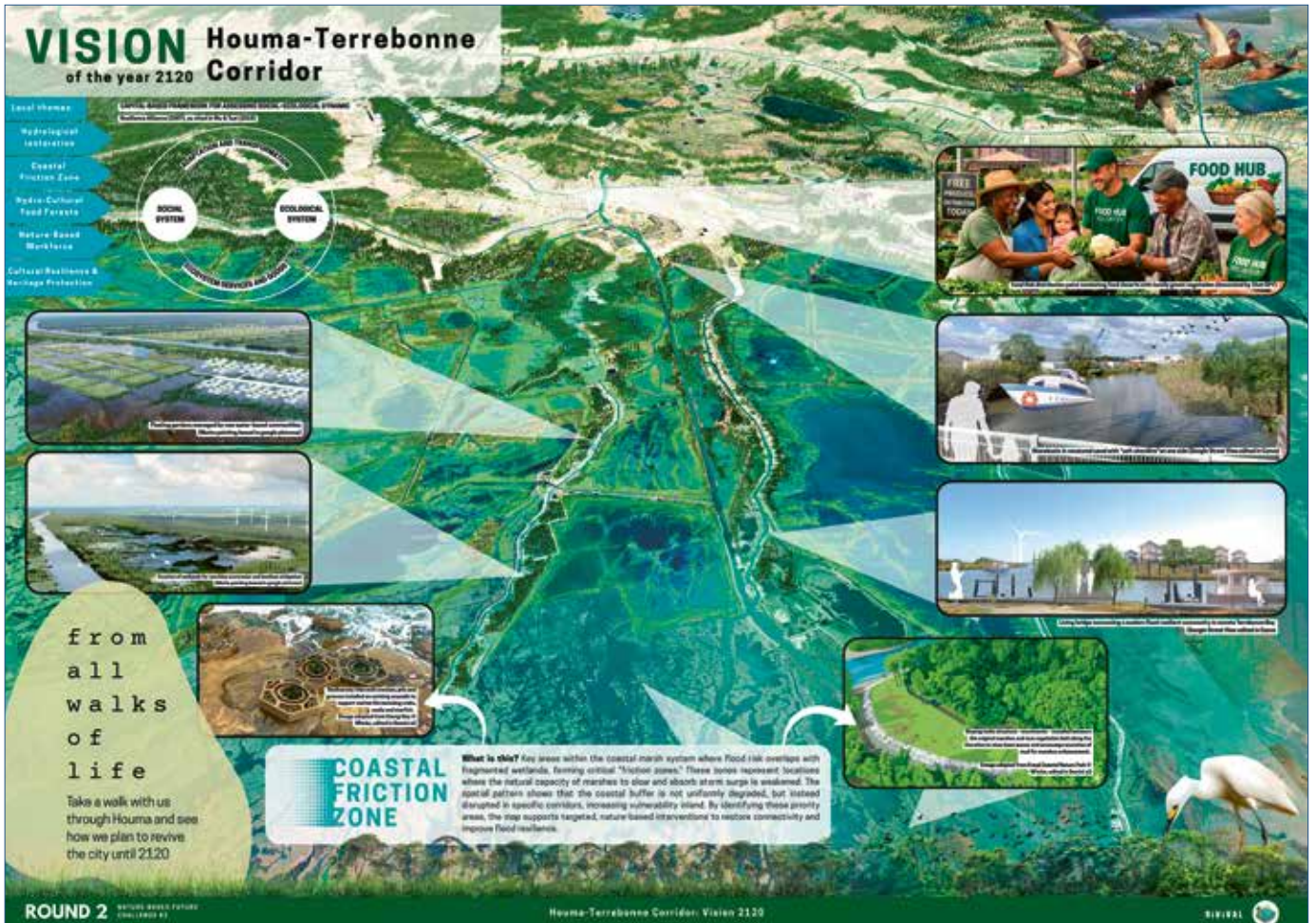
Laura Slot, Isabelle Decher, Luis Garcia, Rihab Mazouzi, Yeganeh Karami, Marlon Zarate, Ruochen Wu, Yi Fu Smits, Coretta Tchouandem Nzali

Institut Agro Montpellier, University of Hohenheim, Universitat Politècnica de Catalunya, National School of Agriculture Meknes, Isfahan University of Technology, Uppsala University, University of Padua, Wageningen University & Research



“My biggest takeaway from the challenge was realizing how important adaptability and teamwork are when working on something complex.”

“This challenge really had me thinking out of the box and using a really integrated approach to solutions.”



# Spartina

Restoring the delta through large-scale revegetation and community-driven ecosystem recovery.

## A coast losing its roots

Coastal Louisiana, particularly regions like Barataria and Terrebonne, is experiencing some of the most severe land loss in the delta. The disruption of natural processes, combined with cancelled large-scale interventions, has left gaps in strategies to restore and protect these vulnerable landscapes. As wetlands disappear, ecosystems weaken and the stability of land, infrastructure, and livelihoods is increasingly at risk.

## Rebuilding through vegetation

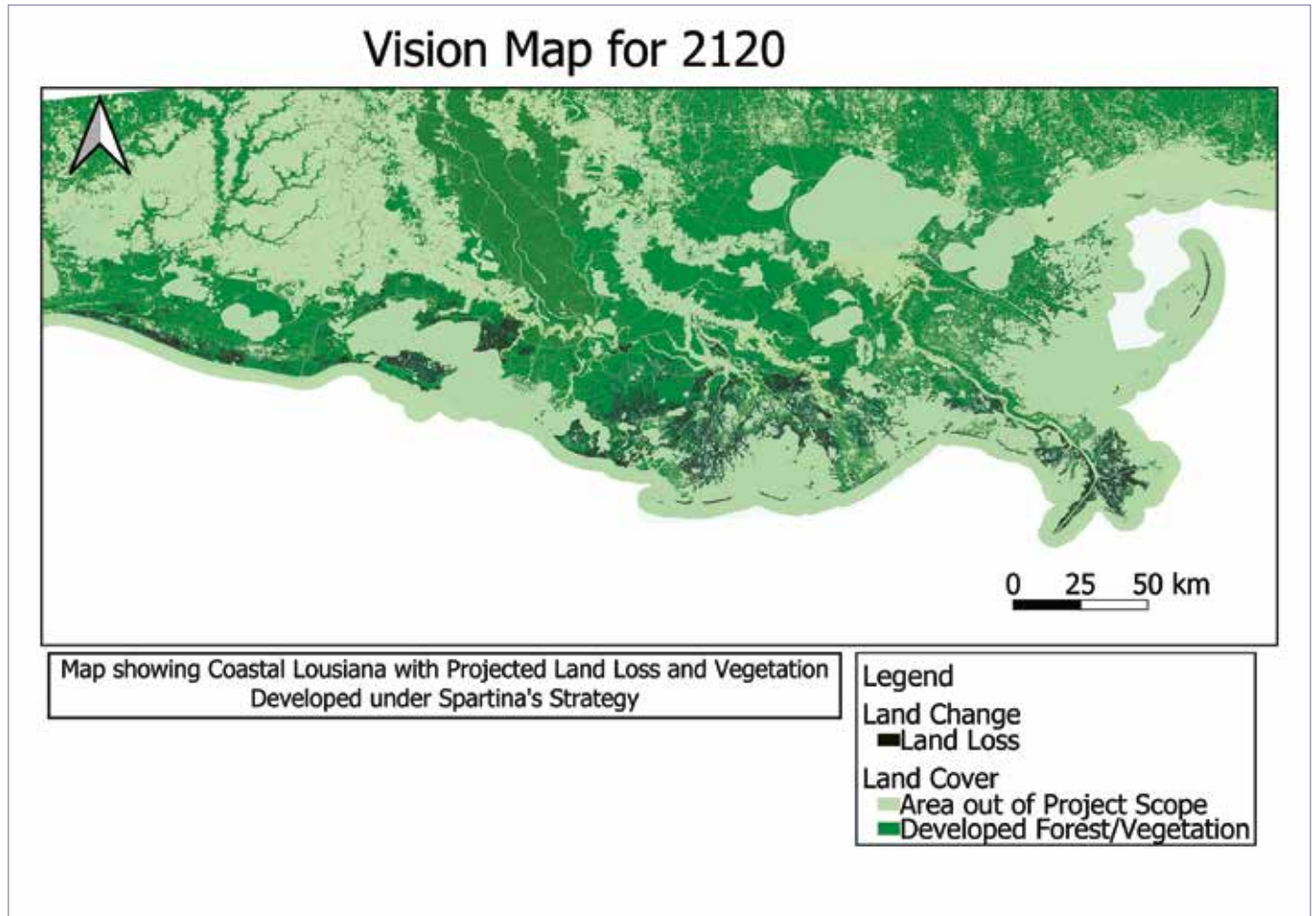
Spartina's approach centres on revegetation as a long-term, nature-based solution. By supporting natural regeneration where it already exists and introducing new plantings where needed, the strategy strengthens ecosystems from the ground up. Silvicultural techniques such as thinning are used to improve plant survival and growth, ensuring that vegetation can establish itself and develop into resilient systems over time.

## Protecting and maintaining growth

To ensure long-term success, vegetation is supported by tailored green infrastructure that responds to local risks. Both soft and hard nature-based measures help protect emerging plant systems from flooding, erosion, and other pressures. Continuous monitoring allows these ecosystems to adapt and remain resilient as environmental conditions change.

## A living system supported by people

Community involvement is central to the proposal. Volunteers take part in planting, maintenance, and monitoring, strengthening both ecological outcomes and local engagement. Over time, this approach supports biodiversity, stabilises land, and opens opportunities for eco-tourism and local economies. Spartina envisions a future where vegetation not only restores the landscape, but becomes the foundation for a thriving, community-supported delta.





Sadikshya Gautam,  
Valentina Matteucci, Isabella Griffin,  
Cheylin Patenaude, Michela Preatla,  
Sylvie Aoun, Thea Minea,  
Cecilia Marina Seclì

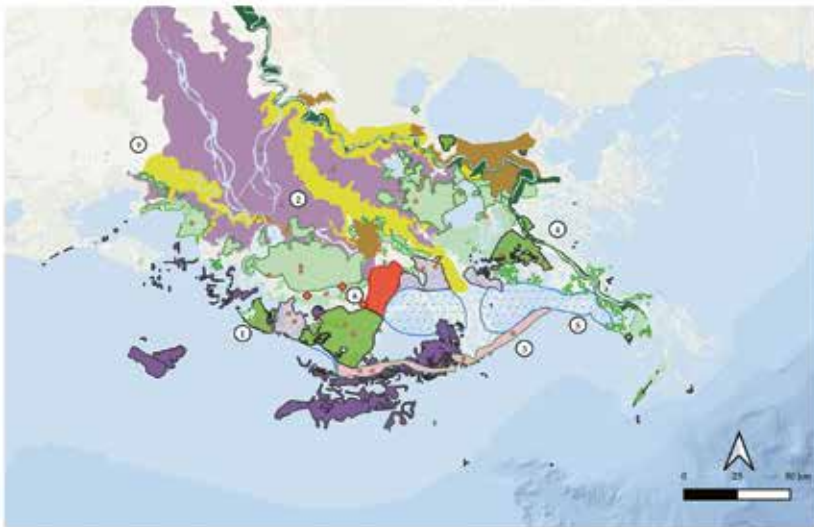
University of Padua



“This challenge helped me understand better how landscape planning and reforestation projects actually work - from the funding part to the ecological modeling.”

“It was interesting to explore the level of inter-connectedness between nature and society, economy and other factors and to understand the relevance of multi-disciplinary, collaborative solutions.”

**THE MISSISSIPPI DELTA, BARATARIA-TERREBONE SYSTEM IN 2120 - SPARTINA TEAM'S VISION MAP**



Softbank diversions	Drackish marshlands (with <i>Spartina alterniflora</i> )
Sliver-aquaculture systems	Freshwater wetlands (with herbaceous and woody)
Mangrove restoration	Intertidal vegetation communities
Urban settlements (medium - high development)	Saltwater marshlands
Reforestation trees	Swamps ( <i>Cladonia detritica</i> and <i>Najas difformis</i> )
Coastal managed retreat	Agriculture - Agroforestry systems
Oyster reefs	Potential sources of surficial sediment
Water bodies	Permanent plots proposed sites

1. Introduction and background information on the project, including the objectives, the team, and the funding sources.

2. The project's goals, objectives, and expected outcomes, including the specific actions to be taken and the timeline for implementation.

3. The project's budget, including the estimated costs and the sources of funding, and the expected financial sustainability of the project.

4. The project's monitoring and evaluation plan, including the indicators to be used and the methods for data collection and analysis.

5. The project's communication and outreach strategy, including the methods for disseminating the project's findings and the role of the media and the public.

6. The project's conclusion and recommendations, including the lessons learned and the suggestions for future research and action.



# Studio Bayou

Designing from within the delta, rooted in local knowledge and lived experience.

## Living the delta

Studio Bayou approaches the Mississippi River Delta not as an abstract system, but as a place they know and experience directly. With many team members based in Louisiana, their perspective is shaped by daily realities from storm risks to cultural connections with land and water. This proximity brings a strong focus on solutions that are grounded, practical, and rooted in local context.

## Strengthening what exists

Rather than radically reshaping the delta, the team focuses on reinforcing and restoring existing systems. Wetlands, oyster reefs, and green infrastructure are combined to protect communities from flooding and storm surges while improving ecological health. Their approach builds on what is already present, enhancing natural defenses instead of replacing them.

## Community at the center

For Studio Bayou, resilience is inseparable from the people who live in the delta. Their strategy emphasizes community involvement, ensuring that local voices shape decisions and outcomes. Protecting the coast also means protecting livelihoods, culture, and the sense of place that defines the region.

## A future that stays connected

By linking ecological restoration with community needs, Studio Bayou envisions a future where people do not have to leave the delta to stay safe. Instead, they remain part of a landscape that continues to evolve supported by nature-based solutions that protect, sustain, and strengthen both the environment and society.





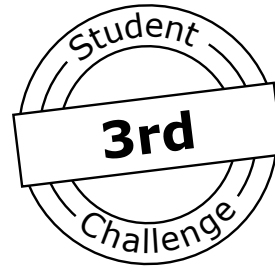
Justice Kosi Atsu, Willow Cook,  
 Fransis Lopez, Kevin Enriquez,  
 Rachel Judson, Emma Field, Jarret Luter,  
 Amanda Richter, Jennifer White,  
 Brooke Harvey, Leah LeBlanc,  
 Carlie Dutile, Taylor Horton,  
 Gifford Greer, Camille Milligan

University of Ghana,  
 Louisiana State University,  
 University of New Orleans,  
 Iowa State University



“There are many different ways to solve a problem, so figuring out which one works best for the project and context is key.”

“The challenge was very cool! This is the first time I have worked with such an interdisciplinary and international team, so it has definitely broadened my horizons!”



**The Currents that Connect Us: Ecology, Economy, and Culture in Southeast Louisiana**  
 Master Plan

\*No AI was used in the making of this project

**Concept**  
 Southern Louisiana functions as an **ecologically, economically, and culturally interconnected system of urban, rural, and coastal zones**. From our research, we chose to focus on the challenges and opportunities in each zone and adapted solutions for each unique context.

**Vision**  
 In 2120, Southeast Louisiana remains a "Sportsman's Paradise" where resource-based livelihoods are thriving under adaptation strategies that strengthen coastal resilience, cultural identities, and harmony with nature.

**Goals**  
**Preserve** the places, traditions, and resources that matter most to residents.  
**Protect** communities from storm surge and flooding through resilient, nature-based solutions.  
**Celebrate** culture by providing spaces for community gathering, cultural events, and festivities.

**1: New Orleans**

Urban Agriculture  
 MRGO Fix

**2: Marsh**

Shell Beach  
 Delcros

Ironton

**3: Coastal**

Pointe a la Hache Diversion  
 Grand Bayou Village  
 Port Sulphur Diversion  
 Empire Diversion  
 Baras Diversion  
 Venice Diversion  
 Barrier Island Maintenance

**Design concepts for each zone:**

**1: Bridging the Gap**

**2: Vanishing Communities**

**3: Lines of Defense**

# The Five Rivers Alliance

Transforming the delta through circular economies, living infrastructure, and community-led resilience.

## A delta of opportunity and stress

The Mississippi River Delta is both highly productive and increasingly vulnerable. In areas like Cocodrie, nutrient-rich waters support fisheries and local economies, while marshes act as natural buffers. At the same time, erosion, water quality decline, and climate pressures threaten both ecosystems and livelihoods, creating a landscape where environmental and economic challenges are closely intertwined.

## Rebuilding through natural dynamics

The Five Rivers Alliance envisions a delta that works with its natural systems. Sediment diversions restore land-building processes, while wetlands and floodable landscapes replace rigid infrastructure. Levees are adapted to function alongside marshes, allowing water and sediment to move more freely and rebuild elevation over time.

## Linking ecology and economy

A key element of the proposal is the transition toward circular, regenerative industries. Bio-refinery hubs convert biomass and excess nutrients into renewable energy, while ports shift to electrified and low-emission logistics. These systems are integrated within existing infrastructure, reducing fragmentation while creating new economic opportunities tied to ecological restoration.

## A just and resilient system

Community-led governance ensures that benefits are shared and local knowledge is central to decision-making. Workforce transition programs support a shift from extractive industries to restoration and renewable energy sectors, while ecosystem service markets fund long-term adaptation. By connecting environmental processes with social and economic systems, The Five Rivers Alliance presents a future where resilience is not only ecological, but also equitable and sustainable.

“I mainly learned how to communicate with international teammates and to converse in English.”

“My studies teach me a lot, but this challenge taught me even more.”





Aizada Nugerbekova,  
Adama Gouanle, Antonelle Soulié,  
Francisco Joaquim De Souza Neto,  
Diana Carolina Fagua Castro

University of Padua, Institut de  
Développement Économique et Social  
(IDES), Superior Institute of Agri-  
culture, JUNIA, State University of  
Campinas, Universidad Nacional de  
Colombia



# ed Future of Barataria Basin



not need to be saved from outside,  
conditions to regenerate from within.”

# Highlights from the First Edition





# Partners about the Challenge

"It was amazing to see teams from all over the world soak up information about Louisiana's people and coastal challenges and produce an array of thoughtful, ambitious, but still implementable solutions. The teams' visions for nature positive future for coastal Louisiana were also depictions of a worlds I would want to live in--bright reminders that even in the face of mounting environmental change and risk, the future we want cannot be built entirely out of concrete."

Charles Sutcliffe - National Wildlife Federation

"WUR Student Challenges created a wonderful challenge, not only for the students, but also for us as coaches. We were impressed by the creativity, open-mindedness, and fresh perspectives the students brought to the table. While guiding them, we also found ourselves learning from their ideas and approaches. We believe nature-based solutions are the future, and seeing students develop innovative ways to apply them makes us excited for the future ahead!"

Martine Roseboom - Witteveen + Bos

"I'm so proud of my team. The members are inquisitive and smart and efficient. They all brought different strengths to the competition, and most importantly they functioned well as a team. It is impossible not to be optimistic about the future if it is in such capable hands. Coaching them was so rewarding."

James Karst - Coalition to Restore Coastal Louisiana

"A nature-based future is not simply about incorporating natural elements; it calls for an integrated and systemic perspective to understand dynamic challenges. It has been a rewarding journey to coach the students, observing how they learned to deal with the complexity, discover the driving forces, shape their own narratives, and ultimately develop transformative visions of the future."

Yanran Luo, WSP

"Serving on the Selection Committee was a rewarding experience, allowing me to evaluate innovative, interdisciplinary proposals addressing complex environmental and social challenges. I was impressed by the depth of research, creativity, and systems-based thinking demonstrated by the teams in advancing nature-based solutions. I am grateful to Wageningen University and Research (WUR) and the Foundation for Food & Agriculture Research for the opportunity to contribute to this important initiative supporting our most vulnerable cities."

Prof. Dr. Eric Harris - PhD and Visiting Assistant Professor at University of the District of Columbia

"The EAGE Student Community is proud to have supported the students participating in the NBF Challenge. We hope to continue help empowering and inspiring students worldwide to reach their full potential, pursue their dreams, and become the future leaders of our industry."

EAGE Student Community