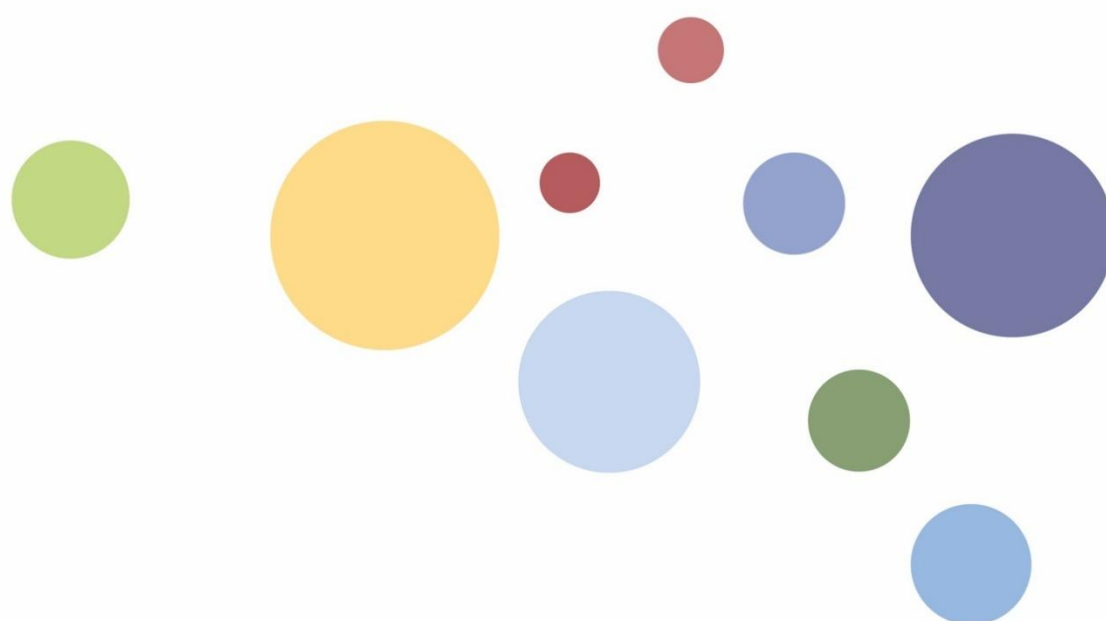# Ocean governance and protection

What (more) can Africa and Europe do together?
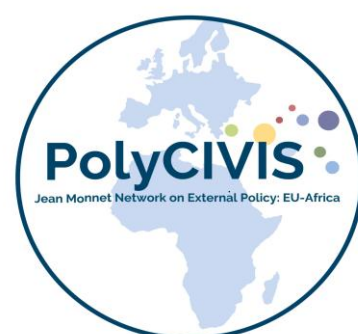
Policy brief no. 11
December 2025

By Sebastian Seiffert

PolyCIVIS
Jean Monnet Network on External Policy: EU-Africa

Executive Summary

Societies around the world heavily depend on a healthy ocean for food security, climate regulation and recreational use, but ocean protection and governance often struggle to gain centre stage in international (and domestic) politics. SDG 14, "Conserve and sustainably use the oceans, seas and marine resources for sustainable development", has received the smallest part of funding among all 17 SDGs, and ocean topics have not been addressed in the past AU-EU summit in 2022. Luckily, this is now starting to change with the pioneering efforts of the Africa-Europe Strategy Group on Ocean Governance that was set up by the European Commission in partnership with the African Union Commission.

The paper first situates ocean governance and protection in a polycrisis perspective by drawing on literature on marine tipping points and regime shifts. It then asks which policy tools Africa and Europe can use jointly to slow down and reverse ocean degradation. The discussed policy tools: marine protected areas, restoration of coastal vegetated ecosystems, and fisheries transparency, resonate with recommendations in the October 2024 report from the Africa-Europe Ocean Strategic Group, and key takeaways from the UNOC 3 conference in June 2025. It is advised to include the three policy tools into a structured and ambitious Africa-Europe Ocean Partnership, to be launched at or in the aftermath of the November 2025 AU-EU summit.

Key messages

❖ As from the upcoming AU-EU summit, African and European leaders should give increased prominence to joint ocean cooperation. The setting up of a structured and ambitious Africa-Europe Ocean Partnership, as suggested by the Africa-Europe Strategy Group on Ocean Governance, is a good starting point. The Partnership should include capacity-sharing and strengthening of governance regarding the three policy tools discussed: effective area-based protection in the run-up to the 30×30 target, protecting and restoring coastal vegetated ecosystems, and increased fisheries transparency.

❖ One of the most important actions to protect the global ocean and sustain its role for climate regulation and food security, is an ambitious phasing out of fossil fuels and achieving net zero of greenhouse gas (GHG) emissions. Achieving net zero quickly and boldly is the only way to address the root causes of ocean warming and acidification and decrease the likelihood of ecosystem collapse and radical change in ocean circulations, such as the Atlantic Meridional Overturning Circulation (AMOC). Even if net zero is achieved, the ocean will keep warming and acidifying for decades due to the heat and CO_2 already absorbed. Adaptation and resilience strategies are thus equally needed.

❖ Protecting and restoring coastal ecosystems with a proven capacity for CO_2 sequestration and long-term storage, and thus framing them as method for marine Carbon Dioxide Removal (CDR), can be a supplementary tool to achieve net zero. However, this brings tricky questions of additionality, that is hard to ascertain spatially and temporally. African and European states should be very careful to see marine CDR options only as accompanying measures in parallel to ambitious GHG reduction, not to replace it and continue to pollute in a business-as-usual scenario. Apart from the climate impacts, mangroves and seagrass restoration will deploy multiple socio-economic and ecosystem benefits. Assuring adequate funding and robust implementation of legal instruments to shield those habitats from other detrimental sea and coastal uses is a key condition for success.

(1) Introduction

The global ocean is subject to multiple interlinking anthropogenic stressors, leading to risks for tipping dynamics and regime shifts. These dynamics have been analysed from many perspectives, be it earth system analysis, marine biology, biogeochemistry, human ecology, law or political sciences. The earth system boundaries literature stresses global-level processes such as climate change (ocean warming), ocean acidification and deoxygenation. When passing critical thresholds, human well-being on earth will be severely distressed and change will become irreversible within human timescales. Some regions will be more affected than others, and impacts will be felt differently- depending on both natural processes but also our society's ability to mitigate or adapt to change.

The Global Tipping Points report, released for COP 28 in late 2023, analyses the likelihood of manmade tipping points in warm-water coral reefs, mangroves and seagrass, and in ocean circulation systems. In a similar vein, marine biologists have described regime shifts in African and European waters such as the North Sea, the Mediterranean and the Benguela current. Some of these abrupt reorganisations of dominant species and food webs are thought to be irreversible.[1]

In summary, the degradation of marine ecosystems can be thought of in a polycrisis perspective, interlinking in complex ways with social, economic and political phenomena. For instance, overfishing and stress factors such as warming and pollution can lead to loss of livelihoods for coastal communities, resulting in internal or international migration. Vulnerability differs greatly depending on geography, wealth, governance, and resilience. For example, small island nations are far more exposed than wealthy coastal cities.

The paper discusses three concise policy tools that are high on the agenda for ocean governance and protection, and that have the potential to slow down and ultimately reverse some of the tipping dynamics alluded to above if they are boldly introduced and upscaled. The discussed policy tools: marine protected areas, restoration of coastal ecosystems, and fisheries transparency, align with recommendations in the October 2024 report from the Africa-Europe Ocean Strategic Group and with advances in international ocean governance from the June 2025 UNOC 3 conference[2].

---

[1] Rockström et al., 2009, Findlay et al., 2025, Lenton et al., 2023, Sguotti et al., 2022a & Sguotti et al. 2022b
[2] Africa-Europe Foundation, 2024

2.1. Policy tool 1: Safeguarding biodiversity and health of marine resources through Marine protected areas and Locally managed marine areas

Marine protected areas (MPAs) are part of the ocean protection toolbox since the early 20th century. The International Union for the Conservation of Nature defines a MPA as "a clearly defined geographical space, recognized, dedicated and managed, through legal or other effective means, to achieve the long-term conservation of nature with associated ecosystem services and cultural values"[3]. Many states and regional organisations have given themselves territorial objectives in terms of MPA coverage since the 2000s. In 2023, the international community has committed within the Kunming-Montreal Agreement (and thus under the umbrella of the UN Convention on Biological Diversity) to increase MPA coverage to 30% of the global ocean, of which 10% shall be protected strictly. This objective is to be achieved shortly, by the year 2030.

There is ample evidence of "no-take" MPAs being effective to reach conversation targets. No-take zones rule out extractive human activities such as fishing and dredging. A meta-study concludes that fish biomass is on average 7 times higher in no-take-zones, compared to unprotected areas. However, no-take zones are currently very rare. To take the OSPAR area in the Northeast Atlantic as an example, it includes as many as 476 MPAs, but for more than 60% of them the protection status is so weak that conservation benefits cannot be observed with certainty, and less than 1% of the geographical coverage is classified as "no-take". But also elsewhere in EU waters as well as in other world regions, the literature abounds with examples of important gaps between the ambition and reality of protection, leading critics to call some MPAs "paper parks".[4]

The traditional MPA model is built on the assumption that the primary drivers of conservation are (central) state authorities or their delegated agencies, which command qualified staff as well as regulatory and financial means for MPA designation, monitoring and enforcement. Social and economic actors, such as fishing communities and their professional and interest organisations, as well as NGOs, play only secondary roles. In recent years, this model has been increasingly challenged.

In the Western Indian Ocean, fishing communities in Kenya, Tanzania, Madagascar and Mozambique have piloted and consolidated their own brand of community-based marine protection under the term "Locally managed marine areas" (LMMAs). Such LMMAs cover coastal waters and include temporary fishing closures for species such as *octopus cyanea*, showing good effects on rebuilding of fish biomass and sometimes secondary effects such as stimulation of ecotourism. While the initiative for setting up these local protection measures is community-driven, observers converge in saying that for a continued success and upscaling, communities require capacity-building, favourable legislative settings and financial support either from national level or external donors. Legal recognition will also shield the LMMAs against conflicts with other users, e.g. for oil and gas extraction.[5]

Examples of community-based MPAs are also discussed within the EU, e.g. at Portugal's Algarve coast[6]. The early integration of local stakeholders' perspectives is likely to enhance the effectiveness of MPAs, although it may result in longer planning leads.

Future innovation in MPA designation and implementation will stem from at least two additional factors. First, technological innovation will increasingly allow for geographically and temporally flexible protection measures that may be especially beneficial for highly endangered migrating

---

[3] Relano & Pauly, 2023, Dabalà et al., 2023

[4] Sala & Giakoumi, 2018, Roessger et al., 2022 & Aminian-Biquet et al., 2024

[5] Kawaka et al., 2017, Gardner et al., 2020 & Diz et al., 2018

[6] Rangel et al., 2025

species (such as North Atlantic right whales)[7]. Second, the Conservation and Sustainable Use of Marine Biodiversity Beyond National Jurisdiction (BBNJ) treaty will come into force in January 2026. It will provide new and unprecedented avenues for MPAs outside countries' territorial waters and Exclusive Economic Zones, and thus in the High Sea accounting for over 60% of the global ocean.

2.2. Policy tool 2: Restoring mangroves and seagrass meadows: nature-based solutions for multiple benefits

Coastal vegetated ecosystems in Africa and Europe are rich in biodiversity and ecosystem services. Scientific interest has recently focused on mangroves (in tropical latitudes), seagrass meadows and kelp forests (in near-coast waters of up to 50 meters depth, on both continents) and salt marshes (mainly in temperate latitudes). All four habitat types have in common that the plants absorb CO_2 from the air or water through photosynthesis. Parts of the plants that die off typically get sequestered in sediments in the oxygen-poor soils. Unlike in terrestrial forests and grasslands, CO_2 from the dead organic matter is thus not released, but stored, as long as the soil sediments remain intact. Compared to terrestrial forests and grasslands mangrove forests store roughly 3 times more carbon[8] and this figure is believed to be much higher. As marine carbon cycles are highly complex, research is still ongoing on how long CO_2 can be expected to be safely stored. If sequestered underground, evidence suggests that in favourable conditions storage can last for several thousand years.[9]

Restoration of these marine habitats is often framed as a specific type of "nature-based solutions", especially in the EU. Moreover, they are also discussed as methods for ocean-based carbon dioxide removal (CDR). Terrestrial and marine CDR methods are supposed to help states achieve net zero emissions, compensating for residual emissions from sectors that prove unable to decarbonise completely. However, another crucial question concerns the total area available for upscaling, sometimes providing a reality check for high ambitions.[10]

This increasingly understood role of coastal habitats as carbon sinks now gives further credence and impetus to restoration projects around Africa and Europe. However, while restoration has already started in some areas to compensate for previous loss of coverage[11], mangroves continue to be severely threatened in many other places, with some estimates reaching up to 50% loss between now and 2050[12]. Main stressors cited include rising sea levels, excessive logging, oil spills, aquaculture, rice farming and near-shore construction works. Seagrass meadows experienced a loss of around 29% from the 1940s to now, with ocean warming, acidification, excessive nutrient intakes and bottom trawling as key drivers. For both habitats, preservation of existing vegetation and restoration thus often must go together, more importantly as it may take decades before a replanted mangrove or seagrass ecosystem is fully functional.[13]

Both seagrass and mangrove restoration have the advantage of being tools that are available as of today. Local ecological knowledge (LEK) can be a key asset in designing and implementing restoration,

---

[7] Bakker, 2022
[8] Donato et al., 2011
[9] World Ocean Review, 2024
[10] Riisager-Simonsen et al., 2022 & Yao et al., 2025
[11] Friess et al., 2020
[12] Ofori et al., 2025
[13] Garmendia et al.,2023, Evans et al., 2025, Lenton et al., 2023 & Bosire et al., 2008, Unsworth et al., 2022 & World Ocean Review, 2024

and allows to bring in knowledge compounded over generations and held by local people. LEK is defined as "the knowledge, practices, and beliefs gained through extensive personal observation of, and interaction with local ecosystems, and shared among local resource users"[14]. Aspects of seagrass replanting such as selection of suitable sites, planting methods and high labour intensity are subject of a vivid debate among practitioners[15], and the Mangrove Restoration Tracker Tool (MRTT) helps to meet local practitioner needs and track progress toward global restoration targets.[16]

While the carbon sink role is currently still difficult to quantify in terms of CO_2 amounts and storage duration, preserved or restored mangrove and seagrass ecosystems are certain to bring a panoply of other benefits. They will serve as hatching ground for fish[17], break waves and thus prevent coastline erosion[18], and foster local identity and sense of well-being of coastal communities[19]. Compared to often highly speculative types of ocean-based CDR with low technology readiness levels, such as artificial upwelling or sargassum farming and sinking, they represent few risks and unknown secondary effects and can thus be recommended for upscaling without hesitation.[20]

2.3. Policy tool 3: Increasing Fisheries transparency and equitable management

Small-scale or artisanal fisheries are characterised by relatively small boats, fishing near to coast and using harvest mainly for own subsistence or selling it at close proximity. In Africa, small-scale fisheries are estimated to contribute to food security for 200 million people. However, they are exposed to multiple stressors such as climate change, competing uses of coastal areas and pressure from industrial fishing fleets[21]. According to FAO's 2025 Review of the state of world marine fishery resources, around 35% of all assessed fish stocks are overexploited, these percentages are even higher in Northwest Africa, the Mediterranean and the North Sea.

Against this backdrop, many African states have taken measures to enhance and protect small-scale fisheries. One often-used tool are preferential access areas (PAAs), granting preferential or exclusive access to small-scale fishers in a zone between 5 and 12 nautical miles from the coast. PAAs can either rule out non-artisanal or commercial fishing altogether or impose restrictions for gears or vessel size. They are common in West and Central Africa, in Somalia and Mozambique, and have been advocated by the African Confederation of Small-Scale Fisheries Professional Organizations (CAOPA) and other fisher groups. European countries such as Latvia and Albania also have PAAs in place, possibly an indicator of renewed interest in small-scale fisheries in Europe. PPAs differ from LMMAs (supra) in that they are typically installed nation-wide by governments, not community-driven, and do not include conservation measures such as periodic closures. In summary, PPAs can help restore a balance between artisanal and large-scale fishing. Designing and enforcing them is a powerful policy tool from a justice and equity perspective.[22]

Equally important is action that combats illegal, unreported and unregulated (IUU) fishing. It is estimated that between 20% and 25% of global annual catch values falls in the IUU category, with massive detrimental effects on viability of fish stocks, marine

---

[14] Grimm et al., 2024.
[15] Dahdouh-Guebas & Cannicci, 2021 & Zimmer et al., 2022
[16] Gatt et al., 2024
[17] Zu Ermgassen et al., 2025
[18] Feagin et al., 2010
[19] Grimm et al., 2024
[20] World Ocean Review, 2024 & Yao et al., 2025
[21] March & Failler, 2022
[22] Basurto et al., 2024

habitats and livelihoods for coastal communities. IUU fishing can occur on such a level because of wide-spread opacity in operations and ownership of industrial fishing vessels, as well as fragmented ocean governance, where different sets of institutions deal with aspects of fishery management, biodiversity, shipping and labour conditions. Many vessels engaging in illegal fishing sail under a "flag of convenience", meaning the flag state exercises little or no control over their activities. Ultimate ownership of vessels is hard to ascertain because of complex systems of shareholders and shell companies, often based in tax havens. Consequently, even if an illegal vessel is captured and the crew arrested, such as in the iconic *Thunder* case in 2015, those tried and sentenced will be officers or captains, not the beneficial owners.[23]

Transparency through exhaustive and publicly available data at the levels of vessel registration and ownership, as well as on fishing effort and catch, can help to make IUU fishing riskier and hold those commanding it accountable. A noteworthy development in this regard is the Fisheries Transparency Initiative (FiTI), a voluntary mechanism open to countries worldwide that commit to work ambitiously towards transparency along 12 issue areas. Areas on which data needs to be submitted include complete national fisheries laws and regulations, reports on the state of fish stocks, foreign fishing access arrangements, fisheries law enforcement, subsidies and the country's status regarding beneficial ownership transparency. To date, the Seychelles and Mauritania are the first two countries to have achieved the status of "compliant countries". Three more African countries, Madagascar, Cabo Verde and São Tomé and Príncipe, are "candidate countries" having set up a national multi-stakeholder group composed of government, industry and civil society and published at least one progress report. African countries are thus clearly the most active regional group within FiTI.[24]

(3) Policy Recommendations

.

---

1. Building on the most recent AU-EU summit (November 2025), African and European leaders should **give increased prominence to joint ocean cooperation**. The setting up of a structured and ambitious Africa-Europe Ocean Partnership, as suggested by the Africa-Europe Strategy Group on Ocean Governance, is a good starting point. The Partnership should include capacity-sharing and strengthening of governance regarding the three policy tools discussed: effective area-based protection in the run-up to the 30×30 target, protecting and restoring coastal vegetated ecosystems, and increased fisheries transparency.

---

2. One of the most important actions to protect the global ocean and sustain its role for climate regulation and food security, is an ambitious phasing out of fossil fuels and achieving net zero of greenhouse gas (GHG) emissions. **Achieving net zero** quickly and boldly is the only way to address the root causes of ocean warming and acidification and decrease the likelihood of ecosystem collapse and radical change in ocean circulations, such as the Atlantic Meridional Overturning Circulation (AMOC). Even if net zero is achieved, the ocean will keep warming and acidifying for decades due to the heat and CO_2 already absorbed. Adaptation and

---

[23] Freitas, 2021 & Ford et al., 2022

[24] Drakeford et al., 2020

	resilience strategies are thus equally needed.
3.	**Protecting and restoring coastal ecosystems with a proven capacity for CO_2 sequestration** and long-term storage, and thus framing them as method for marine Carbon Dioxide Removal (CDR), can be a supplementary tool to achieve net zero. However, this brings tricky questions of additionality, that is hard to ascertain spatially and temporally. African and European states should be very careful to see marine CDR options only as accompanying measures in parallel to ambitious GHG reduction, not to replace it and continue to pollute in a business-as-usual scenario. Apart from the climate impacts, mangroves and seagrass restoration will deploy multiple socio-economic and ecosystem benefits. Assuring adequate funding and robust implementation of legal instruments to shield those habitats from other detrimental sea and coastal uses is a key condition for success.
4.	**Effective area-based protection zones like MPAs and LMMAs must be designed in a way that assures the full integration and participation of coastal communities and small-scale fishers.** Pursuing the 30×30 target is necessary to halt the extinction of biodiversity. However, quick shots implemented in a top-down way trigger unintended consequences (e.g. artisanal fishers having to fish further away, with increased fuel use) and are sometimes amenable to "paper parks" rather than effective sites of protection. Management plans are needed for all MPAs and they need to be followed up and, in case of infringement, enforced by credible and well-staffed authorities. Governance frameworks need to take the inherent connectivity of terrestrial, coastal and oceanic aquatic systems into account.
5.	**Africa and Europe should continue and scale up their efforts to increase fisheries transparency and end IUU fishing**. Both the EU and the AU should make all efforts to convince their members to stop issuing flags of convenience in breach of UNCLOS provisions, and make tracking of beneficial ownership a priority, requiring international police and justice cooperation.
6.	African and European states should continue to pursue **ambitious ocean protections agendas in ocean governance institutions and frameworks**. All countries should make BBNJ ratification a priority, to unleash the unprecedented protection opportunities in the high seas. African and European states may also want to jointly engage in an ad hoc coalition to set up a far-reaching plastics treaty, following their strong presence in the "Nice wakeup call" and the regretful stalling of the global plastics treaty in the Geneva round of talks in August 2025.

(4) Conclusion

In the introduction, we have argued that ocean-based physical, chemical and biological processes have been scientifically tested for possible non-linear or irreversible change, tipping dynamics and a complex interplay of global and regional stressors. While many ocean-based dynamics are increasingly well understood, others require further

research[25]. The functioning of upwelling systems that create beneficial conditions for fish stocks off the West African coast, the data-intensive modelling of ocean circulations systems or the exact sites where restoration projects can maximise the CO_2 sink function are just a few examples. Many of these questions can be jointly investigated by African-European research teams, paving the way from ocean polycrisis to integrated solutions.

In the marine domain, calls for governance and protection will always meet with needs and interests regarding all kinds of ocean use – be it for fisheries, mariculture, shipping, undersea data cables or offshore renewables. Marine spatial planning can help to find space for different uses, and protection sites, in often confined spaces of countries' territorial waters and exclusive economic zones. Multi-use, the designation of areas for at least two mutually compatible forms of use, is also increasingly suggested. The concept of sustainable blue economy, if carefully balanced, can be a way to reconcile use and protection necessities under a single framework.

Participants in BlueInvest Africa, a business event bringing together African and European stakeholders, are expected to bridge this gap in their business ideas.

In an international situation characterised by geopolitical rivalries and trade conflicts, diligently pursuing policies for multilateral ocean protection and governance can be a challenge. However, both continents have much to gain from decisive action now, to mitigate climate vulnerabilities and maintain marine food security, coastal protection and ecosystem services. Ultimately, each investment that is made now for the policy tools discussed may safe multiple amounts at a later stage. In 2025, both the AU and the EU are at a critical junction in defining and updating their ocean governance frameworks, through the Africa Union Ocean Governance Strategy and Implementation Plan and the EU Ocean Pact. This is a unique chance for strong interregional consultation and cooperation, allowing for bolder progress towards SDG 14, "Conserve and sustainably use the oceans, seas and marine resources for sustainable development".

References

Africa-Europe Foundation (2024), 'Roadmap Towards 2030: Co-driving the Africa-Europe Ocean Partnership', Publications Office of the European Union, https://data.europa.eu/doi/10.2926/1514869

Aminian-Biquet, J., Gorjanc, S., Sletten, J., Vincent, T., Laznya, A., Vaidianu, N., Claudet, J., Young, J. & Horta e Costa, B. (2024), Over 80% of the European Union's marine protected area only marginally regulates human activities, One Earth 7, 1614–1629, https://doi.org/10.1016/j.oneear.2024.07.010

Bakker, K. (2022), Smart Oceans: Artificial intelligence and marine protected area governance, Earth System Governance, Volume 13,100141, https://doi.org/10.1016/j.esg.2022.100141

Basurto, X., Virdin, J., Franz, N., DeLand, S., Smith, B., Cleary, J., Vegh, T. & Halpin, P. (2024), A global assessment of preferential access areas for small-scale fisheries. *npj Ocean Sustain* **3**, 56, https://doi.org/10.1038/s44183-024-00096-0

---

[25] Dahdouh-Guebas et al., 2022

Bosire, J.O., Dahdouh-Guebas, F., Walton, M., Crona, B.I., Lewis III, R.R., Field, C., Kairo, J.G. & Koedam, N. (2008). Functionality of restored mangroves: a review. Aquatic Botany 89(2), 251-259. https://doi.org/10.1016/j.aquabot.2008.03.010

Dabalà, A., Dahdouh-Guebas, F., Dunn, D.C., Everett, J.D., Lovelock, C.E., Hanson, J.O., Buenafe, K.C.V., Neubert, S. & Richardson, A.J. (2023). Priority areas to protect mangroves and maximise ecosystem services. Nature Communications 14, 5863. https://doi.org/10.1038/s41467-023-41333-3

Dahdouh-Guebas, F. & Cannicci, S. (2021). Mangrove restoration under shifted baselines and future uncertainty. Frontiers in Marine Science 8, 799543. https://doi.org/10.3389/fmars.2021.799543

Dahdouh-Guebas, F., Friess, D.A., Lovelock, C.E., Connolly, R.M., Feller, I.C., Rogers, K. & Cannicci, S. (2022). Cross-cutting research themes for future mangrove forest research. Nature Plants 8, 1131–1135. https://doi.org/10.1038/s41477-022-01245-4

Diz, D., Johnson, D., Riddell, M., Rees, S., Battle, J., Gjerde, K., Hennige, S. & Roberts, J.M. (2018), Mainstreaming marine biodiversity into the SDGs: The role of other effective area-based conservation measures (SDG 14.5), Marine Policy, 93, 251-261, https://doi.org/10.1016/j.marpol.2017.08.019

Donato, D.C., J.B. Kauffman, D. Murdiyarso, S. Kurnianto, M. Stidham & M. Kanninen (2011). Mangroves among the most carbon-rich forests in the tropics. Nature Geoscience 4, 5, https://doi.org/10.1038/ngeo1123

Drakeford, B.M., Failler, P., Toorabally, B. & Kooli, E. (2020), Implementing the Fisheries Transparency Initiative: Experience from the Seychelles, Marine Policy, 119, 104060, https://doi.org/10.1016/j.marpol.2020.104060

Evans, A. J., Ford, E. & Cullen-Unsworth, L. (2025), Connecting governance and practice views on the barriers and solutions to scaled seagrass restoration in the UK, Marine Policy, 180, 106781, https://doi.org/10.1016/j.marpol.2025.106781

Feagin, R.A., Mukherjee, N., Shanker, K., Baird, A.H., Cinner, J., Kerr, A.M., Koedam, N., Sridhar, A., Arthur, R., Jayatissa, L.P., Lo Seen, D., Menon, M., Rodriguez, S., Shamsuddoha, M. & Dahdouh-Guebas, F. (2010). Shelter from the storm? Use and misuse of coastal vegetation bioshields for managing natural disasters. Conservation Letters 3(1), 1-11. https://doi.org/10.1111/j.1755-263X.2009.00087.x

Findlay, H.S., Feely, R.A., Jiang, L.-Q., Pelletier, G. & Bednaršek, N. (2025), Ocean Acidification: Another Planetary Boundary Crossed. Global Change Biology, 31:e70238. https://doi.org/10.1111/gcb.70238

Ford, J. H., Wold, C., Currie, D. & Wilcox, C. (2022), Incentivising change to beneficial ownership and open registers—Holding flag states responsible for their fleets and costs of illegal fishing. *Fish and Fisheries*, 23, 1240–1248. https://doi.org/10.1111/faf.12677

Freitas, B. (2021), Beneficial Ownership in the Fishing Sector and Links to Corruption, Targeting

Natural Resource Corruption Topic Brief,
https://files.worldwildlife.org/wwfcmsprod/files/Publication/file/18ar730zse_BO_fishing_FIN
AL2.pdf

Friess, D.A., Yando, E.S., Abuchahla, G.M.O., Adams, J.B., Cannicci, S., Canty, S.W.J., Cavanaugh,
K.C., Connolly, R.M., Cormier, N., Dahdouh-Guebas, F., Diele, K., Feller, I.C., Fratini, S., Jennerjahn,
T.C., Lee, S.Y., Ogurcak, D.E., Ouyang, X., Rogers, K., Rowntree, J.K., Sharma, S., Sloey, T.M. &
Wee, A.K.S. (2020). Mangroves give cause for conservation optimism, for now. Current Biology
30, R135-R158. https://doi.org/10.1016/j.cub.2019.12.054

Garmendia, J.M., Rodríguez, J.G., Borja, A., Pouso, S., del Campo, A., Galparsoro, I. & Fernandes-
Salvador, J.A. (2023), Restoring seagrass meadows in Basque estuaries: nature-based solution
for successful management, Nature-Based Solutions, 4, 100084,
https://doi.org/10.1016/j.nbsj.2023.100084

Gardner, C.J., Cripps, G., Day, L.P. et al. (2020), A decade and a half of learning from
Madagascar's first locally managed marine area. Conservation Science and Practice.
2:e298. https://doi.org/10.1111/csp2.298

Gatt, Y.M., R.W. Walton, D.A. Andradi-Brown, M.D. Spalding, J. Acosta-Velázquez, M.F. Adame, F.
Barros, M.A. Beeston, A.F. Bernardino, C.A. Buelow, C. Cadier, A. Calzada Vazquez Vela, S.W.J.

Canty, F. Dahdouh-Guebas, L.E. de Oliveira Gomes, C. Duncan, A.M. Eger, J.A. Enright, T.C.
Frausto-Illescas, […] & T.A. Worthington (2024). The Mangrove Restoration Tracker Tool: meeting
local practitioner needs and tracking progress toward global targets. One Earth 7, 1-14.
https://doi.org/10.1016/j.oneear.2024.09.004

Grimm, K., M. Spalding, M. Leal, K. Kincaid, L. Aigrette, P. Amoah-Quiminee, L. Amoras, D.
Amouine, F. Areki, W. Arends, J.M. Argueta, C.A. Arrieta-Giron, A.S. Astra, G.N. Atuga, M. Barillo,
S.B. Anariba, M. Botelho, A.S. Cabanban, E. Caceros, […] & M. Zimmer (2024). Including Local
Ecological Knowledge (LEK) in Mangrove Conservation & Restoration: A Best-Practice Guide for
Practitioners and Researchers. Global Mangrove Alliance,
https://doi.org/10.5479/10088/118227

Heinze, C., Blenckner, T., Martins, H., Rusiecka, D., Döscher, R., Gehlen, M., et al. (2021). The quiet
crossing of ocean tipping points. Proceedings of the National Academy of Sciences U. S. A. 118.
https://doi.org/10.1073/pnas.2008478118

Kawaka, J. A., Samoilys, M.A., Murunga, M., Church, J., Abunge, C. & Maina, G.W. (2017),
Developing locally managed marine areas: Lessons learnt from Kenya, Ocean & Coastal
Management, 135, 1-10, https://doi.org/10.1016/j.ocecoaman.2016.10.013

Lenton, T. M., Armstrong McKay, D.I., Loriani, S., Abrams, J.F., Lade, S.J., Donges, J.F., Milkoreit, M.,
Powell, T., Smith, S.R., Zimm, C., Buxton, J.E., Bailey, E., Laybourn, L., Ghadiali, A. & Dyke, J.G.
(eds), 2023, The Global Tipping Points Report 2023. University of Exeter, Exeter, UK,
https://doi.org/10.5281/zenodo.15188118

March, A. & Failler, P. (2022), Small-scale fisheries development in Africa: Lessons learned and
best practices for enhancing food security and livelihoods, Marine Policy, 136,104925,
https://doi.org/10.1016/j.marpol.2021.104925

Ofori, S.A., Hugé, J., Gnansounou, S.C., Ximenes, A.C., Asante, F., Bagbohouna, M., Comte, A., Longépée, E., Lang'at, K.S., Bandeira, S.O., Omollo, D., Onyena, A.P., Sam, K., Hamza, A.J., Tahiri, A.Z., Daf, D.S., Goudiaby, K.D., Olatunji, E.T., Golléty, C., Padonou, E.A. & Dahdouh-Guebas, F. (2025), Leveraging mangroves to advance climate action in Africa: Zooming in on Nationally Determined Contributions (NDCs), Journal of Environmental Management, 392, 126669, https://doi.org/10.1016/j.jenvman.2025.126669

Rangel, M., Horta e Costa, B., Guimarães, H., Ressurreição, A., Monteiro, P., Oliveira, F., Bentes, L., Henriques, N.S., Sousa, I., Alexandre, S., Pontes, J., Afonso, C.M.L., Belackova, A., Marçalo, A., Cardoso-Andrade, M., Cortês, A., Correia, A.J., Lobo, V., Gonçalves, E.J., Pitta e Cunha, T. & Gonçalves, J.M.S. (2025), Engaging and legitimizing communities: co-designing a community-based Marine Protected Area, Marine Policy, 178, 106695, https://doi.org/10.1016/j.marpol.2025.106695

Relano, V. & Pauly, D. (2023), The 'Paper Park Index': Evaluating Marine Protected Area effectiveness through a global study of stakeholder perceptions, Marine Policy, 151, 105571, https://doi.org/10.1016/j.marpol.2023.105571

Riisager-Simonsen, C. et al. (2022), Marine nature-based solutions: Where societal challenges and ecosystem requirements meet the potential of our oceans, Marine Policy, 144, 2022, https://doi.org/10.1016/j.marpol.2022.105198

Rockström, J., Steffen, W., Noone, K., Persson, A., Chapin, FS III et al. (2009), Planetary boundaries: exploring the safe operating space for humanity. Ecology and Society 14(2):1–33, https://doi.org/10.5751/ES-03180-140232

Roessger, J., Claudet, J. & Horta e Costa, B. (2022), Turning the tide on protection illusions: The underprotected MPAs of the 'OSPAR Regional Sea Convention', Marine Policy, 142, 105109, https://doi.org/10.1016/j.marpol.2022.105109

Sala, E. & Giakoumi, S. (2018), No-take marine reserves are the most effective protected areas in the ocean, ICES Journal of Marine Science, 75(3), 1166–1168. https://doi.org/10.1093/icesjms/fsx059

Sguotti, C., Bischoff, A., Conversi, A., Mazzoldi, C., Möllmann, C., & Barausse, A. (2022a). Stable landings mask irreversible community reorganizations in an overexploited Mediterranean ecosystem. Journal of Animal Ecology, 91, 2465–2479. https://doi.org/10.1111/1365-2656.13831

Sguotti, C., Blöcker, A.M., Färber, L., Blanz, B., Cormier, R., Diekmann, R., Letschert, J., Rambo, H., Stollberg, N., Stelzenmüller, V., Stier, A.C. & Möllmann, C. (2022b), Irreversibility of regime shifts in the North Sea. Frontiers in Marine Science 9:945204. https://doi.org/10.3389/fmars.2022.945204

Unsworth, R.K.F., Cullen-Unsworth, L.C., Jones, B. L.H. & Lilley, R.J. (2022), The planetary role of seagrass conservation, Science 377, 609–613, https://doi.org/10.1126/science.abq6923

World Ocean Review (2024): The Ocean – A Climate Champion? How to Boost Marine Carbon Dioxide Uptake, Hamburg, https://worldoceanreview.com/en/wor-8/

Yao, W., Morganti, T. M., Wu, J., Borchers, M., Anschütz, A., Bednarz, L.-K., et al. (2025). Exploring site-specific carbon dioxide removal options with storage or sequestration in the marine environment – the 10 Mt CO2 yr– 1 removal challenge for Germany. Earth's Future, 13, e2024EF004902. https://doi.org/10.1029/2024EF004902

Zimmer, M., Ajonina, G.N., Amir, A.A., Cragg, S., Crooks, S., Dahdouh-Guebas, F., Duke, N., Fratini, S., Friess, D.A., Helfer, V. , Huxham, M., Kathiresan, K. , Kodikara, K.A.S., Koedam, N., Lee, S.Y., Mangora, M.M., Primavera, J. , Satyanarayana, B. , Yong J.W.H. & Wodehouse, D. (2022). When nature needs a helping hand: different levels of human intervention for mangrove (re-)establishment. Frontiers in Forests and Global Change 5, 784322. https://doi.org/10.3389/ffgc.2022.784322

Zu Ermgassen, P.S.E., Worthington, T.A., Gair, J.R., Garnett, E.E., Mukherjee, N., Longley-Wood, K., Nagelkerken, I. , Abrantes, K., Aburto-Oropeza, O., Acosta, A. , Araujo, A.R.d.R., Baker, R., Barnett, A., Beitl, C.M., Benzeev, R., Brookes, J., Castellanos-Galindo, G.A., Chong, V.C., Connolly, R.M., Cunha-Lignon, M., Dahdouh-Guebas, F. […] & M.D. Spalding (2025). Mangroves support an estimated annual abundance of over 700 billion juvenile fish and invertebrates. Communications Earth & Environment 6, 299. https://doi.org/10.1038/s43247-025-02229-w

Author

Sebastian Seiffert- PolyCIVIS project manager, International Office, Université libre de Bruxelles, Belgium.

The CIVIS network is a consortium of 21 universities in Europe and Africa. In October 2023, it initiated the PolyCIVIS project, focused on confronting the Polycrisis in Europe and Africa through Research, Policy and Education. The PolyCIVIS project is funded by the European Union, Erasmus+.