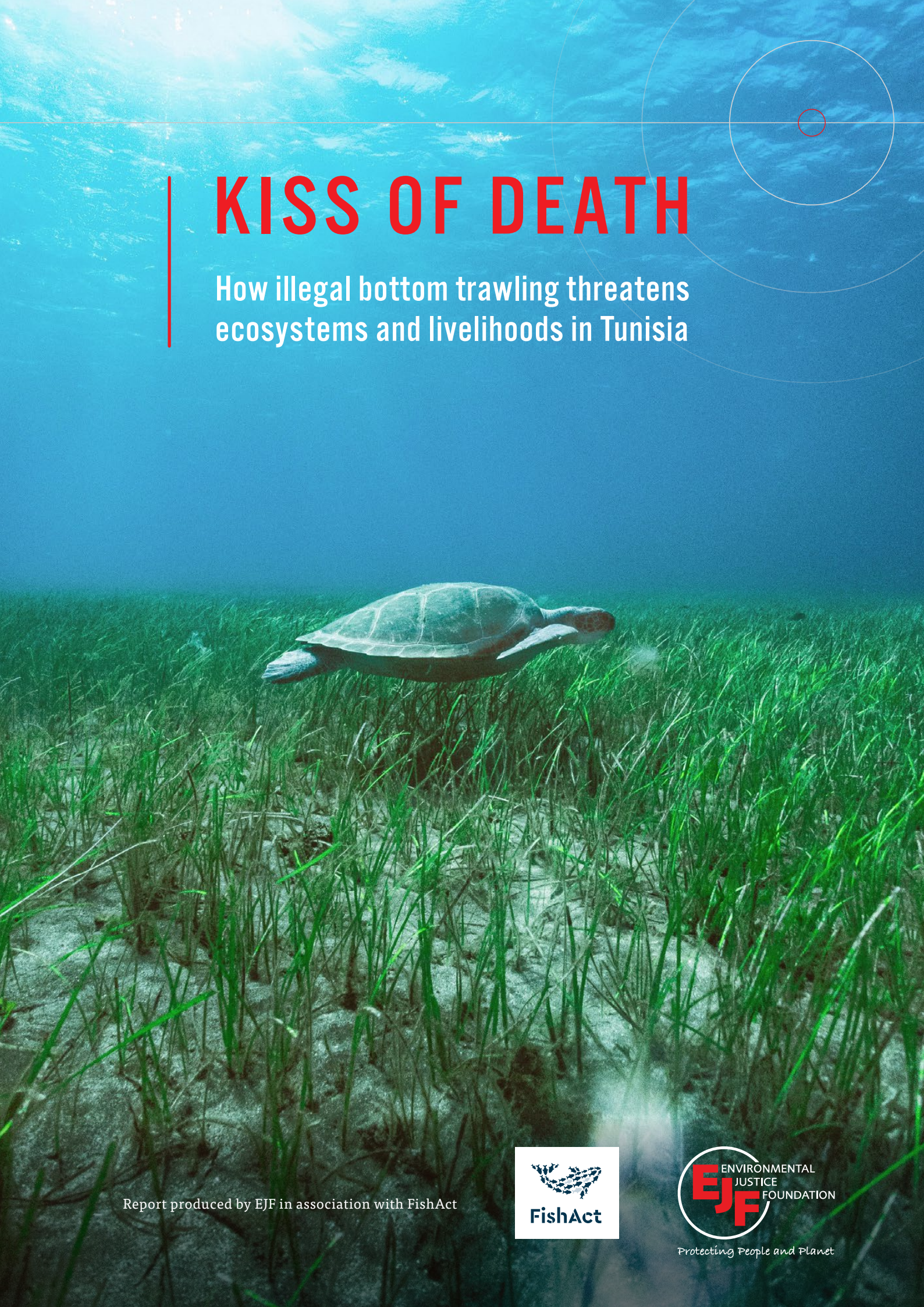
KISS OF DEATH

How illegal bottom trawling threatens ecosystems and livelihoods in Tunisia



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Special thanks to all interviewees for their contribution to this report. All views expressed are those of EJF alone, and interviewees do not necessarily share the expressed views and interpretations.

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Cover picture: Green turtle over seagrass.
Credit: Ocean Image Bank / Liam McGuire

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Glossary

Trawler: Fishing vessel using a trawl gear – a net dragged through the mid-water column or at the bottom of the sea

Kiss trawling: Fishing technique using trawl nets in the shape of a bag (the Arabic for bag is 'kiss')

Kiss trawler: A small wooden trawler (generally less than ten metres in length) that engages in kiss trawling

Charfia: A traditional, fixed fishery system that blocks the path of fish and leads them to traps

Abbreviations

CBD: The Convention on Biological Diversity
CC: Catch certificate
EFH: Essential Fish Habitat
FAO: Food and Agricultural Organization of the United Nations
FTDES: Forum Tunisien pour les Droits Économiques et Sociaux (Tunisian Forum for Economic and Social Rights)
GFCM: General Fisheries Commission for the Mediterranean
GSA: Geographical Sub-Areas
IUU: Illegal, unreported and unregulated (fishing)
MPA: Marine Protected Area
SPA/BD Protocol: Protocol to the Barcelona Convention Concerning Specially Protected Areas and Biological Diversity in the Mediterranean
UNEP: United Nations Environment Programme
UNESCO: United Nations Educational, Scientific and Cultural Organization

Executive summary

Image taken on board a kiss trawler in the Gulf of Gabès. © EJF

- Bottom trawling is one of the most unselective and destructive forms of fishing, causing irreversible damage to marine habitats, releasing significant quantities of carbon from the seafloor, driving coastal erosion and robbing small-scale fishers of irreplaceable livelihoods.

- EJF's investigation examined the impact of a form of shallow water bottom trawling – known locally as 'kiss' trawling – in the Gulf of Gabès region of Tunisia, an area of exceptional ecological, cultural and socio-economic importance.

- Kiss trawlers are small wooden boats of less than ten metres in length that operate bottom trawls in waters of between 5 and 15 metres depth, sometimes less. Despite being illegal under Tunisian law, kiss trawling is practised openly and has proliferated over the past decade. Hundreds of kiss trawlers have been observed in ports in the Gulf of Gabès, with numbers increasing by over a third between 2018 and 2022. Kiss trawlers have been documented operating at sea, working in groups to systematically trawl large areas and deter enforcement.

- Kiss trawlers operate in waters close to the shore, in apparent contravention of conservation and management measures adopted by the General Fisheries Commission for the Mediterranean (GFCM).

- The Gulf of Gabès is host to one of the largest remaining expanses of *Posidonia oceanica*, a species of seagrass endemic to the Mediterranean. It is also the location of 'charfia' fishing, a traditional method unique to the Kerkennah Islands that was included in the Representative List of the Intangible Cultural Heritage of Humanity in 2020. The inhabitants of the Kerkennah Islands are heavily reliant on the sea for their livelihoods, while being highly vulnerable to sea level rise caused by global heating.

- Kiss trawling is devastating the marine ecosystems in the Gulf of Gabès and the livelihoods of local fishers who depend on them. Kiss trawlers use small mesh nets resulting in extremely high rates of bycatch, much of which is discarded – in some cases over 95%. Small mesh nets catch significant quantities of juvenile fish, accelerating the depletion of fish populations.

- Kiss trawlers drag nets and otter doors along the seafloor, destroying sensitive *P. oceanica* meadows which have suffered severe rates of regression in recent decades – losses which are effectively irreversible over human time scales. *P. oceanica* meadows are protected under the Barcelona and Bern Conventions, to which Tunisia is a contracting party.

- Seagrass meadows are among the most valuable ecosystems on Earth in terms of the goods and services they provide. Rates of carbon sequestration of *P. oceanica* meadows are comparable to key terrestrial carbon sinks such as peatlands, and up to 70 times the rate of tropical forests, absorbing an estimated 15-20% of Tunisia's CO_2 emissions.

- Seagrass degradation in the Gulf of Gabès is estimated to cost the Tunisian economy millions of dollars annually, considering only the impacts on commercial fisheries. Seagrass plays a critical role in stabilising Tunisia's coastlines – a country experiencing some of the highest rates of coastal retreat in the world and where around 85% of the population lives on or near the coast. The Gulf of Gabès seagrass meadows are vital to the health of Mediterranean fisheries, many of which are already severely depleted, some on the brink of collapse.

- EJF's investigation revealed intense conflict between artisanal fishers and kiss trawlers around the Kerkennah Islands. Traditional, low-impact methods are unable to compete with kiss trawls, which also damage or tow away artisanal fishing gear. Artisanal fishers complain that kiss trawling is driving declines in fish populations, forcing some to abandon their traditional methods in favour of the illicit practice. Others have turned to migrant smuggling to make a living.

- The findings of this investigation indicate that European Union (EU) Member States may be importing seafood caught illegally by kiss trawlers, in possible contravention of the EU regulation to end illegal, unreported and unregulated (IUU) fishing. The EU is the most important market for seafood from Tunisia and has an interest, and responsibility, to ensure harvests are legal and sustainable.

- The invasive African blue swimming crab (*Portunus segnis*) presents a further threat to fishers' livelihoods. The species has driven declines in populations of native marine species, while causing damage to fishing gear. In the absence of stricter controls and targeted support, there is a risk that more fishers will switch to kiss trawling, which is the most efficient method of catching the blue swimming crab for the lucrative export trade.

- Tunisia's fishing communities have been severely affected by the worsening economic situation in the country and fallout from the COVID-19 pandemic. The degradation of marine resources and associated fishery declines have left fishers in a precarious situation, unable to respond to successive crises. Fishers interviewed by EJF expressed their desperation at their economic situation and readiness to migrate. The findings of this and previous research confirm the lack of employment prospects in the fishing industry as a driver for young people to migrate from the Kerkennah islands.

- Recommendations are directed at the Tunisian government, the EU and the GFCM for specific actions to end illegal kiss fishing, in order to protect the Gulf of Gabès' biologically and economically important coastal habitats, and safeguard the livelihoods and the viability of artisanal fishing communities.

Small-scale fishers loading a charfia trap at the landing pier at Kellabine in the Kerkennah Islands. © EJF

1. Introduction

Bottom trawling – which involves scraping weighted nets and rigid structures along the ocean floor[1] – is one of the most unselective and destructive forms of fishing.[2] Whether conducted by industrial or small-scale vessels, the practice causes long-lasting[3] and potentially irreversible damage[4] to marine habitats and threatens populations of sensitive species such as sharks[5], turtles[6] and dolphins[7]. It leaves lifeless ocean deserts in its wake and leads to the release of significant quantities of carbon from the seafloor, which is likely to increase ocean acidification and may potentially aggravate climate breakdown.[8] The practice is not only destructive for nature but also coastal communities; by driving coastal erosion, lowering water quality and robbing small-scale fishers of irreplaceable livelihoods, it undermines the ability of already highly vulnerable communities to adapt to climate change.[9]

The Mediterranean Sea, which is already heavily impacted by overfishing, habitat degradation, pollution, invasive alien species and climate change,[10] is not immune to trawling impacts. Despite the progress made in establishing protected areas and spatial closures of all types where bottom trawling should not occur, this hugely destructive practice continues even where it is considered illegal. The recently launched Med Sea Alliance online Atlas recorded evidence of potential and confirmed cases of bottom trawling in no-trawl areas across the Mediterranean.[11]

This report examines the impact of illegal bottom trawling in the Gulf of Gabès region of Tunisia, one of the most biodiverse and sensitive areas of the Mediterranean and a region of exceptional cultural and socio-economic importance. The research focuses on the practice known locally as 'kiss' trawling, which has proliferated over the past decade,[12] causing widespread destruction of marine ecosystems[13] and loss of livelihood for local fishers.[14] Data was gathered through a desk-based review and in-country investigation in early 2022. Recommendations are directed at the Tunisian government, the EU and the General Fisheries Commission for the Mediterranean (GFCM) for specific actions to end these illegal practices and stem associated biodiversity and marine fishery declines.

The report makes an urgent call for action, in particular to halt the loss of *Posidonia oceanica* meadows, a species of seagrass endemic to the Mediterranean of global conservation importance. The meadows provide critical habitat, nursery areas and spawning grounds for a vast number of marine species, support productive local and regional fisheries, and play a major role in carbon sequestration, shoreline stabilisation and maintenance of water quality. Extremely slow to recover from disturbance, the species has suffered extensive regression in recent decades, with losses directly impacting the health of local fisheries and associated livelihoods.

2. Methodology

EJF's investigation aimed to better understand the threat that illegal, unreported and unregulated (IUU) fishing, notably kiss trawling, poses to local traditional fishers and the ecosystems on which they depend. The research involved a desk-based review of the relevant literature and fisheries trade data, followed by fieldwork in the Gulf of Gabès in early February 2022, during the high season for kiss trawling (which takes place from November to February). Field research, which was conducted by EJF staff, focused on the Kerkennah Islands in the governorate of Sfax, which is both a hotspot for kiss trawling and a crucial area for small-scale fishers and traditional fishing techniques that are unique to the region. EJF conducted a total of 13 interviews, including with seven fishers (two of whom were retired), two fish processors/net makers, one boat builder, one kiss fisher and two scientists based in Sfax and Tunis, respectively. At-sea fieldwork involved expeditions on a kiss trawling vessel and small-scale gillnet vessel to understand more about these fishing operations, their impacts and industry dynamics.

Kiss trawl nets at the port of Sidi Youssef in the Kerkennah Islands. © EJF

3. The Gulf of Gabès – a region of ecological, cultural and socio-economic importance

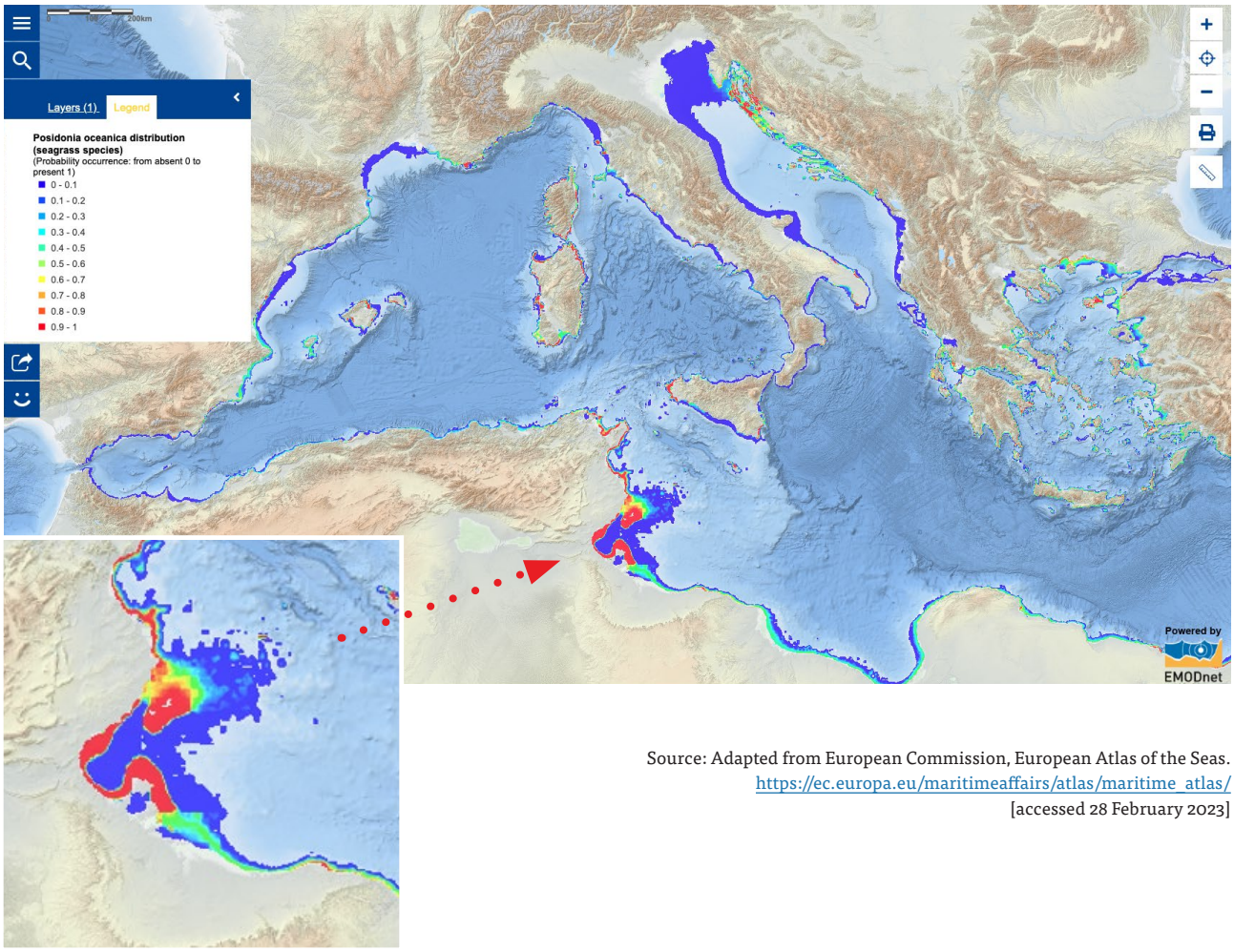
3.1. Ecological significance

The Gulf of Gabès is a region of exceptional ecological significance, not only for Tunisia but for the entire Mediterranean. Situated on Tunisia's southern coastline, the Gulf of Gabès extends from Ras Kapoudia (on parallel 35°N) to the Tunisian-Libyan border. The area is characterised by a wide, shallow continental shelf,[15] creating a unique environment for marine life and fishing activities. Vast seagrass meadows occupy the flat and predominantly soft substrate, which provide essential habitat, breeding grounds and nurseries for an abundance of fish, crustaceans, bivalves and sponges.

> ***"The Gulf of Gabès is a very important region. Many species come for nursery, nutrition and to reproduce in this area. We can imagine how rich the area is in terms of species, and how important it is in the life cycle of many creatures which live in the Mediterranean, not only in Tunisia."***
>
> Olfa Sehli, Head of Tunisian Association for Wildlife

The Gulf of Gabès is known to host one of the largest remaining expanses of *Posidonia oceanica*, a species of seagrass endemic to the Mediterranean (**Figure 1**)[16] associated with high benthic/demersal biodiversity[17] and an important carbon sink (see **Box 1**). The species is highly vulnerable to human disturbance: the extent of *P. oceanica* habitat in the Gulf of Gabès has declined sharply since the 1970s, as a result of combined pressures from bottom trawling[18] and industrial pollution (particularly the phosphate industry),[19] among others.

Figure 1: Distribution of *Posidonia oceanica* (a) in the Mediterranean and (b) the Gulf of Gabès specifically.



Source: Adapted from European Commission, European Atlas of the Seas. https://ec.europa.eu/maritimeaffairs/atlas/maritime_atlas/ [accessed 28 February 2023]

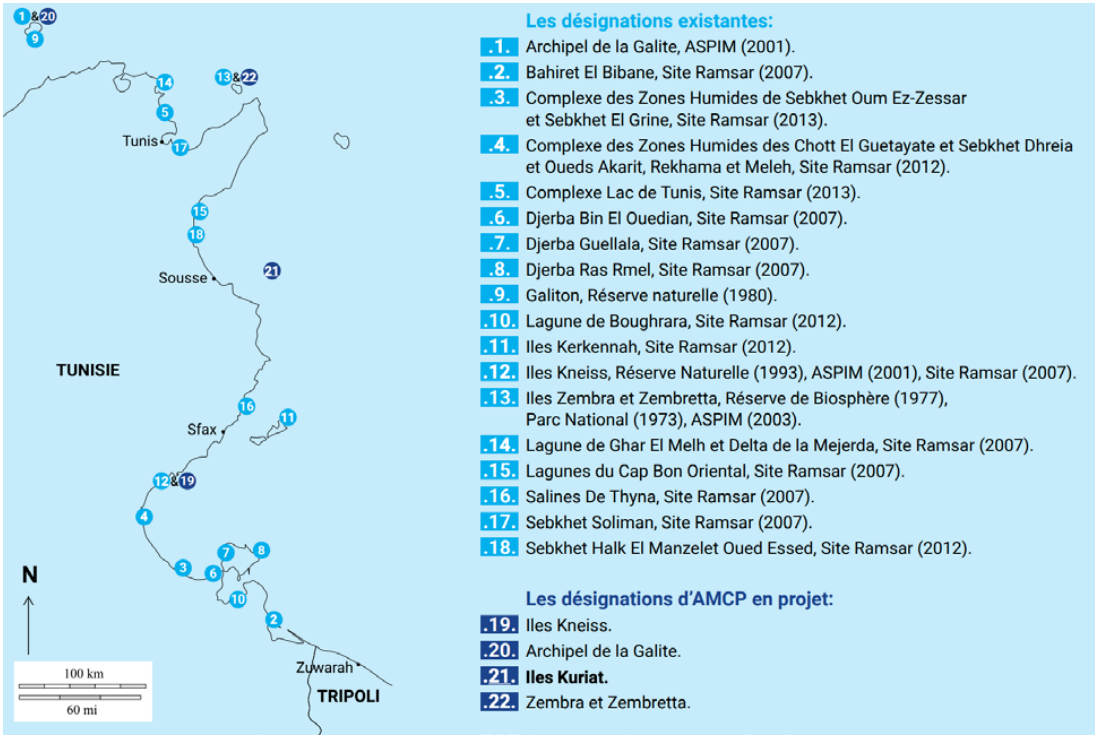
The degradation of seagrass habitat has had a devastating impact on landings of commercial fish species caught locally[20] and by association, local livelihoods. A 2020 study estimated the economic loss from seagrass degradation in the Gulf of Gabès at around €60 million in 2014 alone, with a cumulative economic loss to coastal fisheries of approximately €750 million between 1990 and 2014.[21]

> ***"The Mediterranean is a biodiversity hotspot, but during recent years, it has become a hotspot of extinction."***
>
> Olfa Sehli, Head of Tunisian Association for Wildlife

The *P. oceanica* meadows in the Gulf of Gabès are subject to protection under the Barcelona and Bern Conventions, to which Tunisia is a signatory (see **Table 1** for further information). In addition, in June 2012,[22] members of the Barcelona Convention agreed on an Action Plan for the conservation of marine vegetation in the Mediterranean Sea, which includes the protection of *P. oceanica* and other seagrass species. Two of the key actions agreed in this Action Plan are "*avoiding loss and degradation of the seagrass meadows, and of other vegetal assemblages of importance for the marine environment, as marine habitats that are essential to the survival of many Mediterranean species, and keeping them in favourable conservation status*" and "*ensuring the conservation of marine vegetal assemblages that could be considered natural monuments, such as barrier reefs of Posidonia…*".[23] The Tunisian government has recognised *P. oceanica* as a vulnerable ecosystem in its national reports under the Convention on Biological Diversity (CBD). However, in its most recent report on CBD implementation, there had been no significant progress in addressing major threats to the species, including IUU fishing.[24]

Tunisia has designated 18 protected or managed areas with a marine component – representing 1.02% Tunisia's waters – the majority of which are Ramsar sites (15 sites).[25] In the Gulf of Gabès, marine areas include the Kerkennah Islands Ramsar site, which was designated in 2012 in recognition of, among other things, the role of *P. oceanica* in supplying oxygen and shelter for many vertebrate and invertebrate species,[26] as well as the Kneiss Islands Specially Protected Area of Mediterranean Importance (SPAMI) under the Barcelona Convention (see **Figure 2**). In addition, 11 sites have been proposed as part of a national network of marine protected areas (MPAs), including the Kneiss Islands and the Kerkennah Islands.[27] While management plans have been drafted for several of these proposed sites, at the time of writing, Tunisia had not yet officially designated its first MPA under Law N° 2009-49 of 20 July 2009, relating to marine and coastal protected areas.

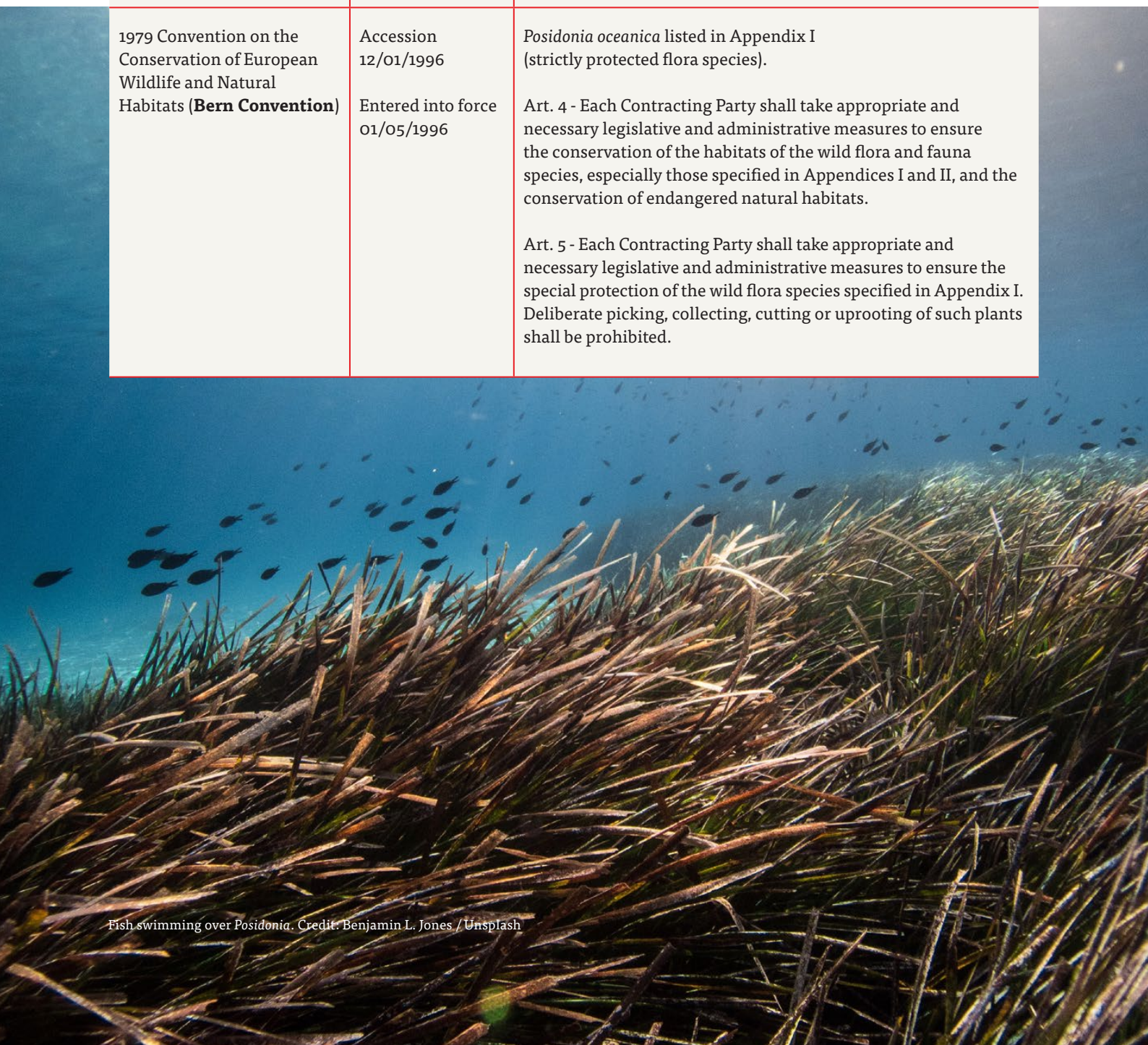
Figure 2: Protected or managed areas with a marine component in Tunisia[28]



Source: SPA/RAC et MedPAN (2019). *Le cadre juridique des Aires Marines Protégées en Tunisie : Fiches synthétiques.* Par Emmanouilidou P., Seddik W., Webster C., El Asmi S. et Kheriji A. Ed SPA/RAC. Projet MedMPA Network, Tunis : 11 pages. https://www.rac-spa.org/sites/default/files/doc_medmpa_network/tunisia/amp_fiche_tunisie.pdf

Table 1: Regional legal protections for *Posidonia oceanica* relevant to the Gulf of Gabès

Instrument	Status in Tunisia	Relevant provisions
Protocol to the Barcelona Convention Concerning Specially Protected Areas and Biological Diversity in the Mediterranean (**SPA/ BD Protocol**)[29]	Ratified (01/06/1998) Entered into force (12/12/1999)	*Posidonia oceanica* listed in Annex II (endangered or threatened species). Art. 12(2) - the Parties shall ensure the maximum possible protection and recovery of flora species listed in Annex II by adopting the national measures listed in Art. 11(5). Art. 11(5) - with respect to protected species of flora, the Parties shall regulate, and where appropriate, prohibit all forms of destruction and disturbance, including the picking, collecting, cutting, uprooting, possession of, commercial trade in, or transport and exhibition for commercial purposes of such species.
1979 Convention on the Conservation of European Wildlife and Natural Habitats (**Bern Convention**)	Accession 12/01/1996 Entered into force 01/05/1996	*Posidonia oceanica* listed in Appendix I (strictly protected flora species). Art. 4 - Each Contracting Party shall take appropriate and necessary legislative and administrative measures to ensure the conservation of the habitats of the wild flora and fauna species, especially those specified in Appendices I and II, and the conservation of endangered natural habitats. Art. 5 - Each Contracting Party shall take appropriate and necessary legislative and administrative measures to ensure the special protection of the wild flora species specified in Appendix I. Deliberate picking, collecting, cutting or uprooting of such plants shall be prohibited.



Fish swimming over *Posidonia*. Credit: Benjamin L. Jones / Unsplash

Box 1: *Posidonia oceanica* meadows - an ecosystem under threat

Posidonia oceanica meadows perform a range of critical climate-related and ecological functions, sequestering significant quantities of carbon, protecting coastal areas from erosion due to rising sea levels, enhancing water quality through oxygenation, serving as an important regional nursery area and habitat for many marine species,including endangered species of shark and marine turtle,[30] and supporting key commercial fisheries.

In recognition of their critical functions, *P. oceanica* has been a key target for conservation and management efforts in the Mediterranean. *P. oceanica* beds are listed as priority habitats under the EU Habitats Directive (92/42/CEE);[31] strictly protected under Appendix I of the 1979 Convention on the Conservation of European Wildlife and Natural Habitats (the Bern Convention);[32] and recognised as endangered or threatened under the 1995 Protocol Concerning Specially Protected Areas and Biological Diversity in the Mediterranean (SPA/BD Protocol to the 1976 Barcelona Convention) (**Table 1**).[33]

Yet, in spite of these protections, *P. oceanica* meadows have experienced extensive losses, regressing by an estimated 34% over the past 50 years.[34] These losses are effectively irreversible on human time scales: due to an extremely slow growth rate (1-6 cm y^{-1}),[35] *P. oceanica* meadows can take centuries to recover from disturbance.[36] Local patterns of seagrass loss reflect global trends: a 2009 study estimated a mean loss of 1.5% of seagrass beds each year, with a decline of almost 29% of the known areal extent since 1879.[37]

Losses of *P. oceanica* have been attributed to pollution, invasive species, fishing, shipping and coastal development, among others.[38] Rising sea temperatures and ocean acidification linked to global heating also threaten the survival of *P. oceanica* meadows.[39]

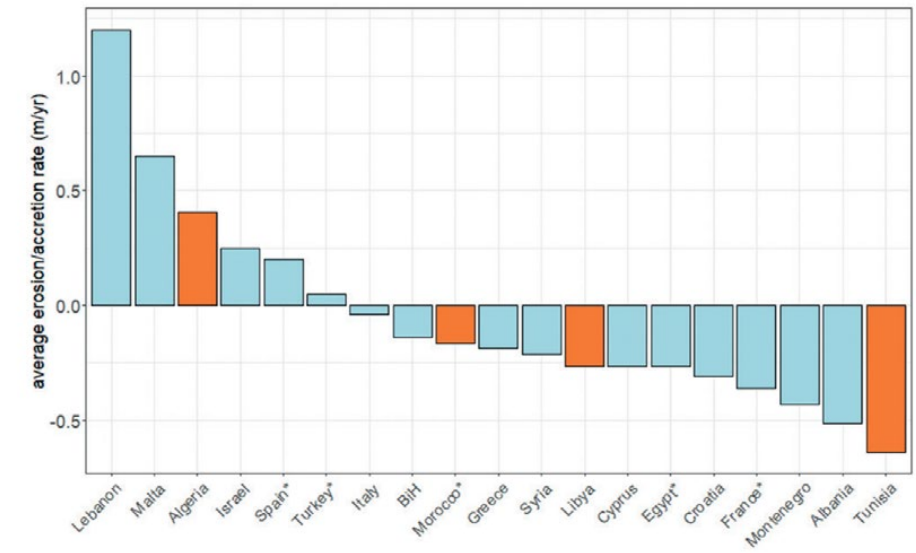
P. oceanica meadows are biodiversity hotspots, providing refuges and breeding grounds to over 400 plant and several thousand animal species.[40] They are the most biodiverse ecosystems in the Mediterranean, housing 20% of all species[41] despite making up just 1.1% of the total surface area.[42] *P. oceanica* meadows play a key role in water oxygenation, emitting up to 20 litres of oxygen per day per square metre of meadows.[43] Termed "the lung of the Mediterranean", the species is the most important source of oxygen supplied by coastal waters.[44]

P. oceanica is considered to be the most effective of the 64 seagrass species globally in carbon fixation and storage.[45] *P. oceanica* meadows are capable of sequestering an estimated 7.7 - 84.4 g C/m2/year (corresponding to rhizomes and sheath tissues), decreasing with depth as meadow density also declines.[46] Carbon sequestration levels are comparable to key terrestrial carbon sinks such as peatlands,[47] and up to 70 times the rate of tropical forests,[48] with the advantage of providing long-term storage from centuries to millennia. *P. oceanica* meadows absorb on average 0.6% of CO2 emissions from Mediterranean countries, a figure which may be higher locally (e.g. 15-20% in Tunisia and 14% in Corsica).[49]

Critically, *P. oceanica* plays an essential role in protecting coastal areas from increasing rates of erosion due to rising sea levels and extreme weather events associated with global heating. *P. oceanica* meadows act as a natural buffer, stabilising the shoreline by binding sediment and weakening water movement (waves, swell) by an estimated 10-70%.[50] This is a vital service in the Maghreb, where a high proportion of the population lives on or near the coast (85% in Tunisia specifically)[51] and coastal areas are home to key industries and infrastructure and a source of revenue from tourism. Rates of coastal erosion in the Maghreb are the second highest in the world, with Tunisia experiencing the highest rates of retreat, losing an average of 64 cm of sandy shoreline per year, and erosion across 35% of its beaches (**Figure 3**).[52] Direct costs of coastal erosion are estimated to be US$1.1 billion to Tunisia annually, equating to 2.8% of gross domestic product (GDP),[53] excluding values such as foregone revenues from tourism. Experts have described the threat posed by coastal erosion in the region as a "socioeconomic bomb" waiting to go off.[54]

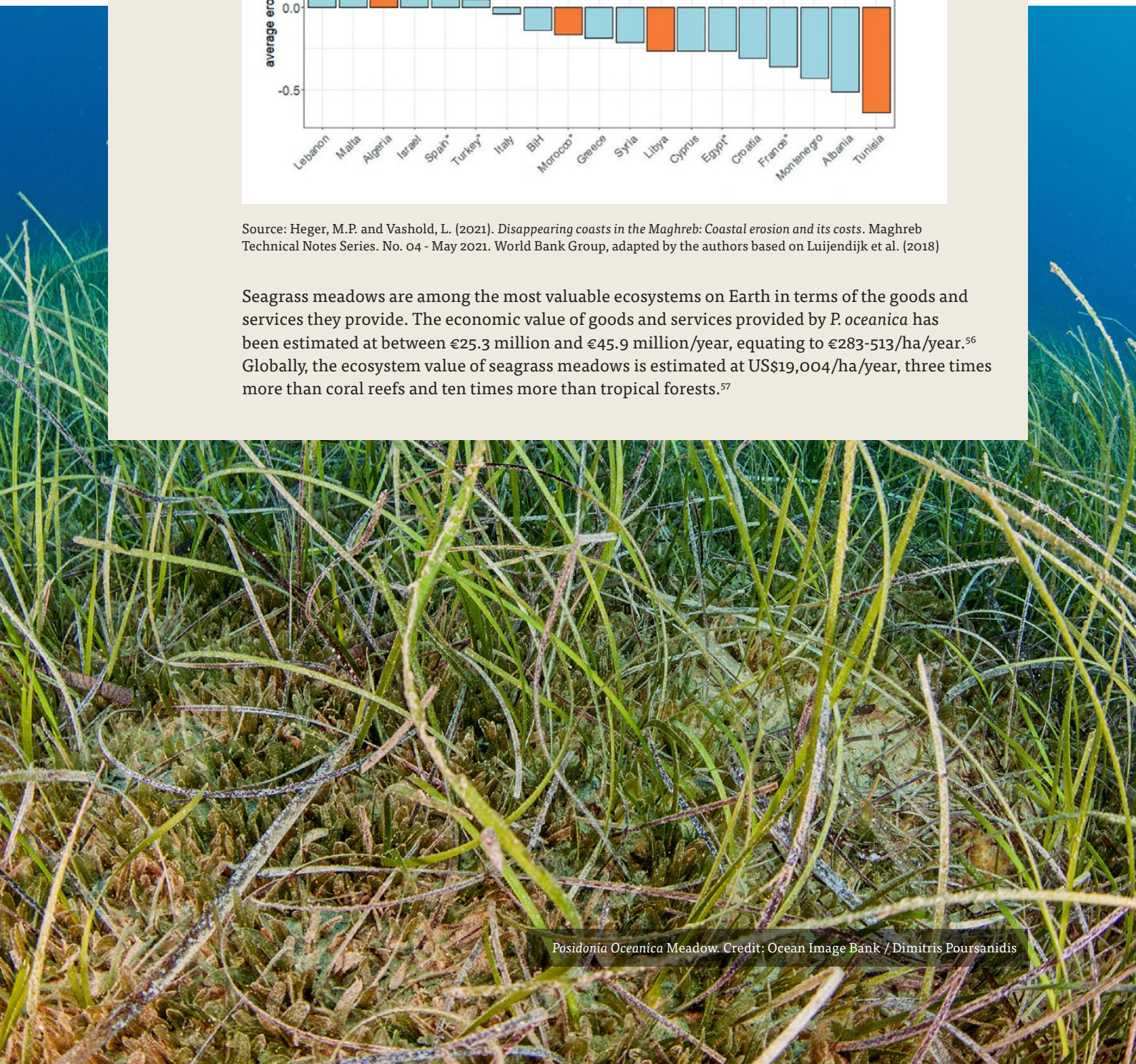
Box 1 (continued):

Figure 3: Net coastal erosion by country in the Mediterranean basin (average rate, 1984-2016)[55]



Source: Heger, M.P. and Vashold, L. (2021). *Disappearing coasts in the Maghreb: Coastal erosion and its costs*. Maghreb Technical Notes Series. No. 04 - May 2021. World Bank Group, adapted by the authors based on Luijendijk et al. (2018)

Seagrass meadows are among the most valuable ecosystems on Earth in terms of the goods and services they provide. The economic value of goods and services provided by *P. oceanica* has been estimated at between €25.3 million and €45.9 million/year, equating to €283-513/ha/year.[56] Globally, the ecosystem value of seagrass meadows is estimated at US$19,004/ha/year, three times more than coral reefs and ten times more than tropical forests.[57]



Posidonia Oceanica Meadow. Credit: Ocean Image Bank / Dimitris Poursanidis

Over 650 species of marine fauna have been reported in the Gulf of Gabès, including 247 species of fish,[58] 171 species of mollusc and 108 species of sponge.[59] The gulf hosts benthic communities of macroalgae and seagrasses such as *Cymodocea nodosa* and *Zostera noltei*, critically endangered species such as the Mediterranean Fan Mussel *Pinna nobilis*[60] and species protected under Annex II of the Barcelona Convention, such as the sponges *Geodia cydonium* and *Aplysina aerophoba*.[61] It also serves as a critical nursery area for the entire Mediterranean, including for a number of species of shark and ray listed as Endangered or Vulnerable on the IUCN Red List of Threatened Species: Blackchin Guitarfish *Glaucostegus cemiculus* (IUCN - Critically Endangered), Common Guitarfish *Rhinobatos rhinobatos* (IUCN - Critically Endangered), Common Smoothhound *Mustelus mustelus* (IUCN - Endangered) and Sandbar Shark *Carcharhinus plumbeus* (IUCN - Endangered).[62] In total, 48 species of elasmobranch have been reported in the area.[63]

The Gulf of Gabès is one of the most important sites for marine turtles in the Mediterranean, serving as an overwintering and foraging area.[64] Three species of turtle have been recorded, namely (from least to most commonly observed): Green Turtle *Chelonia mydas* (IUCN - Endangered), Leatherback *Dermochelys coriacea* (IUCN - Vulnerable) and Loggerhead *Caretta caretta* (IUCN - Vulnerable). Cetacean species are also observed in significant numbers, including the Fin Whale *Balaenoptera physalus* (IUCN - Vulnerable), and Common Bottlenose Dolphin *Tursiops truncatus* (IUCN - Vulnerable in the Mediterranean).[65]

"The Gulf of Gabès is considered to be one of the most important locations in the Mediterranean because a lot of marine species are migrating to it, like the turtle and cetaceans."

Hamed Mallat, Marine Biodiversity Specialist,
Association Tunisienne de la Vie Sauvage

Green turtle over seagrass. Credit: Ocean Image Bank / Liam McGuire

3.2. Fisheries in the Gulf of Gabès

The Tunisian coastline is marked by intense human activity, with some 85% of the country's population living on or near to the coast.[66] Small-scale fisheries are a major provider of employment and livelihoods for the coastal population: the sector employs around 42,000 fishers, representing more than 70% of the fisheries workforce.[67] Tunisia's small-scale fishing fleet is the largest in the Mediterranean at 12,328 vessels, representing over 90% of the total fleet in Tunisia[68] and contributing around half of the value of national fisheries production.[69] In 2017, Tunisia recorded a marine fisheries production of 111,000 tonnes, with octopus, cuttlefish, tuna and shrimps the most valuable commercial species caught.[70]

The Gulf of Gabès is one of the most important fishing areas in Tunisia. Its high productivity, shallow marine environment and smooth seabed topography create especially favourable conditions for fishing activities. The area is subject to particularly heavy fishing pressure, hosting the third highest number of operational fishing vessels of all Mediterranean regions (FAO Geographical Sub-Area (GSA) 14), representing 8.4% of total vessels operating in the Mediterranean.[71] Around 52% of Tunisia's fishing fleet (which totals around 13,000 vessels) operates in the Gulf of Gabès, contributing 39.3% of national fish production.[72]

The Gulf of Gabès suffers from the highest levels of overfishing in Tunisia.[73] Fish populations are reportedly overfished by more than 30%.[74] Across the broader Mediterranean and Black Sea area, 63.4% of fish populations are fished at biologically unsustainable levels, the second highest of the FAO's major fishing areas.[75]

The majority of fishing activities around the Gulf of Gabès are coastal and small-scale in nature, employing 63% of the area's fishers.[76] The Gulf is culturally significant as the location of 'charfia' fishing, a traditional fishing method unique to the Kerkennah Islands that was included in the Representative List of the Intangible Cultural Heritage of Humanity in 2020 (see **Box 2**). The Kerkennah Islands are home to around 15,500 inhabitants who are heavily reliant on the sea for their livelihoods.[77] The islands host over half of all fishing vessels in the Sfax governorate, with 43% of workers engaged in the fishing sector in 2014 compared to 16.5% at the national level.[78] Their way of life is under threat due to declining fish populations linked to overfishing, while being highly vulnerable to sea level rise caused by global heating[79].

A small-scale fisher returns to port with a meagre catch. © EJF

Box 2: Charfia fishing

The Kerkennah Islands have a unique history of traditional fishing using low-impact methods such as the charfia, a technique inscribed on the UNESCO Representative List of the Intangible Cultural Heritage of Humanity in 2020.

The charfia is a fixed, passive fishery system, in which palm fronds embedded on the seafloor form a triangular barrier that channels fish into capture chambers on the ebb tide and finally into a net or trap.[80] Fishing rights are passed from generation to generation, with target species including seabream, red mullet, octopus, sole, cuttlefish and squid.

Charfia fishing is generally conducted between September and June to provide a biological rest period for marine wildlife. Fish are kept alive in the trap until they are collected, meaning undersized/juvenile fish can be released back to the sea. In contrast to gear such as bottom trawls which damage the seafloor, the charfia causes minimal disturbance to the seabed.[81] However, date palms are increasingly replaced by synthetic materials (e.g., polyamide nets and PVC tubes) which are causing pollution and damage to the marine environment.

Charfia fishing system in the Kerkennah Islands. © EJF

Coastal fishers compete with larger vessels operating out of the region's ports, including sardine boats and around 270 trawlers targeting predominantly shrimp, cephalopods (mostly cuttlefish) and demersal (bottom-dwelling) fish.[82] In addition to legal fishing operations, several hundred illegal 'kiss' trawlers are estimated to conduct bottom trawling activities in the Gulf of Gabès (see **Section 4** for further information and **Box 3** for the legal provisions pertaining to bottom trawling activities in the Gulf of Gabès). This practice, and its impacts on coastal livelihoods and marine ecosystems, are discussed in the following section.

Box 3: Legal status of kiss trawling in the Gulf of Gabès

The practice of kiss trawling is expressly prohibited under Article 15 of the Tunisian Order of the Minister of Agriculture of 28 September 1995 (the 1995 Order) – however, it is not precise in specifying what gear this entails, which has hindered enforcement of this provision in practice.[83] Article 27(5) of the 1995 Order also prohibits the use of bottom trawl gear in depths of less than 50 metres in the Gulf of Gabès, subject to a special dispensation for shrimp fishing during defined periods (15 May-30 June and 16 October-30 November, inclusive)[84] when fishing can take place beyond 30 metres depth (Article 35 of the 1995 Order).

At the regional level, GFCM Recommendation GFCM/42/2018/5 prohibits bottom trawling between the coast and the 200 metre isobath in the Gulf of Gabès between July and September each year, to allow marine species and ecosystems to recover.[85] This measure has been applied to the Tunisian fleet operating in the Gulf of Gabès since 2009, in accordance with a recommendation of the GFCM Scientific Advisory Committee (SAC) concerning the reduction of fishing effort for demersal stocks in the Mediterranean.[86] GFCM Recommendation GFCM/36/2012/3 aimed at the conservation of shark and rays in the GFCM area of application also prohibits the use of trawl nets within three nautical miles of the coast, or the 50 metre isobath, whichever is closer to the coast. The Gulf of Gabès is designated by GFCM as an area of Essential Fish Habitat (EFH).[87]

A kiss trawler observed by EJF operating in the Gulf of Gabès in February 2022. © EJF

4. Impacts of illegal 'kiss' trawling

4.1. Prevalence and mode of operation

'Kiss' is Arabic for bag – kiss trawling is so-called because of the bag-shaped nets boats use in their fishing activities. Kiss trawlers are small wooden boats of less than ten metres in length that operate bottom trawls in shallow waters of between 5 and 15 metres depth, sometimes less.[88] Their main target species are cuttlefish, shrimps, octopus, red mullet and sea bream, as well as the invasive blue crab.

> ***"The kiss...they go to shallow waters of three metres and start trawling. Just in three metres. It destroys the sea and the fish."***
>
> Abderrazak Khcharen, retired fisherman

This research confirms kiss trawling as a major threat to local livelihoods and marine biodiversity in the Gulf of Gabès.[89] Despite being prohibited under Tunisia's fisheries laws, kiss trawling has emerged as a significant activity over the past decade.[90] It is now the most prevalent form of illegal fishing in Tunisian waters, accounting for an estimated 65% of infractions.[91] Worryingly, kiss trawling is no longer a marginal practice – a survey of 250 small-scale fishers in Kerkennah, conducted by the Tunisian Forum for Economic and Social Rights (FTDES) in 2021, found it is now practised by the majority of fishers around Mellita in the Kerkennah Islands.[92]

The proliferation of kiss trawling has its roots in the economic and political upheaval of the 2010-11 Tunisian revolution – a response to soaring unemployment, especially among young people, and the rising cost of living.[93] At the end of 2021, the rate of unemployment in Tunisia stood at 16.1%, while the figure was 40% among young people.[94] The practice has attracted new entrants to the fishery, who have seen an opportunity to make a quick profit,[95] including graduates unable to find work and artisanal fishers faced with diminishing catches. Corruption, a lack of law enforcement and declining respect for the law[96] are also considered as driving the expansion of the practice. According to a recent FishAct investigation, alleged abuse of the public subsidy system may have allowed some kiss trawlers to access state-subsidised fuel, potentially feeding the expansion of the kiss trawling industry.[97]

During a visit to the area in February 2022, the high season for kiss trawling,[98] EJF counted tens of kiss trawlers at the ports of Sidi Youssef in the Kerkennah

Kiss trawlers docked at the port of Sidi Youssef in the Kerkennah Islands. © EJF

Islands and at Sidi Mansour in Sfax alone. In November 2022, FishAct documented 576 kiss trawlers within the district of Sfax,[99] an increase of 38.5% on the number recorded by the organisation in 2018.[100] The recently constructed port of Sidi Mansour was associated with the highest number of kiss trawlers in the 2022 FishAct survey (159 vessels, representing over a quarter of the total number recorded), with very few other types of vessel observed at this port.[101] The concentration of kiss trawlers in the governorate of Sfax is suspected to be linked to corruption in the local administration.[102]

Fishers interviewed by EJF reported that kiss trawling takes place throughout the year, including during the July-September temporal closure adopted by GFCM. These activities severely undermine the effectiveness of conservation and management measures and inhibit the recovery of key fish populations.

> ***"Now fishermen are not allowing the sea to rest because the kiss [boats] are trawling for the whole year. So if a squid comes to lay its eggs, the kiss takes it and it doesn't lay its eggs. The same thing for the octopus and the fish, it takes everything. They don't allow them to lay eggs and reproduce."***
>
> Wassim Ben Slimane, fisherman in Kerkennah

EJF investigators observed how kiss trawling operations, despite being illegal, are conducted in plain sight. From onboard a kiss trawl vessel, EJF investigators documented a kiss trawling operation from start to finish, capturing geotagged images of the vessel with nets deployed at a distance of approximately 1.2 nautical miles from the coast of Mellita on the Kerkennah Islands (**Figure 4**), in apparent contravention of Tunisian law and GFCM Recommendation GFCM/36/2012/3 which prohibits bottom trawling within three nautical miles of the coast. **Figure 6** shows how this kiss trawling operation was conducted in an area of confirmed *P. oceanica* distribution in the Mediterranean. Images captured by EJF show seagrass, likely *P. oceanica*, present in the vessel's catches from the same fishing trip (**Figures 7 and 8**).

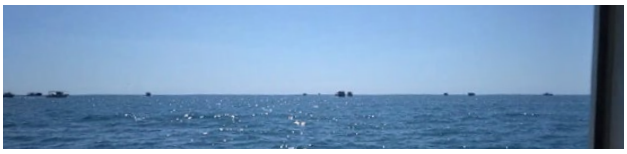
The investigation conducted by FishAct in late 2022 revealed how kiss trawlers now operate in a highly coordinated manner, in groups of up to 30 vessels, to systematically trawl large areas and cooperate in deterring enforcement action.[103] Kiss trawlers have been observed employing dangerous methods to evade capture, such as deploying ropes in the water which can become caught around the propellers of a patrol vessel (**Figure 8**).

Figure 4: Location of kiss trawling documented by EJF on 5 February 2022 at 13.55 local time

Figure 5: Images from the 2022 FishAct investigation provided by an anonymous source within the enforcement agency[104]

Kiss trawlers flocking together 1

Kiss trawlers flocking together 2



Kiss trawlers dragging a rope to deter law enforcement 1

Kiss trawlers dragging a rope to deter law enforcement 2

The fishers we interviewed said that kiss trawler operators carry out their activities openly, leaving their illegal gear in plain sight when in port. This is consistent with the findings of a 2018 FishAct survey which observed that, in the Kerkennah Islands, offenders would leave evidence of trawling, e.g. nets and otter doors (the metal or wooden doors mounted on the nets) on clear display with no apparent consequences.[105] Kerkennah's artisanal fishers criticise this inaction by the authorities.

"The kiss trawling fisher can have access to the port with his gear with the nets and everything, and he finds no problem to do so. He then offloads his catch in front of the authorities. In front of them, he sells his catch, and he gets the catch much easier than us. The law should be enforced. We don't ask for something else."

Local fisher in Kerkennah

"[Kiss trawling] is everywhere. They are just watching. We made lots of complaints. The small-scale fisherman is the one who will pay the bill."

Salah Ben Slimane, fisherman in Kerkennah

In an attempt to deter illegal kiss trawling, local authorities have placed artificial reefs on the seabed in the Gulf of Gabès. Fishers, however, complain they are ineffective as the blocks are either trawled away or avoided by kiss trawlers after the initial encounters.

"They put some small blocks already, the European Union put blocks here, but they were small. The kiss would trawl those blocks and take them away or mark them with the GPS. So when they get stuck in it the first time, they mark it and then send all its coordinates to their friends and colleagues to alert them, and this is what is happening."

Abderrazak Joulak, fisherman in Kerkennah

Kiss trawlers docked at the port of Sidi Youssef in the Kerkennah Islands. The otter doors and trawl nets are visible on board the vessels and on the dockside. © EJF

Kiss trawling is supported by a network of speculators (known locally as 'gacharas') who provide kiss fishers with funds for costs and running expenses in return for exclusivity of their products.[106] These speculators reportedly exert pressure on kiss fishers for catches, which has been responsible for the rapid and unregulated growth of the kiss fleet and the failure to comply with regulations (such as the closed season for shrimp and octopus fishing), driving the rapid deterioration of fishing conditions. Gacharas reportedly use refrigerated trucks to collect kiss trawlers' catch, and illegally provide the fishers with fuel.[107] Such trucks were observed on the ferry to Kerkennah and around the islands during EJF's investigation.

Mesh size of kiss trawl net at the port of Sidi Youssef. © EJF

4.2. Destination of catches

Local fishers claim that the catch from kiss trawls is mainly exported abroad. They allege that the catches are mixed with the catches of legal trawlers and exported to Europe, particularly the shrimp, octopus and squid. This is supported by the findings of investigations by FishAct and others, which identified weak controls on fisheries products leaving Tunisia and highlighted Italy as the likely entry point for non-compliant products to the EU, centred on a major seafood trading group that distributes products throughout Europe.[108]

Data reported by Italy to the European Commission[109] under the EU IUU Regulation[110] indicates a failure to undertake adequate checks of information contained in catch certificates (CCs) accompanying imports of fisheries products from Tunisia. In 2020-2021, Italy received 9,477 CCs for the import of fisheries products from Tunisian-flagged vessels (equating to 11.4% of CCs received by Italy during this period), but did not conduct a single verification with the Tunisian authorities to confirm the legality of the catches or accuracy of information set out in the CCs, in accordance with Article 17(6) of the EU IUU Regulation. An analysis of data on seafood exports from Tunisia to the EU is provided in **Box 4.**

> ***"The catch coming from the Gulf of Gabès is all exported abroad. The kiss trawlers are now mixing their catch with the catch of other legal big boats, and this catch is exported abroad. The catch reaches Europe, and consumers there don't figure out that it is the catch of the kiss."***
>
> Local fisher in Kerkennah

> ***"Now the shrimp caught by the kiss is exported to Europe, the squid is taken to Europe, the octopus goes to Europe, everything is caught by the kiss and out of season. The catch of the kiss varies between the big fish to the fish which is still an egg, and everything is exported abroad."***
>
> Abderrazak Joulak, fisherman in Kerkennah

> ***"The seafood of the kiss trawling or which came from the nets will all look the same, and it will be exported from the factory."***
>
> Salah Ben Slimane, fisherman in Kerkennah

Box 4: Destination of seafood caught by kiss trawlers in Tunisian waters

The European Union is the leading destination for fish and fisheries products from Tunisia, accounting for 55.5% of total export value in 2021, equating to €118.7 million (approx).[111] Italy and Spain dominate imports of octopus, cuttlefish, squid and shrimps – the key target catches of the kiss trawl fleet. According to data reported by EU Member States in Eurostat, in 2021, Italy imported 2,267 tonnes (€16.3 million) of cuttlefish and squid, 1,639 tonnes (€20.3 million) of shrimps and 945 tonnes (€8.5 million) of octopus from Tunisia, while Spain imported 2,487 tonnes (€30.0 million) of shrimps from Tunisia in the same year.[112] These products are also caught by larger scale demersal trawlers operating legally in Tunisian waters, and small-scale fishers using low impact methods such as traps and pots, among others.

Tunisian crab exports are destined primarily for Asian markets. In 2021, Tunisia exported a total of US$27.1 million of crab products, 38.4% of which were destined for Indonesia, followed by the Republic of Korea (15.6%), the US (13.1%), Vietnam (9.7%) and Italy (5.1%).[113] Due to a lack of species specific reporting in global trade statistics, it is not known what proportion of these exports represent products of African blue swimming crab, an invasive species that is having a detrimental impact on local fisheries, ecosystems and livelihoods in the Gulf of Gabès. The species is targeted primarily by the kiss fleet - see **Box 6** for further details.

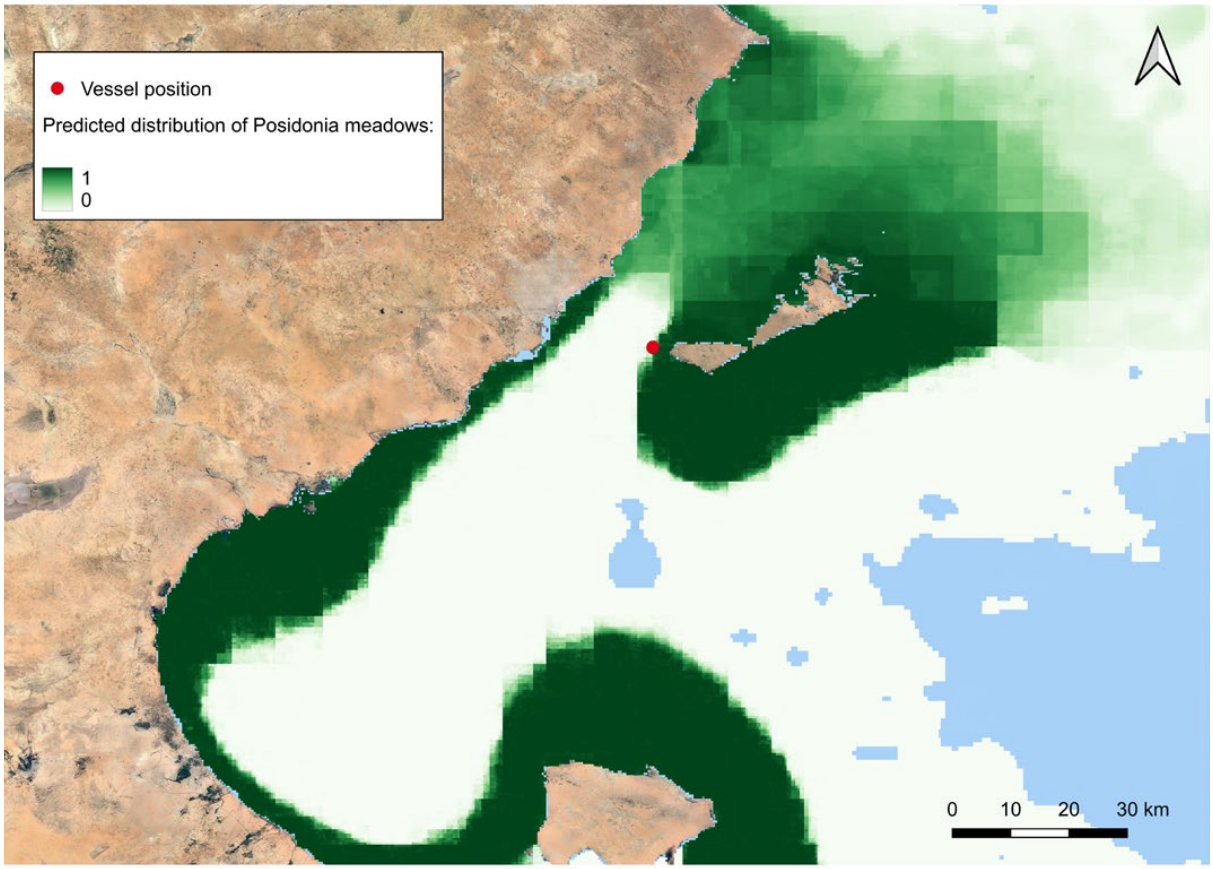
4.3. Ecological impacts

The findings of this investigation show that kiss trawls are having an extremely damaging impact on marine ecosystems in the Gulf of Gabès. Nets and otter doors are dragged along the seafloor, ripping up and destroying fragile *P. oceania* beds (**Figure 6**), as confirmed by images of kiss trawl catches taken by EJF (see **Figures 7 and 8**). In a 2014 study of the impacts of kiss trawling on benthic ecosystems, *P. oceanica* accounted for up to 68% of kiss trawler bycatch.[114] These impacts are highly concerning given the importance of *P. oceanica* in ecosystem functioning, the maintenance of healthy fisheries and in climate adaptation (protection against coastal erosion) and mitigation (carbon sequestration) (**Box 1**). These valuable seagrass meadows are already under considerable strain from illegal fishing, overfishing, land-based pollution and global heating.

> ***"The seagrass on the sea floor gets trawled by the kiss. This grass is a shelter for the squid to lay the eggs and reproduce. Same for the fish and the octopus. The seagrass is where species eat and reproduce but when it is trawled it becomes a desert....The kiss takes everything."***
>
> Wassim Ben Slimane, fisherman in Kerkennah

> ***"The kiss has trawled the Posidonia. It took all the sea bed with it."***
>
> Mohamed Ben Salem Khcharen, former fisherman

Figure 6: Position of kiss trawling operations documented by EJF in relation to predicted distribution of *Posidonia oceanica* in the Gulf of Gabès



Source: distribution of Posidonia meadows from the European Marine Observation and Data Network (EMODnet).[115]

Figures 7 and 8: Images taken by EJF onboard a kiss trawl vessel showing seagrass in the catches

Kiss trawlers use small mesh nets resulting in extremely high rates of bycatch, much of which is discarded. The above-mentioned 2014 study observed up to 355 kg of discarded catch per trawl tow, compared to a maximum of 15 kg of marketable catch,[116] equivalent to a discard rate of 95.9%. In addition to *P. oceanica*, the discarded part of the catch corresponds to sponges, echinoderms and molluscs, among others.[117] The use of unselective, small mesh nets also catches significant quantities of juvenile fish[118] that have not yet reproduced, accelerating the depletion of fish populations.

"Imagine a boat fishing in a depth of two metres, trawling everything. There is a big impact on marine biodiversity. This is one of the remarkable topics in the Gulf of Gabès. If you access any sea port, you will find this kind of mini kiss trawling. It is illegal but the lack of surveillance and enforcement of the law is making this phenomenon grow day by day."

Hamed Mallat, Marine Biodiversity Specialist,
Association Tunisienne de la Vie Sauvage

Size of fish caught by a kiss trawl documented by EJF.

Due to their small mesh size and operation in shallow waters/sensitive areas of habitat, kiss trawls are considered even more damaging than regular bottom trawls.[119] The mesh size of kiss trawl nets is 18 mm compared to more than 28 mm on a regular trawler, resulting in large amounts of by-catch.[120] Regular bottom trawlers also operate at greater depths: for example, they are restricted to areas deeper than 50 metres in the Gulf of Gabès, with a special dispensation for shrimp fishing during defined periods (15 May-30 June and 16 October-30 November, inclusive) when fishing can take place beyond a depth of 30 metres.[121] Across Tunisia's benthic fisheries, reported rates of by-catch are higher in shallow waters than at depth.[122]

Experts we spoke to emphasised the need to create and enforce a network of MPAs across the Gulf of Gabès, where kiss trawling is strictly prohibited, as a means of protecting vulnerable marine ecosystems.

"In the Gulf of Gabès there are MPA projects and there is progress. The creation of MPAs can guarantee sustainable fishing, and make the fishers take part in preservation because the MPA doesn't mean 'closing', it means 'partnership'. Accelerating the creation of MPAs can improve marine biodiversity because when the MPA is created officially, Kiss [fishing] will be banned right away in those areas."

Hamed Mallat, Marine Biodiversity Specialist,
Association Tunisienne de la Vie Sauvage

4.4. Socio-economic impacts

Tunisia's fishing communities have been severely affected by the worsening economic situation in the country and fallout from the COVID-19 pandemic.[123] The degradation of marine resources and associated fishery declines have left fishers in a precarious situation, unable to respond to successive crises.[124] Global heating (**Box 5**), the invasion of alien species (**Box 6**) and pollution from petroleum factories, among other factors, are exacerbating these threats.[125]

In Kerkennah, inhabitants rely heavily on the sea for their livelihoods. Traditionally, fishers on the islands have used low-impact fishing methods, such as the charfia, which are of global cultural significance (see **Box 2**). Fishing rights and know-how have been passed down from generation to generation.[126] This way of life is now under threat. Fishers we interviewed reported declining catches and an inability to support their families.

> ***"The catch is sometimes up and sometimes down. Now it is always down, the catch is decreasing, the sea production is weak...Before the fisherman could earn 1000 dinars. Now you can go and get only 10 dinars and sometimes you earn nothing."***
>
> Wassim Ben Slimane, fisherman in Kerkennah

> ***"When I used to go with my father to pick up the charfia catch, sometimes we would bring a cart to take the fish, it was so prolific. Now there are people who make charfia with 15 or 20 cages, but get so little catch, they collect them in a small plastic bag. Charfia was able to make a living for the whole family, but not anymore."***
>
> Abderrazak Joulak, fisherman in Kerkennah

Abderrazak Joulak, a fisherman from the Kerkennah islands, checks his charfia traps. © EJF

"I put around 140 pieces of nets which can bring me five or six kilograms of squid. But how much can I earn from them? Two are working with me and I need to get the fuel and pay the workers. You can't really make a living."

Salah Ben Slimane, fisherman in Kerkennah

"We are just living. We have no other option since we make a living through the sea. We are just trying to cope with it. What can we do?"

Net maker, Kerkennah

"People rely only on the sea to make a living because there are no other jobs to do. All the young people are working as fishermen."

Chadia Arous, net maker in Kerkennah

EJF's investigation found that a lack of employment prospects in the fishing industry is driving young people to migrate from the Kerkennah islands. This is consistent with the findings of the FTDES survey of 250 small-scale fishers in Kerkennah conducted in 2021.[127] The role of fisheries declines as a driver of migration from Tunisia is the subject of increasing research and documentation (see **Box 7** for further discussion).

"The majority of youth here in Kerkennah don't find a job to do. People living here have only two options. Either leave the island or leave the country."

Hamza Feguir, local union of fishers

"There are many countries, and I can choose. I can choose the first country which accepts me to migrate, and I will go to it. What things am I doing here since the authorities are weakening and unable to protect my living? I will leave it. The only job that I can do is working as a fisher."

Local fisher, Kerkennah

"My older son says, from time to time, that he will leave Tunisia because he is watching how his father is suffering."

Salah Ben Slimane, fisherman in Kerkennah

"I wish that I had never been a fisherman. But I was obligated because in Tunisia there is no work. I migrated illegally to Europe when I was 16 years old. I wanted to change my life there because I was fed up with life here. Then I was stopped. They checked my paper and I got deported."

Wassim Ben Slimane, fisherman in Kerkennah

"It is true that those who migrate illegally are not all fishermen. But there is a big number among them whose fathers are working in the sea."

Hamed Mallat, Marine Biodiversity Specialist, Association Tunisienne de la Vie Sauvage

Speaking to EJF, fishers highlighted the conflict between artisanal fishers and kiss trawlers, which is especially acute around the Kerkennah Islands. Fishers complained that kiss trawling is damaging the marine environment and driving declines in fish populations. This, they say, has forced some fishers to abandon their traditional methods in favour of the practice[128] or turn to migrant smuggling to make a living (**Box 7**). According to the FTDES survey, kiss trawling offers young people in Kerkennah a "*significant and secure income*", despite the adverse impacts on other fishers, marine biodiversity and traditional fishing techniques.[129] Although fishers may consider kiss trawling to be immoral, earnings are more reliable – according to one fisher, averaging 30-40 Tunisian dinars (US$10.95 - US$14.60) per day, in contrast to around 10 Tunisian dinars (US$3.65) a day (or sometimes nothing) fishing with legal methods.[130] Fishers in Kerkennah say that even if they were to give up the practice, kiss trawlers would still come from elsewhere to fish in their waters.

"For the kiss, they throw the nets and trawl everything behind. Seagrass, annular sea bream, squid. It takes all immature fish and doesn't leave them to live and grow in the sea. The catch decreases because of the kiss."

Salah Ben Slimane, fisherman in Kerkennah

"When I go to find workers who will work with me, I don't find any. Why? Because youth are going to fish by the illegal kiss and don't want to work for me."

Abderrazak Joulak, fisherman in Kerkennah

"[Kiss trawling] is easy money earning. It doesn't need too much money like the nets and charfia."

Abderrazak Joulak, fisherman in Kerkennah

"The skilled workers who can work with nets are dwindling because they prefer the kiss."

Kiss fisher

In response to fish population declines, fishers also admit to adapting their artisanal gear to become less selective.[131] They say their traditional, low-impact methods are unable to compete with kiss trawls, which produce higher yields than legal fishing methods. With the cost of living, fuel and gear prices continuing to rise, illegal and unsustainable practices among small-scale fishers are also on the increase, including the failure to comply with annual restrictions, the use of undersized mesh nets and the substitution of materials, such as plastics, that damage the marine environment.[132]

"We used to release the small fishes to grow, but now we take them to sell for a cheap price so we can survive. Because of climate change, pollution and illegal fishing, small-scale fishermen are no longer able to make a living on the island."

Hamza Feguir, local union of fishers

"When I was 15 years old, we used to make a good living...Now everything is expensive and I am unable to cover all the expenses."

Salah Ben Slimane, fisherman in Kerkennah

Artisanal fishing gear is often damaged or towed away by passing kiss trawls.[133] This happens most frequently with static fishing gear,[134] such as the charfia (see **Box 2**) and octopus traps (*gargoulettes* and *drina*[135]), used traditionally in the Kerkennah Islands, as well as gillnets. The cost of replacing damaged nets may be in the region of 2,800 Tunisian dinars (US$910) every three to four months.[136] One interviewee admitted to switching to kiss trawling due to the cost of legal fishing gear (nets, jars and cages) and the risk of their loss to kiss trawls.

"Sometimes when kiss trawling...they trawl our nets. We can't go very far out to throw our nets because we fear that kiss trawlers come and tear them apart."

Abderrazak Joulak, fisherman in Kerkennah

"They come to work in shallow water which is our place of fishing...If we throw the nets, they destroy them. They take our cages. They cut our nets."

Salah Ben Slimane, fisherman in Kerkennah

"For the nets and the cages, fishermen sometimes leave them in the sea. Sometimes a kiss comes and trawls the nets and the cages, it tears them apart and they are very expensive."

Kiss fisher

This inequitable situation has created significant resentment within the coastal fishing community, particularly as the illegal fleet of kiss trawlers continues to flourish. In 2012, hundreds of artisanal fishers staged a protest on the Kerkennah Islands, sailing towards Italy in an attempt to gain the attention of the EU.[137] The Tunisian Network for Sustainable Artisanal Fishing (RTPAD) has furthermore called on the Tunisian government to enforce the provisions of the law concerning protection of the Gulf of Gabès, including the prohibition against bottom trawling in depths of less than 50 metres (taking into account the special dispensation for shrimp trawling - see above) and the requirement for trawlers to be monitored with a Vessel Monitoring System (VMS).[138]

"We the fishermen always have hope. Like every day... we have hope that the kiss will definitely be banned."

Abderrazak Joulak, fisher in Kerkennah

The proliferation of the invasive blue crab (*Portunus segnis*) in the Gulf of Gabès presents a further threat to the livelihoods of artisanal fishers in the area (**Box 6**).[139] The species has driven declines in populations of native marine species, while causing damage to fishing gear, e.g., through entanglement in gillnets and destruction of charfia in order to feed on catches, causing significant losses.[140] According to one fisher we interviewed, the market price for crabs is insufficient to cover the costs of damage to his nets.

Although there is a lucrative export market for the blue crab, crab fishing is dominated by kiss trawls, which are the most efficient method of catching the species. In the absence of government controls, there is a risk that fishers will increasingly switch to kiss trawling to take advantage of the crab market.[141] While efforts have been made to promote low impact crab fishing (**Box 6**), the draw of kiss trawling appears to be very strong.

The problems faced by artisanal fishers are compounded by a shortage of palm fronds used in charfia fishing, which has driven up the price of palm on the islands. This shortage – a result of climate change and deforestation – has forced fishers to use plastics in their charfia systems, causing damage to seagrass beds and marine pollution. Almost all interviewees highlighted the problem of plastic cages and the need for a solution.

Small-scale fishers check their charfia traps for fish and cuttlefish. © EJF

Abderrazak Joulak, a fisherman from the Kerkennah islands, rows the short distance to his charfia traps in the Gulf of Gabès. © EJF

Box 5: Global heating and sea level rise - exacerbating the vulnerability of small-scale fishers

The coastal zones of the Gulf of Gabès and their inhabitants are highly vulnerable to the impacts of global heating and associated sea level rise. The shallow nature of the marine environment, unique to the Mediterranean, is particularly sensitive to changing weather conditions and temperature.[142] Climate models predict an accelerating increase in air and water temperatures over the coming decades, with a predicted increase in air temperature of 1.5°C in the 2021–2050 period relative to 1961–1990, and marked decrease in rainfall expected after 2020. Water quality is expected to decrease due to reduced precipitation (associated with lower rates of dilution) and increasing water temperature (associated with a lower dissolved oxygen content). Warmer waters are predicted to lead increasingly to the appearance of alien invasive species, which could reach 80-100 new species by 2050.[143] The case of the blue crab demonstrates the potentially devastating impacts of alien invasive species on native biodiversity and local livelihoods (see **Box 6**).

Anecdotal reports from fishers in this investigation indicate that global heating is already impacting catches, in combination with other factors. Rising sea levels and associated storm surges are expected to have a significant impact in the Gulf of Gabès in the coming decades. In Tunisia, more than 3,000 hectares of urban land are considered vulnerable and threatened by submersion due to sea level rise, including a significant proportion in the city of Sfax.[144] Nearly 300,000 of Tunisia's inhabitants are living in vulnerable urban areas, many in the Gulf of Gabès. An estimated 6,380 hectares of agricultural land are expected to be lost in the Gulf of Gabès with a one metre rise in sea level.[145] Tunisia's coasts are retreating more rapidly than almost anywhere in the world, a phenomenon likely to accelerate with rising sea levels (see **Box 1**).

Box 6: Invasion of the African blue swimming crab

Populations of the blue crab (*Portunus segnis*), an invasive species from the Western Indian Ocean, have increased rapidly since the species was first detected in Tunisian waters in 2014,[146] a phenomenon linked, at least in part, to warming sea temperatures which have favoured expansion of the species beyond its normal range.[147] The blue crab poses a significant threat to artisanal fishers in the Gulf of Gabès (who refer to the species as "Daesh"), destroying the nets and traps of fishers, while also feeding on key commercial species, driving further population declines.[148] There are reportedly now higher volumes of crabs in the waters of Kerkennah than other important commercial species such as shrimp.[149]

International demand for blue crab is high – according to FAO, it is the fifth most popular crab species in the world market.[150] Fishers, including those operating kiss trawlers, have increasingly targeted this species since the Tunisian government created a national plan[151] to develop its production and commercialisation, including through the creation of 17 processing plants located in Sfax.[152] In 2019, the Tunisian government constructed a processing and marketing plant for the Asian market, creating around 50 jobs for the local community in the Kerkennah Islands.[153]

The FAO has also supported this plan with a training programme for fishers to use low-impact crab traps.[154] However, kiss trawling is the most efficient method for capturing the crabs and it is these boats that supply almost all of the catches processed by export companies.[155]

Crab production in Tunisia has increased rapidly in recent years. Production rose from 770 tonnes in 2017 to 3,355 tonnes in 2018 with an increase in value from 5.4 million dinars (2017) to 24.9 million dinars (2018).[156] The catches are mainly destined for export – key destinations include Asia (e.g. Vietnam, Malaysia), Spain, Italy and the Americas.[157] In May 2021, exports represented 2,000 tons at a value of US$7.2 million, compared to 796 tons and US$3.1 million in May 2020.[158] Since 2017, a portion of the catch has also been made into fishmeal for use as feed in aquaculture production[159].

African blue swimming crab in the catches of an artisanal vessel at Kellabine in the Kerkennah Islands. © EJF

Box 7: Fisheries declines drive migration

Irregular migration from Tunisia surged in 2020 and 2021 – during the COVID-19 pandemic – to levels not seen since the months following the 2010-11 Tunisian Revolution.[160] In 2021, Tunisian nationals accounted for 23% of migrants arriving in Italy (15,671 individuals), the highest of any country.[161]

Growing economic precarity is forcing fishers to migrate from Tunisia in search of employment, or become involved in migrant smuggling networks.[162] The Gulf of Gabès has long served as a hub for illegal migration, with the Kerkennah Islands, in particular, serving as a key departure point. During the surge in migration in 2020 and 2021, detected departures were overwhelmingly concentrated in the governorate of Sfax, which accounted for 43% of apprehensions in 2020.[163]

Fishers interviewed by EJF expressed their desperation at their economic situation and readiness to migrate. With so many young people leaving the country, finding workers in the fishing industry is becoming a challenge. The appeal of the fishing sector was low for the young people (under 30) we interviewed.

> ***"The young people are moving away from the sea. When I fish with nets, I go to find workers who will fish with me, but I don't find any. Many young people have left the country. They have migrated illegally."***

Mohamed Ben Salem, fisherman

> ***"We have been told for more than one time that the day when there is nothing left, I will take my boat and go to any other place rather than staying in Tunisia, and this is perilous because today the phenomenon of illegal migration exists and is happening so often."***

Local fisher, Kerkennah

The role of fishers in the smuggling of migrants from Tunisia is increasingly documented. Recent research and investigations have revealed the following:

- An investigation conducted in 2020 by the New Humanitarian[164] found that young fishermen from Kerkennah are offered free passage to Italy if they are willing to pilot boats across the sea – *"[M]ost of the passengers of migrant boats are from outside of Kerkennah, but the captain is generally a Kerkennian"*, according to a naval officer interviewed. Other fishers have sold their boats to smugglers or to migrant groups independently organising their own crossings.

- A 2021 study by the Tunisian Forum for Economic and Social Rights (FTDES)[165] surveyed 250 fishers in Kerkennah. The survey found that fishers from Kerkennah have become engaged in the lucrative practice of transporting migrants by boat to Italy.

- A report published in 2022 by the Global Initiative Against Transnational Organised Crime[166] found that fishermen act as leaders in migrant networks (known locally as *"Harrak"*) bringing together the logistics (boats, departure housing, etc.) required for a successful smuggling effort. Growing numbers of young Tunisians are also choosing to "self-smuggle", pooling their money, sourcing boats, engines and fuel, and departing on their own.

5. Conclusions

In a little over a decade, illegal kiss trawling has emerged as a major threat to local livelihoods and marine biodiversity in the Gulf of Gabès region of Tunisia. This report highlights how the practice is damaging marine ecosystems and the fisheries they sustain, threatening the sole source of income of thousands of fishers. While providing short term gains for some individuals, these are vastly outweighed by the collective economic, social and environmental costs. Under threat are the largest remaining areas of *Posidonia oceanica* seagrass meadows, a species endemic to the Mediterranean which provides critical ecosystem services of local, regional and global significance.

Immediate action is required to safeguard and restore marine ecosystems and the livelihoods that depend on them. The solution to the problem is, at the same time, both simple and complex. The practice occurs in plain sight, in full view of the authorities in the Governorate of Sfax. With the appropriate direction of resources and enforcement effort, perpetrators can be identified, arrested and sanctioned.

However, kiss trawling is so widespread and embedded in local economies that efforts to eradicate the practice must be underpinned by political will at the highest levels of government. To succeed, actions must be taken in partnership with fishing communities and kiss fishers themselves, to find a lasting solution that protects livelihoods, conserves marine ecosystems, and respects human rights and cultural values.

A vital aspect of this should be the protection of the Gulf of Gabès through a national network of marine protected areas, implemented through effective and fully participatory co-management, across which bottom trawling is strictly prohibited. With only 1% of Tunisia's marine environment currently subject to some form of protected area designation, this should be considered a priority action to safeguard *P. oceanica* habitat and the livelihoods of small-scale fishers.

The Tunisian government must furthermore commit to eradicating kiss trawling and support impacted fishermen to sustainably transition away from the practice. The national fisheries law should be reformed to define precisely what constitutes illegal kiss trawling, provide comprehensive powers of inspection and enforcement for the competent authorities, and introduce effective, proportionate and dissuasive sanctions for illegal fishing.

While the responsibility for ending kiss trawling lies primarily with the Tunisian government, the international community must play a role in the form of support and diplomatic pressure to end the practice. The European Union is the most important market for seafood from Tunisia and has an interest, and responsibility, to ensure harvests are legal and sustainable. The findings of this investigation indicate that EU Member States may be importing seafood caught illegally by kiss trawlers, in possible contravention of Council Regulation (EC) No. 1005/2008 which prohibits the import of illegally-caught seafood into the EU.[167] The Tunisian government's failure to enforce its own laws and ensure compliance with GFCM measures raises a risk of future action by the European Commission under the EU IUU Regulation.[168] This may involve, among other things, a ban on exports of seafood to the EU market, which would have severe consequences for the Tunisian economy.

This report has highlighted the need for urgent action to end illegal kiss trawling. Kiss trawling breaches national laws, contravenes regionally agreed management measures aimed at conserving fish populations and undermines global conventions to conserve marine biodiversity and fight global heating. The implications of failing to act are serious and far-reaching. At stake are ecosystems of critical significance for local livelihoods, regional biodiversity and climate mitigation/adaptation efforts, as well as traditional ways of life that are recognised as cultural heritage of mankind by UNESCO. The findings of this study are unequivocal: illegal kiss trawling is unsustainable, unethical and must be stopped.

Small-scale fishing boat in the Gulf of Gabès. © EJF

6. Recommendations

The following recommendations are directed at the Tunisian government, the EU and the GFCM for specific actions to end illegal kiss fishing, in order to protect the Gulf of Gabès' biologically and economically important coastal habitats, and safeguard the livelihoods and the viability of artisanal fishing communities.

To the government of Tunisia, which should:

1. **Commit to eradicating illegal kiss trawling** and **develop a roadmap to this end,** in coordination with the governorate of Sfax, stakeholders from civil society, fishing communities and seafood traders, with a clear deadline for implementation by the end of 2024 given the severity of the issue.

2. **Reform the national fisheries law framework** to *inter alia*: (i) define precisely the fishing methods that constitute illegal fishing, including the practice of kiss trawling; (ii) set out comprehensive powers of inspection and enforcement to the competent authorities ensuring clarity concerning their respective mandates; (iii) establish protocols for information sharing and exchange between authorities with enforcement-related functions; (iv) establish clear requirements for port and vessel inspections; (v) impose effective, proportionate and dissuasive sanctions on offenders engaging in or supporting IUU fishing, including the cancellation of licences, and the seizure and confiscation of vessels and fishing gear.

3. **Allocate adequate financial and human resources** to enable effective monitoring, control, surveillance and enforcement, particularly in the governorate of Sfax, and **establish a new enforcement body** under the jurisdiction of the Ministry of Fisheries and Agriculture dedicated only to fisheries law enforcement.

4. Require smaller fishing vessels to be permanently marked with **unique identification numbers** and record this information in a central database. Consider starting a pilot project to **introduce vessel tracking** on small-scale fishing vessels.

5. **Implement national legislation on protected areas**, prioritising the designation and enforcement of the proposed network of marine protected areas and implementation of their management plans, and ensuring the meaningful participation of fishing communities and other stakeholders through collaborative management.

6. **Adhere to Tunisia's regional and international obligations**, including GFCM conservation and management measures and provisions of the Bern Convention and the Protocol to the Barcelona Convention Concerning Specially Protected Areas and Biological Diversity in the Mediterranean (SPA/BD Protocol).

7. Implement the **national plan of action for the protection of *P. oceanica* habitat and other marine vegetation**[169] within Tunisia's territorial waters, with a view to ensuring maximum possible protection and recovery of the species, as required under the SPA/BD Protocol.

Many small-scale fishers in the Gulf of Gabès still use sails rather than outboard engines. © EJF

8. Support impacted fishermen to **sustainably transition away from kiss trawling** by the end of 2024, and engage with the international community to **target development and climate funding** for this purpose. Use of funding from the Global Environment Facility (GEF) project 'Fisheries and Ecosystem Based Management for the Blue Economy of the Mediterranean' (FishEBM MED) could be considered.

9. **Reorientate efforts under the national plan to develop the production and commercialisation of African blue swimming crab** to ensure support is focused on sustainable, low impact methods of crab harvesting and that subsidies are not funding the activities of illegal operators.

10. Commit to improving transparency in fisheries management and governance in accordance with **the ten principles of the Global Charter for Transparency** in the fishing industry.[170]

11. Engage with the seafood market in Tunisia on the **implementation of traceability measures** to ensure illegally harvested seafood is not reaching the EU and other markets (e.g. in Asia).

To the EU:

1. **The European Commission** should engage **in cooperation and dialogue with the Tunisian authorities** with a view to help end illegal kiss trawling and to ensure full traceability in supply chains to prevent illegally harvested seafood products from entering the EU market, including within the framework of the IUU Regulation.

2. **The European Commission** should, with a view to supporting EU Member States in enforcing the implementation of the IUU Regulation with regard to Tunisia, bring to their attention the IUU fishing risks identified in this briefing through appropriate channels, especially **the Mutual Assistance system set out in Chapter XI of the EU IUU Regulation**.

3. **The EU Member States, in particular Italy and Spain**, which receive the majority of octopus, squid and shrimp imports from Tunisia (and, in the case of Italy, crab imports), should **increase scrutiny of catch certificates for fisheries imports** stemming from Tunisia into the EU market to ensure legal origin, in accordance with Articles 16 and 17 of the EU IUU Regulation.

4. **The European Commission** should, in cooperation with the Tunisian authorities, ensure that relevant existing and future EU-funded projects and programmes promote sustainable fisheries and include safeguards on the protection of marine ecosystems and associated ecosystem services (including climate mitigation).

5. **The European Commission and the European Fisheries Control Agency (EFCA)** should ensure that the support given to the Tunisian authorities on fisheries control and inspection through the **EU project "Mediterranean virtual regional training academy on fisheries control and inspection (e-FishMed)"**, contributes to addressing gaps in the implementation of national and regional (i.e. GFCM) regulations pertaining to kiss trawling.

6. **The European Parliament** should consider investigating the environmental, economic and social impacts of illegal kiss trawling in the Gulf of Gabès, with a view to increasing cooperation between the EU and Tunisian authorities to improve compliance with GFCM Recommendations, as well as the implementation of Tunisia's international obligations under the Bern Convention and SPA/BD Protocol to the Barcelona Convention on the protection of *P. oceanica* habitat.

7. **The European Commission, EFCA and the Member States** should, when exploring the extension of the EFCA Joint Deployment Plan involving third countries, consider Tunisia a priority partner country.

To the General Fisheries Commission for the Mediterranean (GFCM):

The GFCM should, at its **Compliance Committee** in May 2023, urgently discuss the possible non-compliance with GFCM Recommendation **GFCM/36/2012/3**[171] regulating fishing activities and bottom trawling in the Gulf of Gabès. To address the situation the GFCM should call on Tunisia to strengthen control of the affected areas to stop illegal kiss trawling.

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Source: FishAct. A beautiful piece of protest art, showing the destruction of 'kiss trawling', in the port of Kraten, Kerkennah islands. By Mejbri Ahmed.

FishAct

EJF ENVIRONMENTAL JUSTICE FOUNDATION

Protecting People and Planet