Mare Nostrum

Research Proposal

Ghost Fishing Gear
in the coastal area of Portugal

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Phase 1*

Identification of the problem and main challenges

*Following the theme distribution and time-frame previously suggested in the calendar.

Generalities

What is ghost fishing?

Ghost gear is a byproduct of fishing and occurs when the equipment is lost or abandoned in the ocean and continues to capture fish and other marine animals, damaging oceanic ecosystems and depleting marine wildlife. Nets and gear end up discarded or lost due to poor weather conditions, difficulty in accessing disposal or recycling facilities, lack of equipment maintenance, destructive or illegal fishing techniques, and many other reasons such as theft, vandalism, interactions with other gear, fouling on the bottom, and human error.

The most harmful type of fishing gear is commercial nets. Gillnets are especially damaging, hanging in the water like an invisible wall and trapping any fish that tries to swim through them. Many nets get swept away in currents or caught on ocean structures, making them very difficult to catch. Traps and cages are specifically designed to survive for long periods of time underwater and to keep on catching with no input from people, therefore having a big impact too. Ghost fishing lines can be deadly especially for marine mammals, sea turtles, and seabirds.

Fishing is a major economic activity in Portugal. The country has a long tradition in the sector and is among the countries in the world with the highest fish consumption per capita. Multi-gear fishery, which is the largest fleet component in Portugal, comprises a wide variety of fishing gears, such as gill nets, trammel nets, or long lines. Our goal is to develop a pilot project in the fishing town of Ericeira and offer an effective long-term solution to the ghost-net issue, for both humans and Nature.

How can we reorient the industry and its techniques while guaranteeing the livelihood of those who depend on fishing?

Generalities

What effects does ghost fishing gear have on the environment?

It is estimated that, on a worldwide level, 29% of all fishing lines, 8.6% of traps and pots, and 5.7% of every fishing net used, are lost or discarded. Ghost fishing contributes to increased mortalities in a wide variety of marine organisms and is especially damaging to endangered and protected marine species, such as marine mammal and sea turtle populations.

There is not much availability of data on fishing gear such as recreational or commercial fishing nets, lines, pots, and traps lost or abandoned in the environment in Atlantic Portuguese areas, therefore it remains difficult to assess the level of impact and determine accurate ghost fishing catch rates. Recent studies on seabirds proved that in Portugal there is a high annual rate of entangled seabirds (average 6.9%) compared to other studies, and fisheries-related materials is a relevant cause of seabird entanglement (82%) compared to other debris and in general, the fisheries-related materials are a relevant cause of seabird entanglement compared to other debris, with 82% of the case.

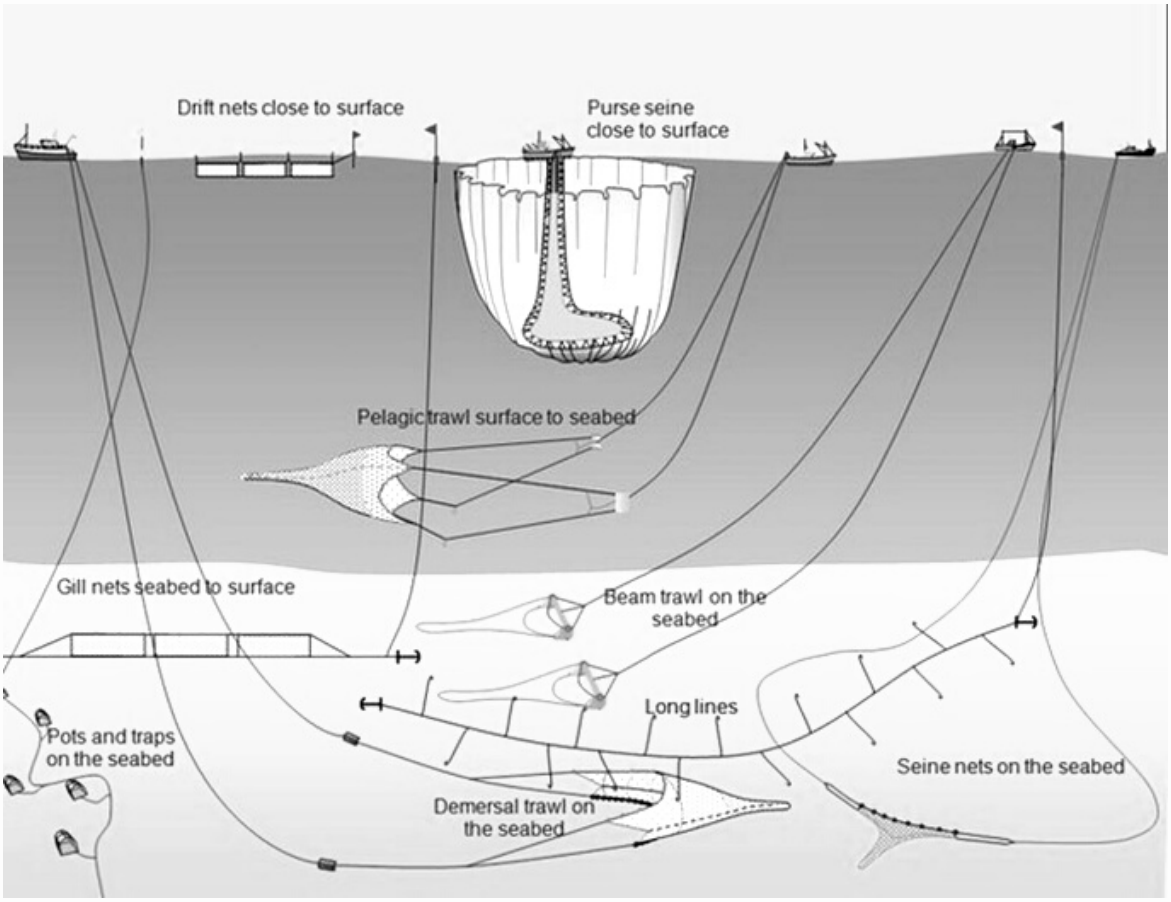
Table 2
Number and percentage (under brackets) of seabirds by species and by type of entanglement material admitted to CRAM-Ecomare (2008–2018).

	Fishing hook	Fishing line	Fishing net	Other marine debris	Total
Razorbill *Alca torda*	0	0	2 (100%)	0	2
Cory's shearwater *Calonectris borealis*	1 (100%)	0	0	0	1
Black-headed gull *Chroicocephalus ridibundus*	0	0	1 (50%)	1 (50%)	2
Common loon *Gavia immer*	1 (100%)	0	0	0	1
European storm petrel *Hydrobates pelagicus*	0	0	1 (100%)	0	1
Audouin's gull *Larus audouinni*	1 (100%)	0	0	0	1
Lesser black-backed gull *Larus fuscus*	6 (26%)	7 (30%)	2 (9%)	8 (35%)	23
Great black-backed gull *Larus marinus*	2 (25%)	5 (63%)	1 (13%)	0	8
Yellow-legged gull *Larus michahellis*	18 (44%)	10 (24%)	2 (5%)	1 (27%)	41
Northern gannet *Morus bassanus*	61 (54%)	19 (17%)	17 (15%)	16 (14%)	113
Great shearwater *Puffinus gravis*	0	0	1 (100%)	0	1
Balearic shearwater *Puffinus mauretanicus*	0	1 (17%)	5 (83%)	0	6
Arctic tern *Sterna paradisaea*	1 (100%)	0	0	0	1
Total	**91 (45%)**	**42 (21%)**	**32 (16%)**	**36 (18%)**	**201**

R.A Costa et all, 2020

Data from this study, show that fishing lines from recreational fishing in Portugal have an impact on marine life, and therefore should be also considered in our project, together with professional fishermen and fisherwomen.

Another study (F.Beata at all, 2009) proved that trammel nets, each 50 m long and corresponding to the most common type used by the local Portuguese commercial fleet, caught up to 541 and 257 individuals per 100 m of net in rocky and sandy bottoms, respectively. Catching efficiency decreased in a negative exponential manner in parallel with the net deterioration. The nets' effective fishing lifetime, when catching efficiency became lower than 1%, was 10–11 months on the rocky bottom and 8 months on the sandy bottom.



Credits: BBC

Generalities

What effects does ghost fishing gear have in society?

BIODIVERSITY AND HABITAT LOSS

Human health depends upon ecosystem products and services. Destructive overfishing techniques and fishing gear pollution debilitate the marine fauna and flora and its natural resources which leads to extinction of species and therefore the imbalance of the natural world.

REDUCED OXYGEN PRODUCTION

The microorganisms present in marine plants produce up to 80% of the oxygen on Earth. When their ecosystem is disturbed so is the oxygen level production which means that plastic pollution in the ocean can compromise the quality of the air we breathe.

COMPROMISED FOOD SECURITY

Fish is an important component of human diet particularly in small islands and coastal areas. Fisheries contribute to food security in two ways: (i) directly as a source of essential nutrients; (ii) indirectly as a source of income. With a reduced amount of fish available, reduced harvesting capacity by fishermen and stricter fishing legislations, fish might not guarantee food security in the next 40 years.

PHYSICAL DANGER FOR DIVERS AND UNDERWATER ACTIVITIES

Hooks, lines and nets are made to catch and kill marine wildlife but it's also a threat to humans. There isn't a mechanical alternative to remove ghost nets so by diving close to these traps the divers are exposing themselves to the danger.

AFFECTED HUMAN HEALTH

Ghost fishing gear releases microplastics in the marine ecosystem which affects fishes diets and directly contaminates human diets too.

ECONOMIC LOSSES

90% of the species caught in ghost nets have commercial value which undermines both overall sustainability of fisheries and people who depend on fish for food and livelihoods.

Social case study

The fishermen community

Who's the most impacted by the ghost fishing gear problem in society and what are their needs?*

Fishermen and their families are the ones directly affected by ghost fishing gear damages. They mostly complain about not getting enough support from the government and not getting subsidies.

The truth is that these subsidies perpetuate the ghost fishing gear; investing in the same type of nets is the cheapest and most practical option and that keep the system rolling. Most fishermen are aware of the problem and are open to alternatives that benefit them, their business and the ocean - but they don't know the solutions. So instead of asking what are their needs we should be asking *"How can we transform the system and make it work for fishermen in order to eradicate these necessities?".*

*Research based on in-person interviews with fishermen in Ericeira and Nazaré.

Photography: Niklas Keller

Social case study

The fishermen community

What are the main challenges fishermen community face due to the impacts of ghost fishing gear?

OVEREXPLOITATION

Fishing becomes destructive when vessels catch fish faster than natural stocks can replenish. Overfishing is directly linked to bycatch which causes the needless loss of billions of fish with commercial value.

COMPETITION AMONG FISHERMEN

The reduced amount of fish in the ocean installs an economic pressure within the fisherman community. This usually leads to competition for resources, and violation of legislations, behavior deriving from scarcity and fear in order to guarantee income and livelihood support.

NO COSTUMER TRUST

With the exposure of illegal fishing now more than ever consumers want to trust the fish they're eating and there's a big demand for transparency.

EXTRA MATERIAL COSTS

When a net is lost in the ocean that implies a huge revenue loss for fishermen too - a single "rede de trepa" is worth 80EUR and the average pay for a commercial fisherman is 5EUR an hour in Portugal.

NOT ENOUGH INCENTIVES

Beneficial subsidies ideally ensure sustainability of the stock. This could be resource management, fisheries management, science and research, or regulation enforcement. But in fact, most fisherman use their incentives for petrol and new material.

LOW PAY

Individual small-scale fishermen use smaller vessels and have a reduced harvesting capacity. When compared to large fleets they earn a lot less money which fosters inequality.

Social case study

Legislations

Regarding fishing gear, the EU 2019/904/UE Directive highlights that:
“The large percentage of plastic present in marine litter originating from discarded fishing gear, including abandoned and lost fishing gear, indicates that the legal requirements in force do not provide incentives enough to return these fishing gears to shore for collection and treatment purposes. The system of indirect fees by another Directive (EU) 2019/883 aims to remove the incentive for ships to discharge their waste at sea and ensures a right of delivery. However, this system should be complemented by other financial incentives so that fishermen can bring their fishing gear waste back to land without a possible increase in the indirect waste fee"

By recognizing also that the plastic components of fishing gear have high potential recycling, the Directive determines that Member States will have to institute by December 31, 2024, extended producer responsibility (RAP) for fishing gear and components of fishing gear that contain plastic, in order to ensure the selective collection of this waste and to cover expenses of their correct management and recycling. Under this regime, producers of fishing gear containing plastic must contribute to covering the costs of collection, transport, and subsequent treatment.

In most Member States, including Portugal, there are no specific policies for waste from fishing gear.

Pilot project

Ericeira, the fishing village in the western coast of Portugal

Photography: Pedro Mestre

Ericeira is a traditional fishing village in the western coast of Portugal and considered to be the the surfing capital of Europe. In 2011 it was declared a World Surfing Reserve by the international organisation Save the Waves Coalition. The goal of the program is to protects waves, surf zones and the surrounding environments. The renown coastline surfing conditions make locals and tourists develop an environmental awareness which opens a channel for conservation opportunities.

Why did we select Ericeira as the action point?
A) Ericeira is 40 minutes away from the capital Lisbon, which makes it a very central point.
B) Ericeira maintains its fishing village traditional character even though the increasing tourism is bringing a lot of investors and business development. The fact that it combines the ancient knowledge of nature and the tourism expansion makes it a good place for environmental initiatives.
C) The municipality is acknowledging the fragility of the ecosystem and its exposure to pollution and has created an environmental fund for conservation and education to preserve its natural form.
D) There's established local NGO's working around the problem of plastic pollution and ocean conservation in the area: ALP (Movimento Ajudem a Limpar a Praia); Clean Ocean Project; Save The Waves Coalition; Ericeira Surf Clube; GhostNetWork; Sea Shepherd Portugal; amongst other small projects.
E) There's a strong local stewardship of surfers concerned with the quality of the coastline conditions.

Pilot project
Possible solutions & collaborations*

A) DEVELOPMENT OF A NON-EXPLOITATIVE BUSINESS MODEL

Through strategy and design we'd advocate for a non-exploitative business model with a radical approach on the fishing industry. We would develop a new business model that uses fishermen's knowledge to benefit the marine ecosystem and reduce one by one fishing boats while assuring stable income for fishermen by replacing fishing activities with ocean conservation practices. E.g. to hire a crew and their boat to collect abandoned fishing nets with a team of divers and previously link the fishing gear waste with producers. This strategy would include advocacy for vegan diet, exposure of illegal fishing and the lack of regulation in "sustainable" fisheries and the aim to abolishment of all techniques that are depleting natural resources.

References
Sea Shepherd marketing strategy
Project HIU, Indonesia by Madison Stweart
https://www.projecthiu.com

B) SUSTAINABILITY TRANSITION SOLUTION

Through education, legislation and policy reinforcement we would develop a transition solution with the acknowledgment that the journey towards collective symbiosis with the planet is long and imperfect. We would promote sustainable fishing techniques and research new ways of transforming waste from fishing industry into products alongside material designers and sustainable brands already working in the topic.

References
Ancient **Maori** and **Native Hawaiian** fishing techniques
Precious Plastic https://preciousplastic.com/
Circology https://www.circology.org/
Bureo https://bureo.co/
Patagonia https://www.patagonia.com/our-footprint/netplus-recycled-fishing-nets.html

*The presented company collaborations have been contacted and interviewed.

Pilot project
Main challenges

What are the main social and economic challenges in overcoming the ghost fishing gear problem?

To address ocean conservation we have to consider how humans are connected to it. With the increasing urbanization our emotional connection to the natural world keeps decreasing and ways in which we can profit from it keep increasing. We're living an era of emotional crisis - more than 300 million people suffer with depression, which is ultimately the lack of the feeling of belonging and no sense of purpose.

The deep ocean is still unexplored territory to us so that makes it harder for us to empathize with the creatures that live in it - namely corals and fish, the ones affected by ghost fishing gear.

Alongside the practical side to the project there has to be development in:

- **ECOLOGY AND EMOTIONAL EDUCATION**
- **CONNECTION WITH HEALTH AND TIME SPENT IN NATURE**
- **STRONGER AND MORE RESILIENT COMMUNITIES**
- **INVESTMENT IN SYSTEM CHANGE STRATEGY IN BUSINESS AND CORPORATIONS**

Photography: Jürgen Westermeyer