



### NEWSLETTER 6

September 2022



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## The Role of Biodegradable Gear to Tackle Ghost Fishing – a technical challenge or an economic problem?

A market analysis carried out by the University of Portsmouth in 2021 (as part of the INdIGO project) identified that the developmental phase of biodegradable fishing gear (BFG) should initially target small-scale static gear vessels. In the Channel fisheries, this represents more than 1,000 vessels with around half of these vessels targeting shellfish with pots and others using static nets (e.g. gillnets).



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While the market analysis identified that BFG is by no means a “silver bullet” solution to marine litter, it also found that BFG is not competing with potential alternatives that are. Recycling, for example, generates a “value gap” where the value of the recyclate is less than the cost of producing it. Extended Producer Responsibility (EPR) will likely be the driver of economical recycling chains, although that will not happen overnight and nor will it eradicate the vast amount of ALDFG in global fisheries, which will continue to grow (even under EPR).

Our assessment of the role of BFG in tackling ALDFG focussed on one negative externality caused when fishing gear becomes unmanaged (i.e. lost) in the marine environment – the so called “ghost fishing”. Our focus on ghost fishing reflects the fact that it is both caused by and impacts on fishermen directly. Thus, if BFG is an economically viable option to address ghost fishing then it should be appealing to fishermen.



## IN THE NEWS

Factoring in various economic costs arising from the use of BFG, such as increased gear cost, value of lost catch to ghost fishing and fishing efficiency of BFG, as well as benefits including the potential to attain higher market prices through consumer awareness of sustainable fishing, we show the cost and challenges of BFG implementation in the Channel static gear fisheries.

We found that the cost of ghost fishing to a 'typical' <10m potter to total approx. £10,050 and £11,268 for a gillnetter (assuming a reduction to 5% fishing efficiency when gear becomes ALDFG i.e. the level of ghost fishing). The most significant issues facing BFG implementation appear to be declines in fishing efficiency, which is estimated to lead to approx. 20% less catch. This represents a potential cost of up to £8 million to the <10m static gear fleet alone. However, if BFG was a like-for-like replacement (i.e. no decline in fishing efficiency), coupled with economic benefits of reduced ghost catch, this figure could be reduced from an £8 million loss to a positive benefit. Therefore, the real task for those developing BFG is to address issues around fishing efficiency, which will require financial incentives (e.g. subsidies) for real world commercial trials. Otherwise, declines in fishermen's revenue will prohibit BFG progression.

Overall, BFG must be both technically feasible and economically viable if it is to be adopted on a commercial scale in the Channel static gear fisheries. Currently, the development of BFG is a "technical challenge" and not an "economic problem".

*Ben Drakeford, Reader in Marine Resource Economics  
Centre for Blue Governance, University of Portsmouth.*



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## Présentation de East of England Plastic Coalition (EEPC)

During its last steering committee meeting, the INdIGO project partners went to Norwich where they presented with members of the East of England Plastics Coalition. William Fitter from Eunomia presents their work.

The EEPC brings together over 25 organisations to tackle the issue of plastic pollution in the East of England. We have three working groups; Litter Reduction, unflushables and Marine Debris.

The Marine Debris Working Group aims to:

- Remove debris from marine and coastal environments;
- Promote nature recovery; and
- Establish sustainable end-of-life pathways for debris.

### Partners

Our partners in the working group include representatives from: The Wash and North Norfolk Marine Partnership, The Marine Conservation Society, The Rivers Trust, Keep Britain Tidy, The Eastern Inshore Fisheries Conservation Authority, The Norfolk Beach Cleaners Collective, Plastic Free Cromer.



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### Recent Working Group Achievements

- The WG ran a series of online workshops bringing together local government, beach-clean volunteers, conservationists, divers and fishermen, to discuss the issue of marine debris in the region, and explore repair, reuse, and recycle options. A summary report of the findings was also produced.
- The WG ran a six week pilot collection scheme, in which dedicated bins were installed at strategic points around The Wash and North Norfolk coast for the collection of marine debris and foul fishing gear by local volunteers.



## AND ALSO

The material was then recycled by Odyssey Innovation, and a future feasibility report was written and disseminated amongst EEPC partners. The future continuation of this project depends on funding opportunities that come through.

- The pilot project's completion also resulted in the EEPC secretariat being invited to speak at a conference held at the University of East Anglia, run by the INdIGO project.

### Looking Forwards

Following the reception of guest speakers from the Looe Conservation Society and Our Only World Refill Stations, the Working Group is currently:

- Looking to implement a gilly crab line recycling scheme at tourist hotspots with the installation of attractive bins designed especially for crab lines and handles. The scheme will be run by local volunteers.
- Looking to install water refill stations along the East Anglia coastline with the plastic fountain made from recycled fishing net.

### Contact

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## Sea Hives – Recreating marine ecosystems from recycled fishing nets

**The team at Plymouth University had a special guest David Francis, CEO of Sea Hives Ltd to join them to talk about his innovation which uses recycled fishing nets and foodgrade HDPE containers to enhance the marine environment.**

Established in 2017 after his diving experience in Libya and many other experiences across the world, David realised that combining hard surfaces and water flow in the sea can create new ecosystems in places which otherwise would be barren with little marine life. This led to the formation of Sea Hives, structures designed to emulate the natural environment and provide multiple habitats for fish and invertebrates to occupy and grow.

**How they work:** The flowing water brings suspended food particles to the filter feeding animals, including sponges, tunicates, barnacles and tube worms. These animals grow and spread out across solid surfaces, and in turn are encourage other animals in the area, and thereby initiate a new 'food chain'. Attaching the Sea Hives to man-made structures like jetties, piers, pontoons and decommissioned rigs can enhance the sealife and marine ecosystem in the area.



@Sea Hives

Not only do they provide great habitats for sea life, Sea Hives are designed and manufactured in the UK. The hexagonal tubes are made using moulds and production facilities in England and Wales. They are then assembled using stainless steel bands to create the 'Honeycomb' shape and then attached to the desired location using stainless steel cables.

David hopes that these will be appealing to marinas, harbour authorities and related maritime industries to increase the marine biodiversity where they operate, or compensate and mitigate for any local disturbance to the marine environment by coastal development. Sea Hives are currently in situ in Wales and Weymouth in the UK.

On top of this David is keen to look into further collaborations with scientists and industries that may be able to help in testing and trialing the Sea Hives environmental impact and monitoring the successes of different material/surface types. Plymouth University alongside Odyssey Innovation and Exeter City Council will be sending David some of the material they receive and process through the Net Regeneration Scheme to see if any of these may be suitable to incorporate into Sea Hives in the future.

**Site Internet :** <https://www.seahives.com> / **Email:** [enquires@seahives.com](mailto:enquires@seahives.com)



## AND ALSO

### Mobile Near Infrared (NIR) Spectroscopy Solutions helping to identify plastics

The University of Plymouth team working on the INdiGO project recently invested in two different NIR Spectroscopy devices in order to help identify plastic types quickly which will assist in the research into recycling fishing gear. They purchased two different models – PlasTell and trinamiX which we hope to compare in identifying plastic fishing gear in the field.

To try the equipment out, the team took it to Beach Guardian, based in Cornwall, near Padstow. Beach Guardian CIC is a Community Interest Company based in Cornwall co-founded by father and daughter duo: Rob and Emily. They have conducted and organised beach cleans over the years mainly collecting the plastics that wash up on the tide. They now conduct many activities to raise awareness of plastic pollution including educational workshops with schools and groups.

Currently Beach Guardian is set up with Odyssey Innovation to be able to send any of their recyclable beach cleaning material which often includes small bits of nets, rope as well as ALDFG for recycling.

They do reuse the majority of their beach cleaning finds for art products and educational packs however they do have the option to send any unwanted or non-reusable material to the NRS (Net Regeneration Scheme) if the item/s meet the recycling guidelines. The Beach Guardian Lab was the perfect place to test the new NIR device to identify items we could link to the industry and furthermore what these items are typically made out of.

The Plymouth team choose to take the PlastTell Device along as this is the least expensive of the two NIR devices and therefore the most likely device which other organisations could think about investing in for identification and sorting purposes.



@University of Plymouth

## AND ALSO

The device managed well with most of the 20 plastic samples we chose, only on one occasion showing us two options of what type of plastic it could be instead of a definite identification and one unknown. We will then use the other Trinamix device to test the same samples to see if they are conclusive of each other.

Beach Guardian's Andrew who joined us for this session was enthusiastic about the possibilities a device such as this would mean for the further sorting of materials at Beach Guardian and being able to recycle their materials in a way that could potentially be more helpful for recycling systems like the NRS. We will be undertaking further research into the devices taking it to Exeter City Council's facility to identify and gain more samples from the materials that are coming through the NRS scheme.

*Eve Gadd, Research assistant INdIGO at University of Plymouth.*



@University of Plymouth



## The team of psycho-ergonomists from the University of Southern Brittany

Tabatha Thiebaut-Rizzoni, Julie Lassalle and Laurent Guillet, researchers in psycho-ergonomics within the FHOOX team of the LAB-STICC (Lorient), have been involved in the INDIGO project since its inception. Their objective: design for sustainable development!



*Julie Lassalle et Laurent Guillet et Tabatha Thiebaut-Rizzoni.*

This research team studies the acceptability of the biodegradable fishing net (what can favour or slow down its future adoption).

The aim is to gain a detailed understanding of the fishing profession, the relationship of fishermen to this new tool and, more generally, to the ecological transition. To analyse the fishing activity, the perceptions, beliefs and attitudes of fishermen towards a biodegradable

net, the team carried out observations on the boats, interviews and questionnaires.

This data collection and analysis work led to the identification of the various constraints of the trade (temporal, organisational, financial, regulatory, etc.) and the actual uses of fishing nets (actions on the net, effects of these actions on its wear, etc.). These studies have made it possible to characterise the key criteria for the design of the future biodegradable net (performance characteristics such as the durability of the thread, its resistance, the fishing capacity of the net) and to favour its adoption process (need for social support, experimentation of the new net, subsidies, creation of a dedicated label).

In the framework of the INDIGO project, ergonomics was able to express its full potential. Indeed, this discipline aims to design or transform situations and environments to adapt them to the needs of activities and to support the mutations and developments of individuals within these activities. In a co-design approach with the fishermen, the psycho-ergonomic research resulted in recommendations to guide the design of the innovative net. The results obtained can also be useful for enriching training offers (improvement of de-meshing procedures for example) and prevention solutions to improve health and well-being at work in the field of net fishing.

## Laurent B  lard (R&D manager) and Pauline Moreau (project manager) at NaturePlast



*Laurent B  lard, NaturePlast.*

Laurent participated in building the INdIGO project in 2019. He has a degree in Materials Engineering (EEIGM in Nancy) and a PhD in Materials Chemistry (University of Reims Champagne-Ardenne). He has worked as a R&D manager in NaturePlast since 2011. His job is to develop, with the technical team, biobased and/or biodegradable plastics with improved properties to enter new markets. It is no secret that numerous plastic wastes created by human activities find their way, ultimately, in our oceans and generate a catastrophic pollution. It is more than urgent to reduce this environmental impact. INdIGO is focused on this point, and deals on one hand with a complex technical challenge (developing a biodegradable item in an unfavorable environment) and on the other with proposing a part of a solution to a major environmental issue.

Pauline joined the INdIGO project in 2020, during the kick-off meeting in Lorient. She has a degree in Material science and engineering (INSA Lyon). She joined NaturePlast in 2019. Within INdIGO project, her job is to manage with UBS the activities of formulation of materials for the new fishing gears: selection of polymers and additives, production of granules for the various tests (prototyping, mechanical properties, biodegradation, toxicity, etc). She is thrilled to participate in INdIGO, which combines a major technical challenge (developing materials that are both resistant and biodegradable) and an actual reflection on end-of-life alternatives (organisational, technical and environmental aspects).



*Pauline Moreau, NaturePlast.*



## CEFAS hosted the 6th Steering Committee Meeting of the INdIGO project on 14 and 15 June in Norwich.

On the first day, the partners met at the University of East Anglia. There were presentations from external speakers: Dr Andrew Mayes, Associate Professor in the School of Chemistry at the University of East Anglia, Eunomia for the East of England Plastic Coalition, Edmund Cole from Seabed Scour Control Systems Ltd.



*Presentation of CEFAS.*

On the 2nd day, the partnership visited the CEFAS laboratories and were briefed on the SmartBuoys which played an important role in the INdIGO project as they allowed the materials developed to be immersed in the sea to test the production of microplastics.

The partners then took part in a beach clean where a lot of waste was collected.

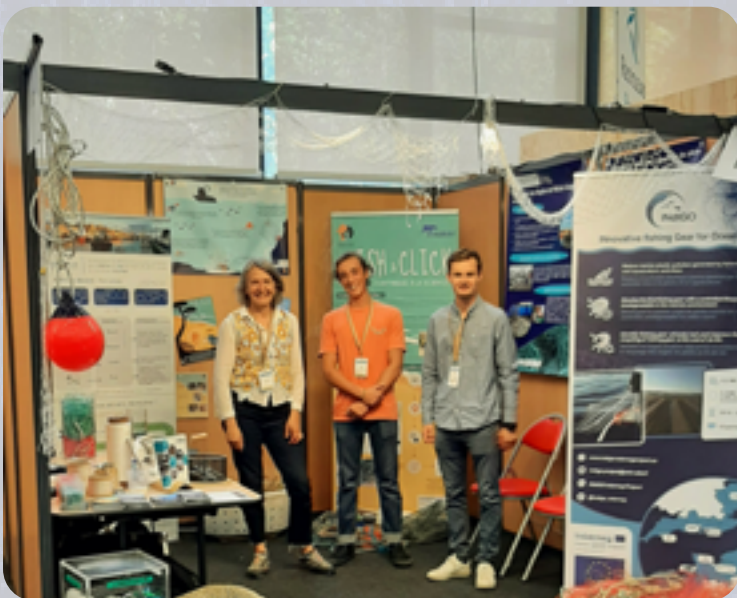


*Beach clean in Lowestoft, in front of the CEFAS premises.*



## INdIGO's presence at events and conferences.

INdIGO's partners have participated in many events in recent months. Here is a brief overview in pictures.



SMEI, UBS, Ifremer and IRMA participated in «Plastiques, changement de cap» in Brest.



LAB-STIC at the SELF conference in Geneva.



The University of Plymouth at SAIL GP.



The University of Plymouth at Green Tech Boat Show.





## What is biodegradable fishing gear in the marine environment ?

Discover the new animated video presenting the INdIGO project.



This video presents one of the main aspects of the INdIGO project: the production of prototype of biodegradable fishing gear in the marine environment.

It will soon be available on the INdIGO project's Youtube channel.

A second video presenting the results of the fishermen's survey will be available soon.

Follow our Youtube channel: [https://www.youtube.com/channel/UCZbeTSkIEFi\\_q2m6DgwMPVg](https://www.youtube.com/channel/UCZbeTSkIEFi_q2m6DgwMPVg)

## Successful trials at partner Filt



In July, the partners CompositIC and NaturePlast were able to test the multifilament produced in the framework of INdIGO.

The objective was to evaluate the processability of biodegradable materials to produce mussel nets.

The partners involved are the CompositIC technical platform, NaturePlast and Filt.



## UPCOMING EVENTS

### Plymouth Seafood Festival 17th & 18th September



INdiGO displaying their work alongside partners Odyssey Innovation.

<https://www.visitplymouth.co.uk/whats-on/major-events/plymouth-seafood-festival>

### 28th September Falmouth Marine School Industry Day

INdiGO invited to talk to students who are going into a career in the marine area.

### Clearing Away the Ghosts - A circular economy for fishing

INdiGO talking with Sussex Wildlife Trust for Shoreham Sustainability Week 29th September on Clearing away the Ghosts: A circular economy for fishing.

<https://www.eventbrite.co.uk/e/clearing-away-the-ghosts-a-circular-economy-for-fishing-tickets-412922531407?aff=odcleoeventsinc>

### Voyage of Discovery

1st October – Voyage of Discovery @ Plymouth Guildhall - INdiGO w. Precious Plastics Plymouth – Workshop

<https://www.eventbrite.co.uk/e/voyage-of-discovery-tickets-395730098377>



Please encourage your colleagues and contacts to join the INdIGO Interest Group to be kept up to date with the project, its events and activities and research.

→ [Register to the newsletter](#)

### CONTACT

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