

Interreg



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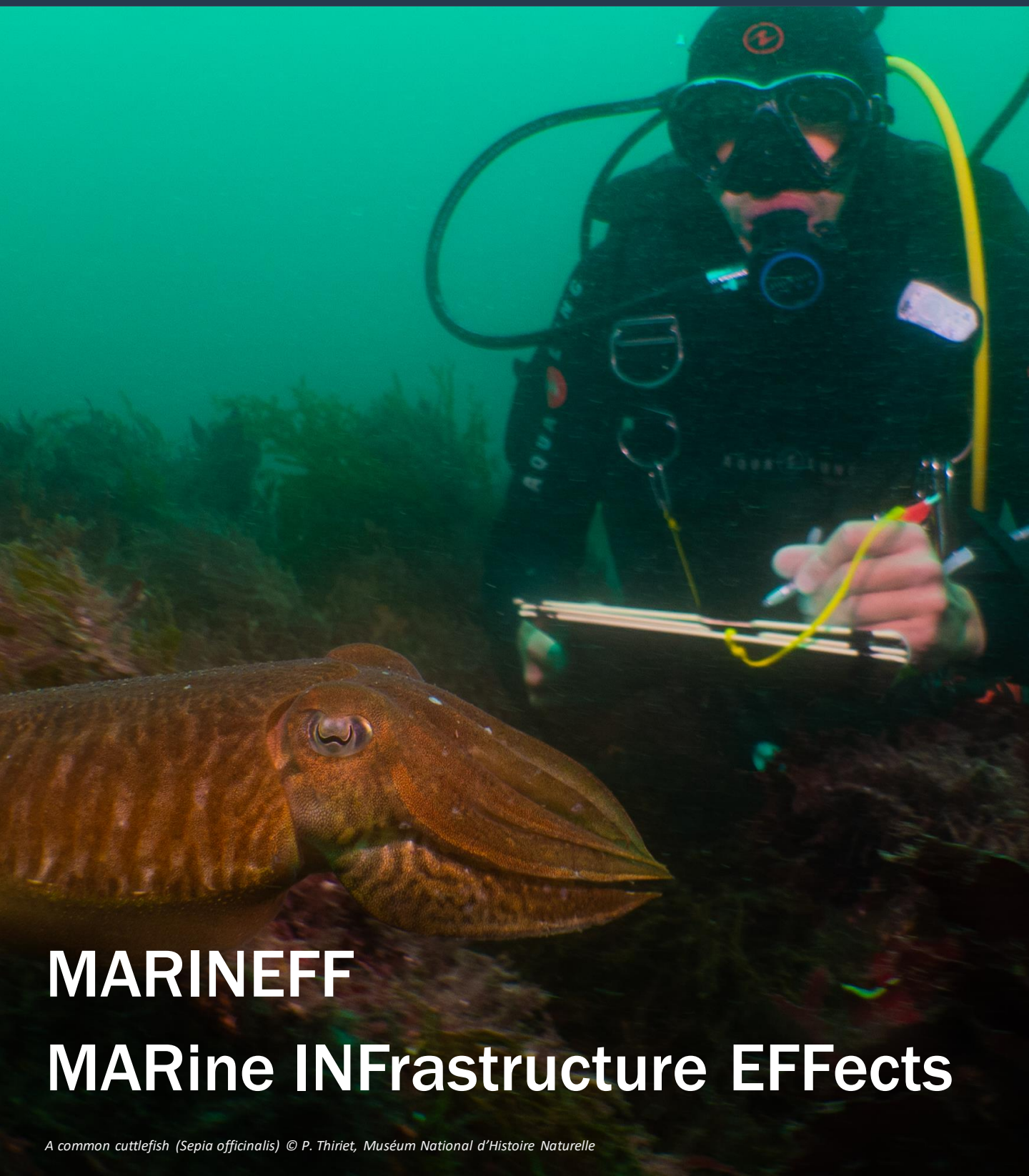
Fonds Européen de Développement Régional



MARINEFF
infrastructures maritimes biomimétiques



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MARINEFF

MARine INFrastructure EFFects

How to get involved

If you are interested in keeping up to date with all current project activities, you can subscribe to mailings, follow us on [Facebook](#), [Twitter](#), or [LinkedIn](#) or visit the news section of the website.

Lead for the Marineff project oyster restoration at University of Southampton

Dr Ken Collins: kjc@noc.soton.ac.uk

Research assistant for the Marineff project at Bournemouth University

Jess Bone: jbone@bournemouth.ac.uk

Lead administrator for the Marineff project at ESITC Caen

Matthieu Dufeu: matthieu.dufeu@esitc-caen.fr

Scientific lead for the Marineff project at ESITC Caen

Nassim Sebaibi: nassim.sebaibi@esitc-caen.fr

Project manager for the Marineff project at ESITC Caen

Mohamed Boutouil: mohamed.boutouil@esitc-caen.fr

Mailings sign-up

To sign-up to future Marineff mailings, including this quarterly newsletter, click [here](#).

Please note, upon sending an email to this address, you will be automatically signed up to the Marineff mailing list and included in future newsletter communications. Information on how your data is handled can be found at:

www.ciria.org/marineff

To unsubscribe from mailings, please click [here](#) and enter your email. If you are subscribed, this will remove you from the database.



Further information

To find out more about the Marineff project, go to:

<http://marineff-project.eu/>

In a nutshell

Welcome to the ninth edition of the Marineff project's dedicated newsletter. It feels as though the project has recently picked up momentum, not least because of the exciting things we are finding out about our Marineff eco-engineered modules. With fieldwork season well upon us, we are busy diving and coming face to face with the marine life that are now calling our oyster prisms, breakwater blocks and boat moorings home.

In this edition, we share some exciting news from the breakwater blocks, involving the industrious and colourful corkwing wrasse fish. We share more about the citizen science opportunities for diving clubs local to the Marineff boat moorings. Our spotlight feature focuses on the use of temperature data loggers with the artificial rockpools and how this supports our research question about their potential 'halo' effect. You can also learn about project partner University of Southampton in our partner profile.

We highlight some recent publications, including recent work by the Marineff team, as well as sharing some events of interest. And finally, we share some good news from project partners VINCI Maritime et Fluvial.

IMPORTANT UPDATE: Due to continuing uncertainty about COVID-19 travel restrictions, the international Marineff conference has been postponed until early 2022. Registrations and successful abstract submissions remain valid.



A sea snail in a Marineff artificial rockpool (*Steromphala umbilicalis*) © Jess Bone

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Diving on the breakwater modules reveals exciting discovery...

The team at the University of Caen have been very busy diving on the breakwater modules that were deployed on the seabed at Cherbourg and Bernieres sur Mer in France to record the marine life now calling these modules 'home'. We are very excited to share that one particular species has also decided to call the breakwater modules 'nursery'! A male corkwing wrasse fish (*Symphodus melops*) was observed nesting in one of the gutters of an experimental breakwater module (the breakwater module with the eco-engineering features). In the middle of the gutter is a metal loop, originally fitted to aid the manoeuvrability of the module, which

provided an excellent anchor point for the wrasse's nesting material. Corkwing wrasses use seaweed to provide a comfortable nest for their developing eggs. Male corkwing wrasses build the nests for a small hareem of females who remain nearby. Once a female is satisfied by quality of the nest, she will lay her unfertilised eggs and the male moves in to fertilise them. The diving team were not only lucky enough to witness the diligent male collecting nesting material, but were on hand with a camera to record a short video of the mating process taking place. [You can watch it here!](#)

Top left: Seaweed stuffed into the breakwater module gutter forming the wrasse nest. Top right: the large colourful corkwing wrasse male (right) and a smaller female (left). Bottom: the male moves in to fertilise eggs laid by a female.



Breakwater modules in the intertidal zone

In September 2020, 12 breakwater blocks (6 plain and 6 experimental) were installed on the shore in Cherbourg, France, next to a seawall. This installation is important to see how well these Marineff modules become colonised by marine life in the intertidal zone, in addition to their subtidal deployments at Cherbourg Harbour and Bernieres sur Mer.



Top: a plain breakwater module (left) covered in green seaweed and an experimental breakwater module covered in a variety of green and red seaweeds. Bottom: the breakwater modules on the shore at Cherbourg Harbour, France. Inset: the concrete cylinders for durability testing.

Already it is possible to see how the rougher, complex design of the experimental breakwater modules are better colonised than the plain breakwater modules. The experimental breakwater modules have more species of seaweed growing on them, as well as providing sheltered areas for grazing sea snails and limpets.

Alongside the intertidal breakwater modules, concrete cylinders made of the same concrete formula as the breakwater modules were secured on the shore.



Concrete in the intertidal environment experiences different temperature and humidity conditions to concrete in the subtidal environment, which can affect the concrete's performance as a material. These cylinders will be removed at a later date and tests will be run to determine how strong the concrete is after being exposed to intertidal conditions.

French National Museum of Natural History recruits recreational divers for community science

Project partner Muséum National d'Histoire Naturelle (MNHN) has set up two monitoring protocols for recreational divers to survey the marine life using the boat mooring modules deployed at three sites off the north coast of France. The Sentinelle protocol is accessible for all divers, easy to use and divers can submit their data and photos on an [online platform](#). The Ambassadeur protocol is limited to a smaller group who gather comprehensive, scientific data using a more in-depth survey method that requires training. You can follow the latest dive on the boat moorings with the Ambassadeur diving group [here](#)!

Top and middle: Divers collect data on the marine life of the surrounding natural reefs. Bottom: A diver takes a closer look at what might be living in the boat mooring module.





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The oyster prisms ten months after immersion in the Solent

The oyster prisms were installed in September 2020 and have colonised rapidly, as these images taken by a remotely operated vehicle show (ROV – Deep Trekker). It is still too early to detect any new settlement by native oysters (*Ostrea edulis*). The oyster prism design was based on the University of Southampton's experience in India so it is interesting to compare these latest photos with shoals of bass and pollack in the green, murky Solent with the clear blue tropical waters of the Keralan coast! The surfaces of the oyster prisms are covered in barnacles, which in turn have been covered by sea squirts and ascidians, especially on the sheltered, inner surfaces of the prisms.

Top and middle top: Shoals of fish investigate the oyster prisms. Middle bottom: Barnacles encrust the surface of the oyster prisms with sea squirts growing on the underside. A velvet swimming crab (*Necora puber*) can be seen hiding at the top of the prism. Bottom: the inspiration behind the Marineff oyster prisms, the artificial reefs off the Keralan coast.

University of Southampton

in focus

UNIVERSITY OF
Southampton

Within the School of Ocean and Earth Science (SOES) at the University of Southampton, the Marine Biology and Ecology group comprises more than 60 researchers and postgraduate students who apply state-of-the-art observational, experimental and analytical techniques to address questions surrounding the consequences of natural environmental change

and human activities on marine organisms and ecosystems, that are fundamental for socio-economic human well-being.

The University of Southampton is one of three UK-based partners at the Marineff project, and are responsible the deployment and monitoring of all 26 oyster prism modules in the Solent, UK.




Left: Professor Chris Hauton, Professor of Marine Ecophysiology, a marine ecophysiologicalist with expertise in assessing how natural and anthropogenic drivers impact the ecophysiology and immunology of marine invertebrates. Right: Dr Antony Jensen, Associate Professor in Marine Ecology, specialising in inshore fisheries, especially lobster, crab, clam and oyster; inshore aquaculture for oyster and mussels; Impact of fisheries and aquaculture on benthic infauna; artificial reef ecology and fisheries; epifaunal ecology.



Dr Ken Collins, Emeritus Fellow leading the University of Southampton Marineff oyster prism project team, specialising in coastal ecology: GIS habitat mapping, seagrass, calcareous algae, biogenic reefs and artificial reefs for fishery enhancement, environmental evaluation of marine construction materials.



Jenny Mallinson, retired SOES research aquarium manager, visiting researcher and leading the group's identification of colonising marine organisms on natural and artificial habitats. Special interest in UK and Galapagos marine invasive species.



Reading list for summer 2021

The first paper we want to share with you is a Marineff paper by Vivier *et al.* entitled “Marine artificial reefs, a meta-analysis of their designs, objectives and effectiveness”. Authors analysed over 120 papers to conclude that artificial reefs involved in fisheries projects were the most efficient at reaching their objectives but artificial reef monitoring should include a variety of methods to fully understand the ecological impact of the structures on the local environment. Well worth a read! [Take a look here.](#)

DOI: 10.1016/j.gecco.2021.e01538

Another Marineff paper from Georges *et al.* entitled “The study of long-term durability and bio-colonization of concrete in marine environment”. This paper shares the Marineff project’s research into the concrete formulas optimised for marine life by varying the type of cement and the addition of oyster shell aggregate, as well as comparing their mechanical strength and chloride ion penetration. [Read more here.](#)

DOI: 10.1016/j.indic.2021.100120

We’re thrilled to share some research from our Interreg friends over at the Ecostructure project, by Lawrence *et al.* entitled “Artificial shorelines lack natural structural complexity across scales”. From a scale of 1mm to tens of metres, the team at Ecostructure demonstrate seawalls lack complexity compared to natural shores by up to 40% across all scales, with results for other artificial structures varying depending on the scale. [Read more here.](#)


DOI: 10.1098/rspb.2021.0329

And finally, another paper from our Ecostructure friends, Salauddin *et al.*, entitled “Eco-engineering of seawalls – an opportunity for enhanced climate resilience from increased topographic complexity”. Results showed that enhancing complexity on seawalls reduces overtopping using physical modelling. [Learn more here.](#)

DOI: 10.3389/fmars.2021.674630



The VINCI Environment Prize for the Normandy region awarded Marineff project partners TPC the “Jury’s Favourite Prize” for their work on the Marineff project!



Dates for your diary



6th – 9th September 2021

ECSA 58 EMECS 13 conference -
Estuaries and coastal seas in the
Anthropocene



Early 2022

Marineff International Conference