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Manche) England



MARINEFF
infrastructures maritimes biomimétiques



Fonds Européen de Développement Régional

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MARINEFF

MARine INFrastructure EFFects

Montagu's Blenny, (*Coryphoblennius galerita*) © Jess Bone, Bournemouth University

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.

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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/>

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In a nutshell

Welcome to the eighth edition of the Marineff project's dedicated newsletter. Spring is finally upon us and we are looking forward to seeing how the changing seasons will affect the project's eco-engineering modules.

In this newsletter, we share more photos of the first few species to colonise the breakwater and boat mooring modules in France. We also reveal some early results for the artificial rockpools in the UK. Our spotlight feature, gives our readers the opportunity to learn about stable isotope analysis, how it works and why the University of Caen are using it for the Marineff project. You can also learn about project partner Ports de Normandie in our partner profile. And finally we highlight some recent publications of interest that we hope you will enjoy, as well as sharing some key conference dates coming up later this year. We also welcome new post-doctoral researcher Bastien Taormina to the University of Caen Marineff team!

The Marineff webinar recording is now online

Back in December, we hosted a live webinar all about the Marineff project and its current progress. For those who missed it, it can now be found on [YouTube here](#).



The artificial rockpools in the UK six months later...



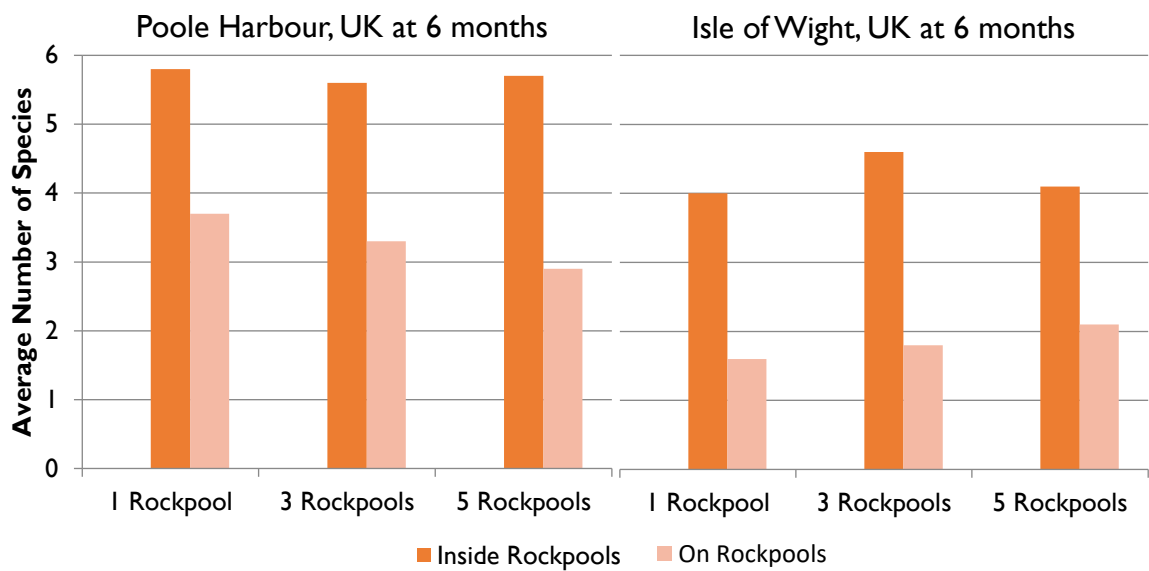
A group of five artificial rockpools at Poole Harbour freshly installed (top) in July 2020 and after six months of colonisation (bottom) in January 2021.

At the time of writing, it has been over 6 months since the installation of the artificial rockpools in Poole Harbour and on the Isle of Wight, UK, in the summer of 2020. At each site are five groups of five rockpools, five groups of three rockpools and five single rockpools. The aim of this is to determine the optimal number and arrangement of rockpools to maximise biodiversity, in order

to better advise coastal practitioners. Bournemouth University are also monitoring marine life on the seawalls to compare abundance and biodiversity with what grows on and in the rockpools which will help to determine exactly how much value the rockpools bring to artificial coastal structures.

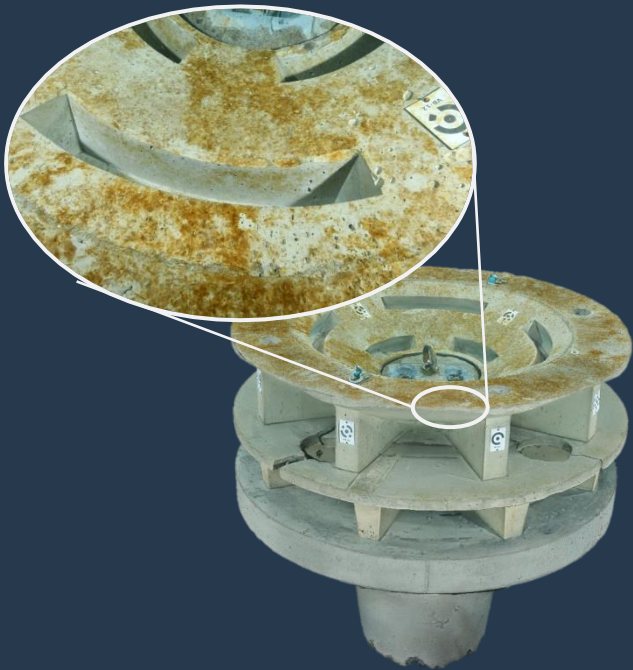
So far, a whopping total of 22 species and 37 species have been recorded on and in the rockpools at our Isle of Wight and Poole Harbour sites respectively. This includes a Montagu’s blenny (*Coryphoblennius galerita* – pictured on front page), which is a rockpool specialist and a new fish record for Poole Harbour! The difference in the number of species found so far between the sites shows why its important to replicate eco-engineering experiments at different locations subject to different environmental conditions.

Following 6 months deployment, the average number of species in the rockpools is higher than the average number of species on the outside of the rockpool. This difference is likely because the pool of seawater prevents marine life from drying out and so more species will be found in the rockpools. In the bar charts below, this pattern is similar between both UK sites and there is little difference between the average number of species between 1 rockpool, 3 rockpools and 5 rockpools at this stage.

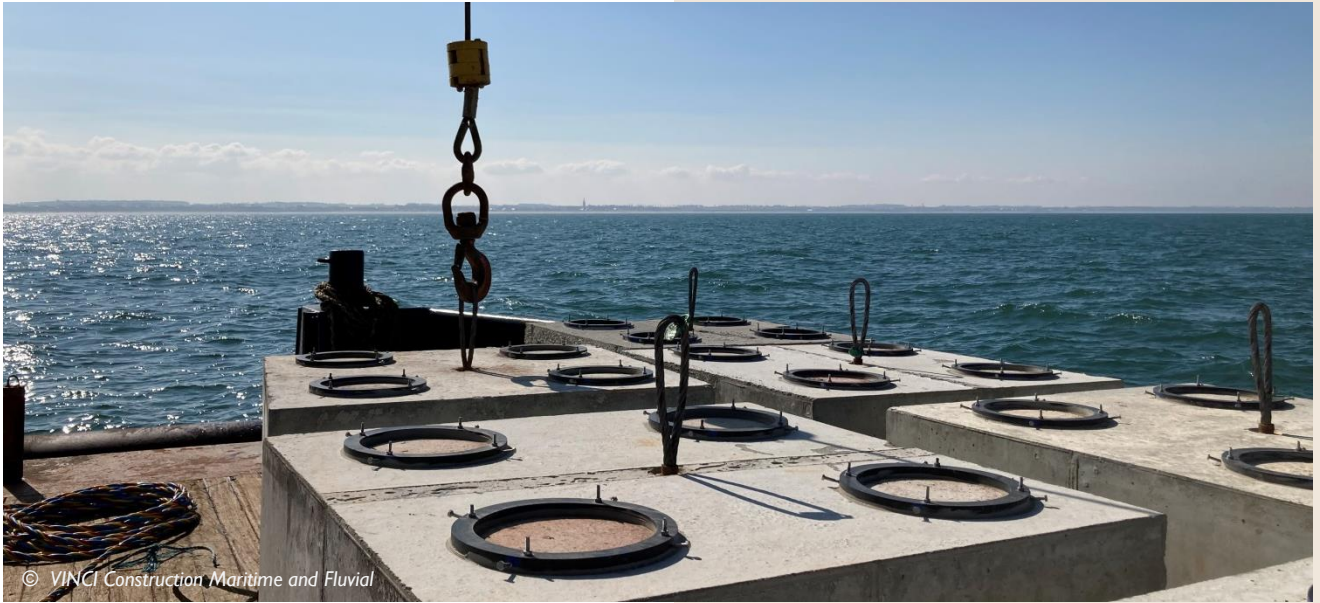


Early growth of biofilms on the boat mooring modules

Dives on the boat mooring modules in late January 2021, by project partner Muséum National d’Histoire Naturelle, revealed some early biofilm growth. Biofilms can be formed from a variety of microorganisms, including algae, bacteria and diatoms. Biofilm formation will encourage the settlement and colonisation of other marine organisms on the boat mooring modules. Its growth is greatest on the top of the boat moorings as that area receives the most sunlight.



Right: A close up of the biofilm growth on the top of a boat mooring module.



Final immersion of breakwater modules in France

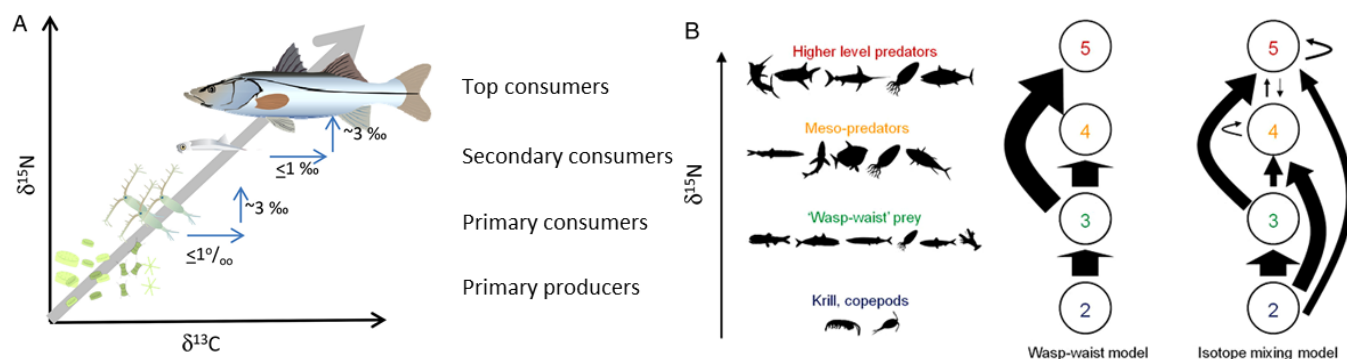
The final breakwater modules were submerged at Bernières-sur-Mer, France, on March 9th 2021. Project partner VINCI were responsible for their successful deployment. The colonisation of the breakwater modules will be compared to plain blocks (bottom left image) to see how much extra biodiversity the rough surface textures and holes and tunnels will create. University of Caen will monitor these modules over the course of the project with quarterly dives.

Top: the breakwater modules awaiting deployment. Middle: the textured (left) and plain (right) breakwater modules being deployed. Bottom: a plain module awaiting deployment.

Marineff Project spotlight on...

Stable Isotope Analysis

you are what you eat



Left (A): Classic food web relationships based on $\delta^{13}\text{C}$ and $\delta^{15}\text{N}$. Right (B): A schematic showing different trophic levels of the California Current system, the expected proportional prey inputs and the actual proportional prey to various trophic groups based on isotopic measurements. (B) reproduced from Madigan et al. (2012) under a creative commons license. Adapted from Glibert et al. (2018), DOI: (10.1002/lno.11087)

In our second Marineff spotlight feature, we share more about stable isotope analysis and why this technique is useful for the Marineff project.

Stable isotopes have helped uncover the origin of organic matter, whether alive or not, in animals or plants. It is used in archaeology to determine the diets of the first human populations and in ecology to study migratory routes, trophic levels, and the geographic origin of animals. Trophic levels (relative to nutrition) refer to the rank that organisms occupy in a food chain. For a given rank, organisms share the same source of nutrition in their ecosystem. Stable isotopes have revolutionised how researchers study nutritional resources and trophic interactions between organisms in ecosystems from primary producers (such as seaweeds), to primary consumers (grazers such as snails, filter feeders like mussels), omnivores, predators and finally to top predators. Isotopes allow us to build robust food webs, and not just simple food chains, which consider the

dietary interactions between various trophic levels.

Most elements, such as carbon or oxygen, exist in two or more forms, known as isotopes. Isotopes have the same number of protons but differ in their number of neutrons, resulting in different masses. For example, the most abundant form of carbon (around 99%) has a nucleus consisting of 6 protons and 6 neutrons (^{12}C) and 1% has a nucleus constituted with 6 protons and 7 neutrons (^{13}C). This variation in the relative abundance of stable isotopes cause the isotopes to act differently in chemical reactions and physical processes. Different environments are often characterized by predictable isotopic signatures. Carbon and nitrogen isotopes are used to study trophic interactions.

For the Marineff project, stable isotope analysis is used to identify if the seaweeds and small invertebrates that grow and live on the breakwater modules will become food sources for other trophic levels and how these interactions occur in the food web.

Ports de Normandie in focus



Ports de Normandie is a community bringing together the Normandy Region, the departments of Calvados, Manche and Seine Maritime, and the agglomerations of Caen la Mer, Cotentin and Dieppe Maritime in the development of the Normandy economy. The role of "Ports of Normandy" is to manage and develop the port area, to guarantee the safety of nautical access and to define a sustainable development policy for the three Norman ports of Caen - Ouistreham, Cherbourg and Dieppe.

Ports de Normandie represents 6,000 direct and indirect jobs, €410 million invested in Normandy between 2007 and 2020, 100ha dedicated to Renewable Marine Energies, more than 2 million cross-Channel passengers per year, nearly 7 million tonnes of goods a year, 3,200 pleasure moorings, a dry harbour and 33,600 overnight stays per year.

Today, maritime infrastructures (dykes, jetties, quays, groynes, anchorages, etc.) are not designed and built

to specifically allow the development of maritime biodiversity. Ports de Normandie aims to develop marine infrastructure improving the ecological condition of port and coastal waters. Ports de Normandie, which had already participated in the RECIF project, wished to deepen the approach within the framework of the MARINEFF project. Its role within the project is to provide feedback for the eco-engineering modules from the point of view of the civil engineering of port structures. It provides experimental facilities in the ports of Cherbourg and Ouistreham and disseminates information on the project and its results to its partners; authorities, local communities and professionals.

Below: An aerial view of Cherbourg Harbour

Left to right: Bertrand Marsset, Deputy Director and Director of Planning and Environment; Edouard Dufay, Operations Manager; Anne Maillard, Head of Communication; Frederick Thomas, Operations Manager; Philippe Hubert, Environmental Manager.



Reading list for spring 2021

Hot off the press is a paper in *Ecological Engineering* by Marine Potet et al. which determines the ideal concrete mix as a substrate for the European flat oyster (*Ostrea edulis*). The oyster larvae preferentially settled on rougher, rock-like textures than flat, exposed areas. These findings will be important in the European-wide efforts to conserve this species and restore its habitat. [Read more here.](#)

Another recent paper of interest is by Alice E. Hall et al. in *Marine Biology* which compared the temporal and spatial variation in mobile fauna associated with natural and artificial coastal habitats. By using baited remote underwater video, it was found that more fish were associated with artificial structures in spring and early summer but this pattern reversed come mid-summer, where more fish were found on

natural reefs. [Read more here.](#)

Newly published in *Marine Environmental Research* by Veronica Farrugia Drakard et al. which compared the growth and abundance of the seaweed bladder wrack (*Fucus vesiculosus*) on natural vs. artificial shores. Abundance and growth of bladder wrack did not vary between natural and artificial shores but the wrack was found to be dislodged more frequently from artificial structures. [Read more here.](#)

And finally, a global assessment of the extent of existing and projected marine construction was produced by Ana B. Bugnot et al. in *Nature Sustainability*. It was estimated that the footprint of built structures worldwide covers 32,000km² and anticipated to reach almost 40,000km² by 2028. [Read more here.](#)

Welcome to the Marineff team, Bastien Taormina!



Bastien Taormina started a one-year postdoc at the University of Caen within the MARINEFF project in March 2021. The aim of his postdoc is to i) make a synthesis of existing ecological indicators that aim to evaluate the environmental impacts of artificial structures, ii) develop an adapted performance indicator based on this synthesis, and iii) apply it to some artificial structures laid down by MARINEFF in Cherbourg harbour.

Dates for your diary



17th – 18th June 2021

[Structures in the Marine
Environment conference \(SIME\) 2021](#)



6th – 9th September 2021

[ECSA 58 EMECS 13 conference -
Estuaries and coastal seas in the
Anthropocene](#)



14th – 16th September 2021

[Marineff conference](#)

FROM MATERIALS AND INFRASTRUCTURES TO MARINE ECOSYSTEMS:
INTERACTIONS AND NEW APPROACHES

MARINEFF
MARine INfrastructures EFFects



BULLETIN #1

September, 14th to 16th 2021

ESITC Caen
1 rue Pierre et Marie Curie
14610 EPRON
Normandie, FRANCE



INVITATION

ESITC Caen, lead of the European Project MARINEFF, and its partners invite you to participate in the Marineff International Conference, being held in Caen (Normandy, France) from 14th to 16th September 2021.

This conference, as a part of the MARINEFF project, will gather researchers, representatives from industry and other stakeholders to highlight research and case studies about the ecological maritime infrastructures, from construction materials, design to marine biodiversity.

The MARINEFF project

The MARINEFF project was selected under the European cross-Broder Cooperation Programme INTERREG V/A between France (Channel) England, co-funded by the ERDF. It brings together 9 French and British partners.

The Marineff project's goal is to enhance and protect coastal and transitional water ecosystems in cross-roder Channel regions. The project aim is to realise new biomimetic infrastructures to improve the initial ecological status of water, by at least 15%.

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FROM MATERIALS AND INFRASTRUCTURES TO MARINE ECOSYSTEMS: INTERACTIONS AND NEW APPROACHES

TOPICS

Abstracts and paper proposals are invited in the following topics:

1. Marine infrastructures (incl. artificial reefs) eco-engineering and nature-based solutions: ecological design, engineering and technology
2. Impacts of marine infrastructures on biodiversity and coastal functioning - Monitoring strategies and protocols
3. Interactions (physical, mechanical, chemical and biological) between materials (concrete, steel, wood, composite...) and the marine environment and biodiversity
4. Stakeholders engagement and collaborative approaches with respect to coastal environment and economy
5. Case studies and pilots

Conference format: oral presentations, poster sessions and external lecturers.

The conference languages will be in French and English.

Abstract, paper submission and registration: [Scienceconf.org](https://scienceconf.org).

ORGANIZING COMMITTEE

- BOUTOUIL Mohamed (chairman)
- LEBRUN Jérôme
- DUFEU Matthieu
- SEBAIBI Nassim
- BOURGUIBA Amel
- GEORGES Marine
- LEPAGE Mathieu
- GERAULT Aurélie
- EL MENDILI Yassine
- COUBE Marie-Caroline

Scientific committee

- | | |
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| BERTRON Alexandra (FR) | HERBERT Roger (UK) |
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| EL MENDILI Yassine (FR) | WILLEMY Charles (FR) |
| FABIEN Aurélie (FR) | YSNEL Frédéric (FR) |
| FEUNTEUN Eric (FR) | to be continued... |

Registration fees

Before April 30th, 2021:

Full registration 400 euros
Students 200 euros

After May 1st, 2021:

Full registration 500 euros
Students 300 euros

Registrations close the July 31st, 2021.

If the organizing committee is unable to host the participants, the conference will be held online.

For more informations

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NEW IMPORTANT DATES

- Deadline abstract submission: Feb 28th, 2021
- Notification of acceptance: Mar 15th, 2021
- Deadline submission of full paper: Apr 30th, 2021

Venue

