Project Björkskär

NEMO UNDER
Seafarms
UNDER YTAN

PROJECT BJÖRKSKÄR

ANNUAL REPORT

2023

THE JOURNEY TO INCREASED BIODIVERSITY HAS BEGUN!

FOREWORD

The idea of combining offshore wind power with seaweed, algae and mussel farming is not new. But deliberately including increased biodiversity in the mix is the extra step that we, OX2, Under Ytan and Nemo Seafarms, have had as a common goal from the start. If it is to be done, it must be done well and with maximum positive impact on our marine environments. Through practical applications, we increase biodiversity, reduce eutrophication, create tasty local food from algae, seaweed and mussels for people, fish and animals, and build nature-enhancing services and knowledge. We do this publicly in our own way through "event-based research".

We have started our journey. We have had challenges, we have gained knowledge, we have designed reefs, foundation pilots, propagation labs, mussel rigs and seaweed rigs, we have had events, we have made new discoveries, we have documented and presented. Last but not least, we have eaten and drunk algae in many different forms.

The year has been very good. We have achieved the goals we wanted. The fact that we already have nearly 50 pilots in various forms in the water shows progress. These 50 pilots will serve as our references for the future. We will learn more from them as we further develop our designs, prototypes and test new models for the coming years.

With 2023 behind us, we humbly and expectantly look forward to 2024, the year of scale-up and implementation!

Joel Lindholm Lotta Nummelin

”No person dives without opening their eyes.”

- Tove Jansson

”Did you know that what is commonly known as an algal bloom is a mixture of cyanobacteria and microalgae. We mainly work with macroalgae at Björkskär, which we refer to as algae and seaweed.”

- Lotta, Magnus & Joel

HIGHLIGHTS 2023

1

THE MUSSELS ATTACH

"At the beginning of June, preparations began. Blue mussels start to reproduce when the water temperature is between 10-14 degrees Celsius. When the larvae started to attach, everything was in place. The blue mussel pilots consist of two different net sails, two "octopuses", a multi-armed prototype with different ropes, a net tube model and two water column reefs. Some placed in Brändö and some placed on Björkskär. In August we could start to see positive results. Blue mussels attached to all pilots. We had even got cockles on the majority of them." - **Joel, Under Ytan**

2

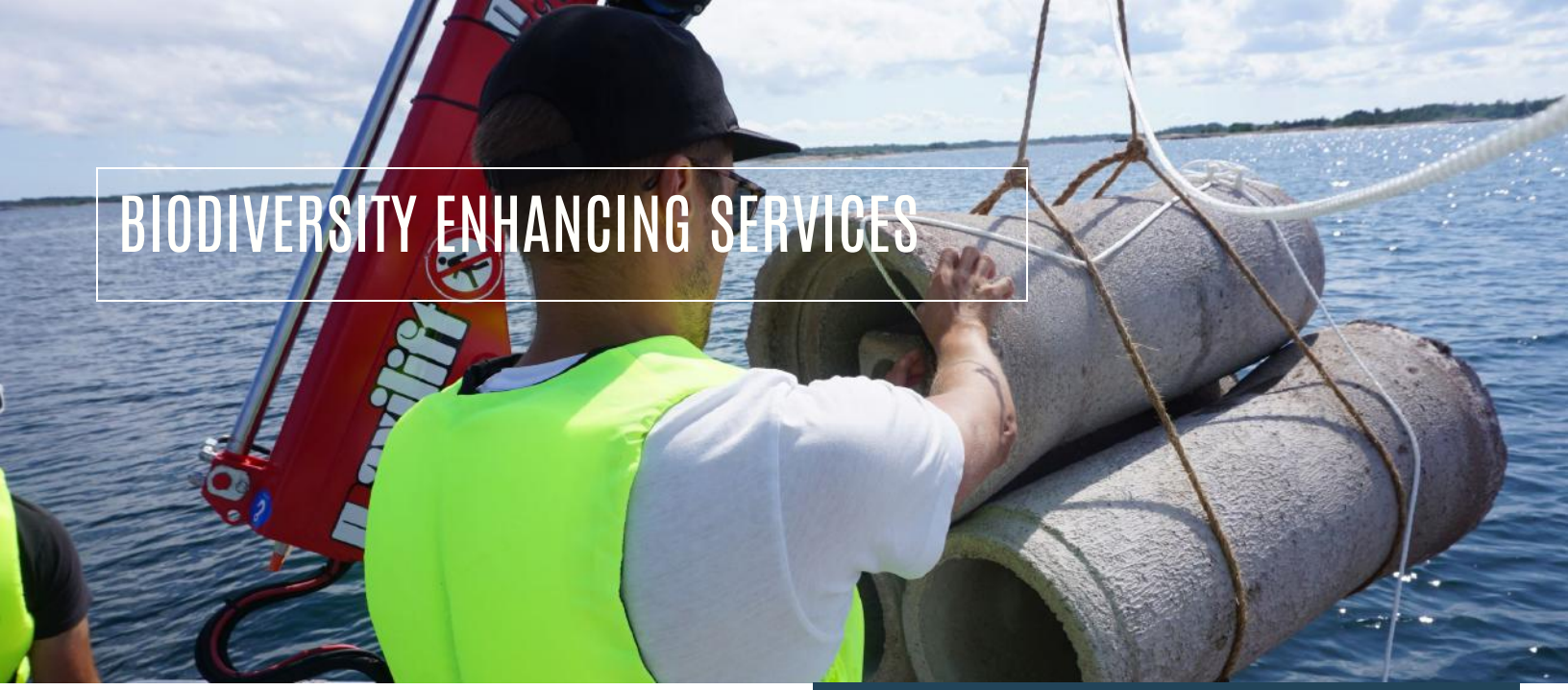
THE VISITS HAVE BEEN CONSECUTIVE

"Ålandsbanken, Nya Åland, Ålandstidningen, OX2's management team, Nylands Fiskare and others have visited us during the past year. They have taken part in our Björkskär tour and tasted algae in both food and drink. We have shared knowledge on how to work practically and agile with event-based research to strengthen marine biodiversity in offshore wind farms. Curious and fascinated would be the best way to describe the reactions of our visitors." - **Lotta, OX2**

3

FOUNDATION TESTS, CHALLENGE BRINGS KNOWLEDGE

"It is one thing to sit at your desk and plan pilots, and another thing to work in the field. It has been both challenging and rewarding to work in the very demanding marine environment. The learning curve has been steep, a knowledge you don't get without practical work. Together with local entrepreneurs, we have managed to create a network of actors who have the right attitude towards our goals, the challenges can be many and large, but solutions are always found." - **Magnus, Nemo Seafarms**



BIODIVERSITY ENHANCING SERVICES

Foundations become reefs - How do we create reef effects?

Bringing engineers and biologists together in a multidisciplinary way at the planning stage of offshore wind farms has been successful. Right from the start of the project, we started designing and building our prototypes to test which species will thrive on a variety of treated surfaces or substrates. With 9 different substrates at 4 different angles, we have already had measurable results. Our cod hotel was also well received by Björkskär's coastal species, which have already moved in with the green algae (Ulva sp. and Cladophora sp.).

Artificial reefs - a pathway to ecosystems?

Scour protection, which often includes boulders and concrete, is a sub-component in the construction of offshore wind farms. By combining different artificial structures in the scour protection, we create a reef effect that simulates ecosystems to increase biodiversity. These artificial reefs create conditions for different species to establish and thrive, even in areas that previously lacked hard-substrate habitats.

BJÖRKSKÄR FACTS

- **Artificial reefs** create conditions for different species to thrive. Mussels and algae settle on the reefs, providing both food and shelter for various fish.

- We create a **multidimensional network** of artificial reefs within offshore wind farms, utilising foundations, scour protection and submarine cables.

- We use local materials, preferably residual materials from other industries, in the **spirit of the circular economy**.

SEAWEED AND MUSSELS

Fucus, Ulva, Chorda, Cladophora - In focus 2023!

We started our tests in May by deploying coils for natural propagation of bladderwrack around Björkskär. These tests are still ongoing and results are expected in the spring of 2024. We also chose to test the propagation of gutweed in boxes with positive results. During the course of the season, sea lace and cladophora emerged as potential candidates and studies and tests began for propagation with the box technique. The work continues throughout the year in our small propagation lab, established in Espoo in the autumn, where the propagation of gutweed is tested in a controlled environment.

Blue mussels and cockles - Molluscs for wind power?

Mussels are often called the 'lungs of the sea'. They are a key species in the ecosystem and an obvious choice for the development of biodiversity enhancing services. We have tested a number of different structures to capture the natural reproduction of mussels, with very good results. During the course of the year, the cockle also came up as a potential candidate, a species we will continue to work with in the coming years. The mussels will be cultivated for biomass and used as a biodiversity enhancing measure in connection with the wind turbine foundations and our artificial reefs.

BJÖRKSKÄR FACTS

-We aim to use locally available materials for our cultivation rigs, such as stone and wood, and work on developing **sustainable designs for the cultivation substrates.**

- Algae and mussels **efficiently absorb nutrients** from the sea, helping to combat the eutrophication of the Baltic Sea. They also produce valuable biomass. Algae also bind CO_2 through photosynthesis, which we want to utilise.

- Cultivation in both winter and summer, different species have different growth periods and we **aim to cultivate all year round.**

COMMUNICATION AND EVENTS

Photo: Elina Kervinen

Project Björkskär - Creating attention!

Project Björkskär was officially launched on the 14th of March. The initiative took off and we were featured in over 20 different media outlets both nationally and internationally. At the same time, our Facebook page was launched where we share our knowledge. Our Instagram also saw the light of day in the autumn. We have, in both text and images, been openly telling about our tests and at the same time increasing the understanding of how important marine biodiversity is in the Baltic Sea. And how it can be combined with offshore wind power.

A visit to Björkskär - Always worth it!

Björkskär has been visited frequently during the year by both partners and curious visitors. We have focused on education and openness. Combined with tastings of algae and seaweed in both food and drinks. As early as the boat trip to Björkskär, we started our presentations. Combining offshore wind power with biodiversity enhancing measures in the Baltic Sea is complex and requires a lot of focus on minimising the environmental impacts while increasing and creating positive biodiversity effects. The fact that the end product is tasty food and drinks is a big bonus

BJÖRKSKÄR FACTS

- During the year, **we have served** several seaweed cocktails, pickled seaweed slices, Asian seaweed salad, sea truffle cream, seaweed soda, cabbage pancake with sugar seaweed marmalade, etc.

- The Björkskär Project has also been presented at conferences and lectures during the year. E.g. at the **Finnish Ministry of the Environment, COP28, Cool Blue EU Project, Coastal Water Day on Åland and others.**

Follow our journey at:

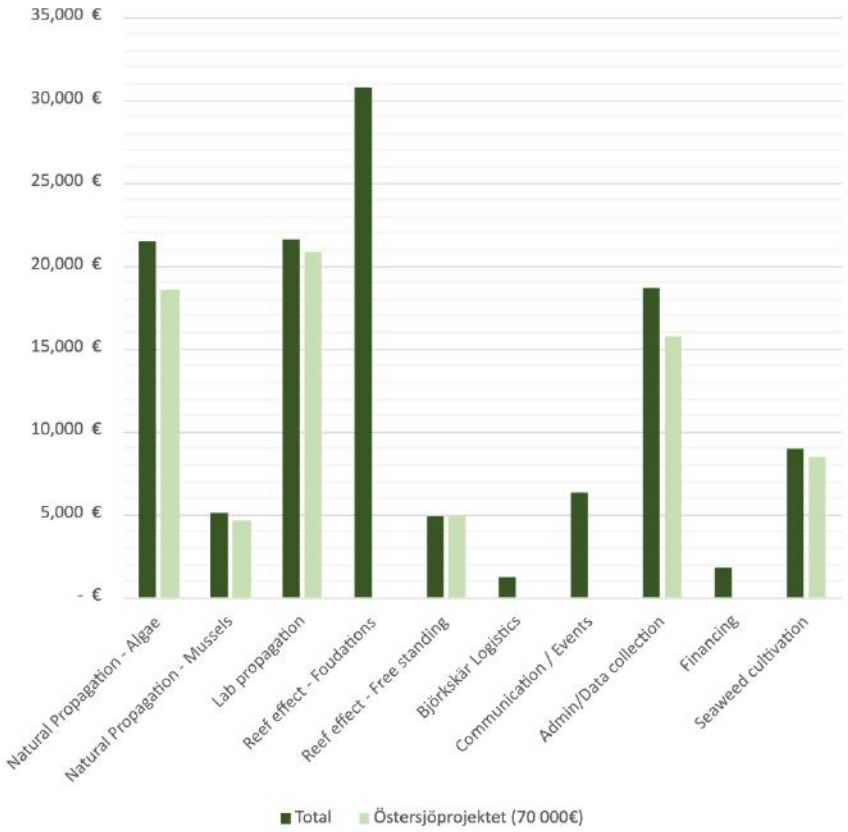
Projekt Björkskär

Projekt_Bjorkskar

2024 - MORE AND BETTER

Activities are developing.

The total budget for project Björkskär 2023 was €120,000. Initially, our work packages were 20 in number. But to facilitate an agile administration, these were changed during the year to 10 in number. Our work packages were: Natural Propagation - Algae, Natural Propagation - Mussels, Lab Propagation, Reef Effect - Foundation, Reef Effect - Free Standing, Björkskär Logistics, Communication & Events, Admin & Data Collection, Financing and Seaweed Cultivation. The chart on the right shows the budget for the different posts.



TOTAL BUDGET 2023:

120 000 €*

**Of which € 70,000 was funded by the Baltic Sea Project.*

2024 is our year of scale-up. The year of diversity and development. The most important lesson we are taking from 2023 is that we need to think about marine ecosystems. Project Björkskär is a part of the blue economy that, in addition to creating valuable products from algae, seaweed and mussels, also strengthens the resilience of our Baltic Sea. The focus lies in preparations for full-scale biodiversity foundations, broader collaborations, more events, introduction of more species in our R&D work, focus on the Bothnian Sea and its species, and integration of infrastructure and biodiversity both above and below the surface. **2024 is the year for connecting species, habitats, people and infrastructure.**

MANY THANKS TO OUR PARTNERS

Funded by:

ÖSTERSJÖPROJEKTET
BALTICSEAPROJECT
ITÄMERIPROJEKTI

Partners:

ÅLCOM · AquaBiota · NORDIC SEAFARM · HÖGSTORPS · NEFCO · SLU Aqua · FLYGFYRENS STÅLLAGER · BYGG VARUHUSET · MARINT CENTRUM · AX rent · JFS EL & ENERGI

- Johan Mörn
- Arvid Mörn
- Nils Mörn
- Jouni Lahdenperä
- Max Kankkonen
- Jack Norrmén
- Zacharias Pawli
- Roosa Mikkola
- Roxana Preston
- Karl Mihhels
- Martin Isaeus
- Patrik Kraufvelin
- Birgit Koehler
- Ellen Schagerström
- Geta Betong
- Cool Blue Project
- Eu4Algae
- Submariner Network
- North Sea Farmers