MULTI FRAME

OCEAN MULTI-USE BLUEPRINTS COLLECTION

List of content

Imprint

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Introduction

The concept of ocean multi-use emerged two decades ago in Europe as a response to challenges resulting from the increased intensification and diversification of human activities at sea. It is defined as the intentional joint use of resources in close geographic proximity. Multi-use can cover a multitude of combinations between marine uses, from the association of wind and wave energy technologies to the reconversion of decommissioned oil and gas platforms, right through to fishing-based tourism or aquaculture or fishing within offshore wind farms. Multi-use is conceived as a more integrated and efficient approach to marine spatial management aiming at:

- Creating synergies between marine uses and achieving economies of scale to unlock Blue Growth;
- Encouraging new forms of collaborations between marine users to reduce conflicts over space and resources; and
- Freeing up space from human pressures resulting in potential benefits for biodiversity and local ecosystems

The concept and interest from policy makers, marine planners and sea users of combining different activities at sea continues to grow outside of Europe. However, its implementation remains limited and challenging due to several factors such as legal barriers, the lack of knowledge or management tools to assess its potential, benefits, and impacts. The MULTI-FRAME project has an ambition to increase the knowledge base and capacity of public and private actors for ocean multi-use systems. It aims at providing concrete open-source tools, assessment results and best practice examples to encourage stakeholders to systemically consider multi-use in their marine planning practices and to streamline it in relevant ocean policies and investments. Compared to previous projects, MULTI-FRAME offers a global glimpse into multi-use to promote awareness of how this novel concept can be transposed more broadly.

The 11 Blueprints presented in this report provide a state-of-the-art overview of multi-use developments worldwide. These cases have been selected out of 28 multi-use solutions identified by MULTI-FRAME partners during the project. The compilation of this series of marine use combinations relied on an exploratory and pragmatic approach comprising the analysis of available data, literature, and empirical knowledge. It provides a snapshot of multi-use diversity to provide a better understanding of how this concept is and can be applied in different environments and different regions of the world. Not only do these cases involve different marine uses, but also a wide spectrum of functional, spatial, governance, and temporal relationships between activities. Six cases are located in Europe, where multi-use was coined, three in North America, and one in South America.

- **Blueprint cases**
- **Other cases reviewed**

1. Tourism in Middelgrunden wind farm
2. Nature enhancement in Ducth offshore wind farms
3. Fishing in Banc de Guérande wind farm
4. Aquaculture, fishing and tourism in the Bay of Arcachon
5. Fishing and tourism on the East Coast of Sardinia
6. Aquaculture and tourism in the Aegian Sea
7. Research and tourism in Stellwagen Bank Marine Sanctuary
8. Aquaculture, recreational fishing and boating in Rhode Island
9. Fishing and tourism in Block Island wind farm
10. Recreational fishing, biodiversity enhancement in decomissioned oil & gas platforms in the Gulf of Mexico
11. Artisanal small scale fishing and magrove restoration in Ecuador and Peru

What information is included in each Blueprint?

Each Blueprint contains the following information:

- **Location:** area where the case is located, dynamics of each combined activity, and case history.
- **Description:** type of multi-use case, interactions in space and time, degree of functional integration.
- **Enabling conditions and tools:** conditions which made multi-use possible and political management and technical tools used to develop the case;
- **Impacts and positive change:** impacts and benefits on society, economy, and environment as well as scaling-up perspectives; and
- **Contacts and links:** persons and documents to know more about each case.

Marine planners and users will find in this series of solutions relevant information and tools to encourage multi-use developments worldwide while adapting this novel concept to local environmental, social and regulatory specifics.

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MULTI-USE BLUEPRINT

Tourism and Offshore Wind in Middelgrunden
off Copenhagen, Denmark

Location

The multi-use activity took place near to Copenhagen at the Middelgrunden wind farm. The wind farm is located 3.5 km from Denmark's capital, visible from certain city beaches and rooftops. Middelgrunden was celebrated as the world's largest offshore wind farm when it opened in 2000 and produces up to 100,000 MWh of electricity annually, three per cent of Copenhagen's total power consumption. The wind farm consists of 20 turbines, each 2 MW, which are equally shared (i.e. 10 each) by its developers "Københavns Energi" (today HOFOR utility) and "Middelgrundens Vindmøllelaug" (Middelgrunden Cooperative), a private cooperative partnership with 8000 owners. Its operations are managed individually by each of the owners. The two partners initially invested a total of $60 million in the wind farm.

After the success of a cooperative establishing a nearshore wind farm in 1996 in Copenhagen (Lynnetten wind farm), this same group of enthusiasts came up with the idea of establishing the first offshore wind farm in an area designated by the municipality for wind energy interests. Once they started working on it, they realised that the local utility had the very same interest, and so they decided to join forces together (cooperative + utility) for the planning and construction stage, and agreed that once in operation, the whole project would be divided in two: 10 turbines to the utility, and 10 turbines to the cooperative. This joint approach between the cooperative and utility to realise the Middelgrunden Project was a very good match for both. The utility had the financing & engineering expertise in place, while the cooperative gathered positive local citizens, who turned to be advocates and ambassadors of the project to their relatives and friends.

Description

This ocean multi-use comprises a combination of tourism with an offshore wind farm, consisting of an in-person boat tour to the wind farm as well as a virtual tour.

The physical tour to the offshore wind farm is organised by representatives of the Middelgrunden cooperative, who also contracts the boat operators. The tour starts in Copenhagen where visitors are picked up and provided with the necessary safety instructions and safety equipment for the voyage by a representative of the cooperative. The boat then sails directly to the Middelgrunden Offshore Wind Farm where people can take a closer look at the 20 astonishing wind turbines before mooring the boat at one of the wind turbines. Two boat operators are used for the tour, which is scheduled in advance depending on boat availability and weather conditions. While one of the boat operators also actively supports the promotion of tours, the tour is always organised and guided by the representative of the Middelgrunden Cooperative. One of the boats is also used for leisure fishing, thus providing the boat company with an alternative source of income. The 2-3 hour long guided tour allows people to experience the interior and even climb to the top of a 64-meter-high wind turbine.

They hear about the history of the turbines, their construction and maintenance as well as actual operation and electricity production.

About 40–50 tours are hosted annually, of which one tour in June is dedicated to the shareholders and individuals from the cooperative. On this day, usually the third Sunday of June, about 150–200 people climb the turbines. Most of the other tours are groups of 12 to 60 people. In total, around 800–1000 people tour the turbines annually.

A virtual tour consisting of a video showing a tour of the wind farm can be accessed via a QR code. The QR code is placed at all strategically important places around the city from where the Middelgrunden Offshore Wind Farm can be seen – for example rooftops of museums, parking lots, etc.

Enabling conditions and tools

Type of turbine:

The Middelgrunden turbines are one of the few wind turbines in Denmark that can offer this unique tour, as they are equipped with ladders and floor sections every 8 meters that allow visitors to safely climb up the turbine. Turbines installed after 2007 do not have such floor sections and would need to be climbed with equipment, which would make organising the tour more challenging.

Local regulation:

In other offshore wind farm locations, local regulation in terms of the safety zone around the wind turbine and access limited to maintenance and operation boats may be a barrier for conducting this kind of tour. The direct involvement of the cooperative owners in the tours make this feasible in the case of Middelgrunden.

Close to shore vs offshore:

It is important to note that the Middelgrunden wind farm is very close to shore and thus easily reachable with a small vessel after a short time. This type of multi-use may not be fully applicable to wind farms located further offshore, as they would likely be more resource intensive (staff, fuel/energy and time), thus making the business case unsustainable.

Weather conditions:

The weather and wind conditions can have a big impact on this tour. Mooring can be an issue in harsh weather conditions, and

opening the nacelle in strong winds may also not be possible due to safety risks.

Local cooperative ownership:

The wind farm is partially owned by the "Middelgrundens Vindmøllelaug", a private cooperative partnership. The local ownership has had an important role in the wind turbines' development in Denmark from 1980–2010.

The local engagement in planning and layout of the farm ended up being the pre-condition for the acceptance and rollout of the multi-use. The fact that 10 of the turbines are owned by the cooperative makes it easier to have access to the turbine and develop additional related add-ons such as tours and educational programs.

Impacts and positive changes

• **Local economy:** The tours have contributed to local businesses – mainly boat tour operators and tour guides. It provides an alternative source of income for sectors in decline such as fishing, and it diversifies the local tourism offer. It is drawing tourists out of Copenhagen, thereby diversifying tourism geographically.

• **Awareness raising:** The educational and awareness raising elements of the tour have contributed to improved understanding knowledge about the role and importance of offshore wind for energy security in the context of the climate crisis. The tour has been offered to both locals and universities from abroad, as well as wind energy companies who use it for building their internal capacities and showcasing to clients.

Contacts and links

• **Hans Chr. Soerensen, PhD**, a board member of the Middelgrunden Cooperative, is responsible through his company SPOK ApS for the visiting program. *The guides and visitors are covered by a professional insurance through this company.*

• **Tours can be ordered on** *mollebesog@gmail.com*

• **Video virtual visit** *https://www.h2020united.eu/index.php?option=com_content&view=article&id=73)*

• **More information about the windfarm** *(http://www.middelgrunden.dk/)*

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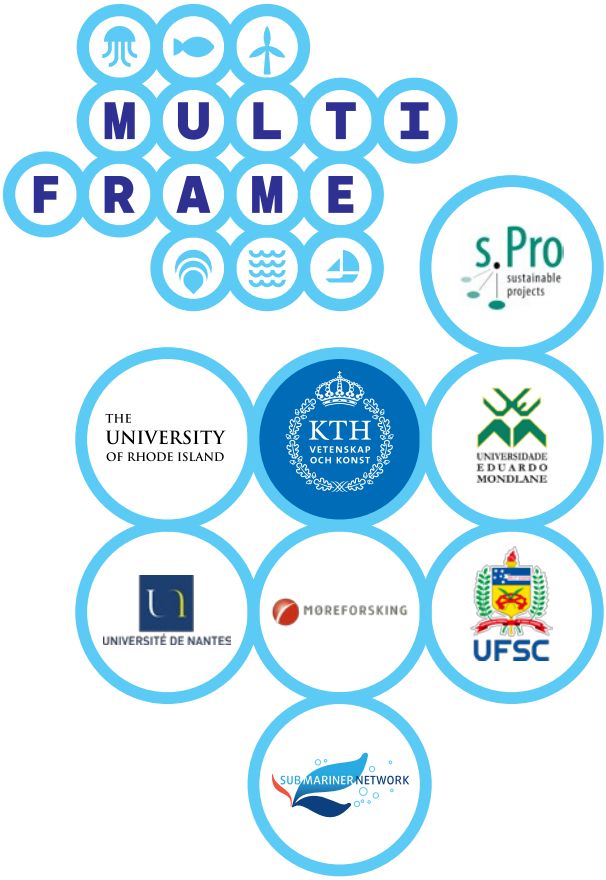

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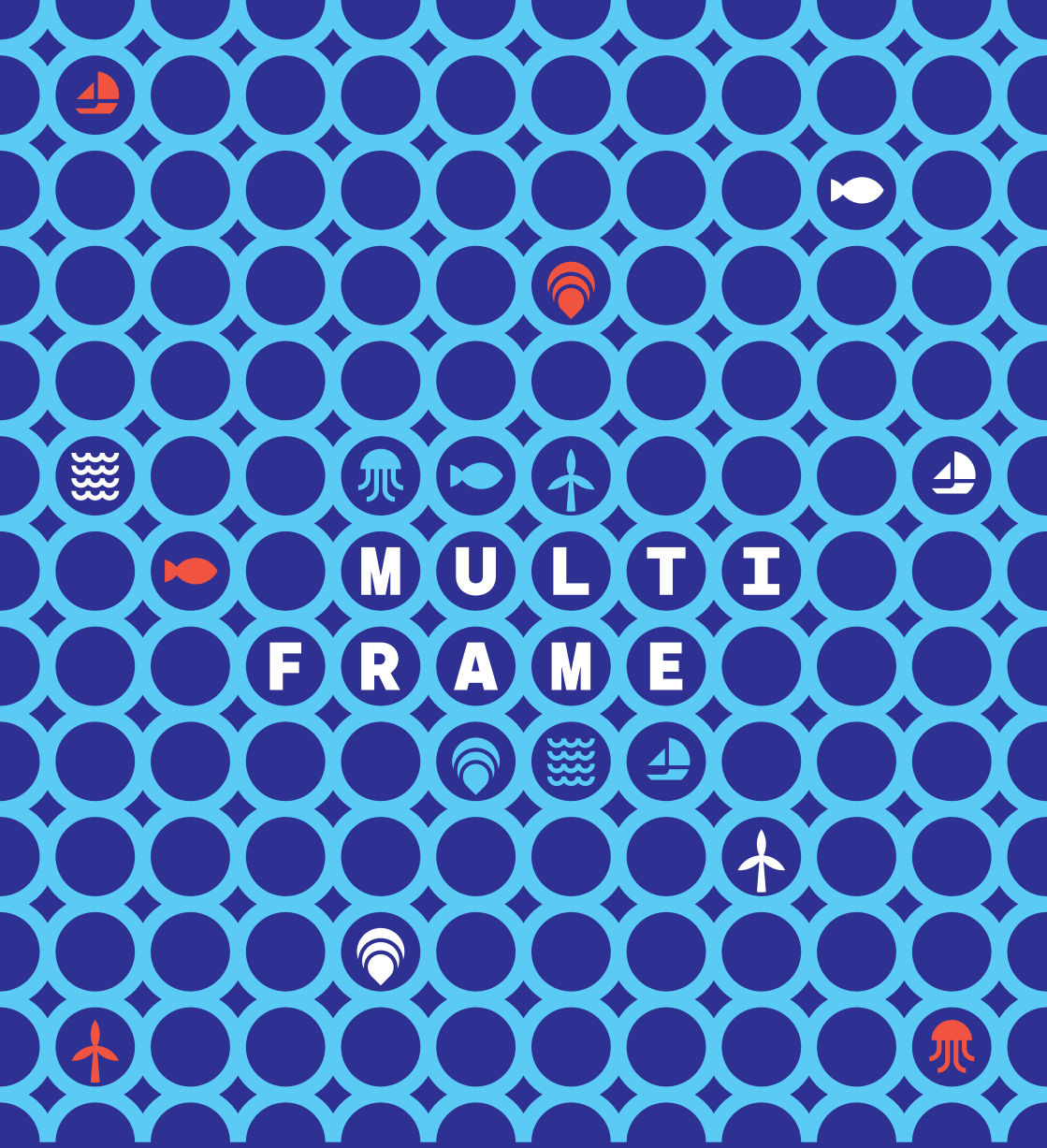

MULTI-USE BLUEPRINT

Nature enhancement in offshore wind farms,
the Netherlands

Location

The combination of offshore wind energy and nature enhancement is being extensively considered and tested in the Dutch North Sea. A first pilot location was in the Eneco Luchterduinen offshore wind farm, 23 kilometers off the coast at Noordwijk aan Zee where, in 2018, cages with flat oysters and reef balls were installed.

The project ran for one year and was the starting point for many other projects. Currently, at least ten different projects of nature enhancement are running in six different offshore wind farm areas.

The following are examples of some of the ongoing nature enhancement projects in offshore wind farms:

1. Borssele Orsted: pipe reefs, lobster and cod tagging
2. Borssele Blauwwind – oyster restoration
3. Luchterduinen Eneco – oyster restoration
4. Hollandse Kust Zuid Vattenfall – nature inclusive design
5. ZeeEnergie Gemini – oyster restoration
6. Buitengaats Gemini – oyster restoration
7. EcoScour Borssele V – nature inclusive design / oyster restortation
8. Hollandse Kust Zuid Tennet – fishhotel
9. Hollandse Kust Noord – Scour protection artificial reefs / Hollandse Kust Zuid Vattenfall – Rock Reefs

Description

The current Dutch North Sea ecosystem is considered degraded, partly because the natural flat oyster reefs have disappeared. Installing wind farms in the Dutch North Sea changes characteristics within the current ecosystem, subject to both localised as well as cumulative effects. In the Dutch North Sea, parts of wind farms act as artificial reefs, with associated changes in species composition and populations not only within the wind farms, but also in the surrounding waters. However, these cannot be seen as substitutes for natural reefs. Nature enhancement in wind farms cannot be seen in isolation from other, potentially negative effects of wind farms on the ecosystem such as turbidity, vibrations and noise pollution. The interpretation of nature enhancement therefore depends on the objectives for enriching the present North Sea ecosystem.

Offshore wind farms in the Dutch North Sea offer opportunities for enhancing North Sea biodiversity by adding hard substrates such as scour protection and excluding benthic disturbance from bottom trawling. In this way, both soft sediment habitats and hard substrate communities are given the opportunity to develop.

A clearly increasing trend can be seen in the number of offshore nature enhancement projects outside and inside wind farms. Knowledge is gathered in the form of practical, often small-scale nature restoration projects, applied research, theoretical research and pilot projects. Monitoring and the development of new techniques as well as (ecosystem) modelling are part of the process. Results can take a long time to materialise because ecological processes can take decades to be observed. Pilot projects are currently underway in several places, the first monitoring results of which are positive (but largely unpublished). In addition, much can be learned from nature enhancement projects outside wind farms. For example, results to date show that it is possible to release flat oysters as a nature improvement measure, with effects such as an increase in biodiversity have been observed.

In the Dutch North Sea, oyster beds have almost completely disappeared due to human impacts such as overfishing, the effects of trawling and diseases. With the addition of hard substrate and a need for restoration sites, deploying flat oyster as a species for nature enhancement in offshore wind farms is a logical choice. Shellfish reefs offer shelter, settlement substrates as well as food to many different species, creating a biodiverse habitat. Currently, several different projects are working on oyster restoration in the Dutch North Sea, including projects in offshore wind farms.

An example of an initiative focusing on nature enhancement in offshore wind farms is "The Rich North Sea" (De Rijke Noordzee). The Rich North Sea program officially started in 2020 initiated by NGOs Stichting de Noordzee (The North Sea Foundation) and Natuur & Milieu (Dutch Nature and Environment foundation). The Rich North Sea runs until the end of 2023 and responds to the opportunities that offshore wind farms offer for nature restoration. The Rich North Sea works to increase biodiversity within wind farms in the North Sea by developing and implementing nature-inclusive measures and creating reefs. Currently The Rich North Sea and its partners have five running projects in offshore windfarms, ranging from nature-inclusive designs to placing artificial reefs or flat oysters.

The Rich North Sea works together with industry partners such as wind farm owners and offshore installation companies. The consortium has purchased the oysters

and are effectively the owners. However, if oysters are deployed without cages or other infrastructure, once submerged they are technically not under anyone's ownership anymore. For The Rich North Sea, the main goal of the programme is nature enhancement rather than commercial use. In the Netherlands, options for multi-use of wind farms are being explored. While active bottom trawling is prohibited within offshore wind farms, passive fisheries (e.g. pots or creels) may be an option in the future.

Enabling conditions and tools

Local regulation

Regulations are not always aligned with nature enhancement. Safety requirements can hamper the location, design and monitoring of offshore projects. For example, the safety zone around a platform could potentially be a good location for enhancement projects, however regulatory restrictions may limit options or entirely prohibit certain measures. One example is the prohibition of diving in offshore wind farms in the Netherlands, making monitoring dependent on remote methods such as video footage and water sampling. Additionally, decommissioning requirements can make installation challenging. The sooner nature enhancement is made part of an offshore wind farm design and installation, the better the alignment will be.

Ideal location

Nature enhancement is being promoted in offshore wind farms through tendering criteria. The latest offshore wind tendering procedure included one tender completely focused on ecology. Multi-use of wind farms is being explored right now with the help of area passports. Nature enhancement and protection outside of offshore wind farms and marine spatial plans is under development, with fully protected areas slowly coming into view. Nature enhancement should always be based on local conditions, habitat, history and future prospects, and thus should be seen as part of a bigger ecosystem.

Suitable technology

When designing enhancement measures, one needs to take into consideration the local environment and the geomorphological conditions. For example, some of the cage types are not suitable for sandy environments. Nature enhancement should always be beneficial for the intended habitat types or species, ruling out or mitigating any negative effects.

NGO leadership and organisational set up

The Rich North Sea had a central role in bringing the approach forward and establishing a collaboration with wind farm owners and developers. The Rich North Sea was one of the first programmes trying to embed nature enhancement in offshore wind farms, both in practice as well as in policy. However, other NGOs as well as commercial companies and governmental bodies are currently involved in nature enhancement within (and outside of) offshore wind farms. In general, willingness to cooperate is high. The wind sector is interested in nature enhancement, due to regulatory obligations and an intrinsic need for sustainable and responsible use of the sea. However, ongoing projects costs are usually shared by all partners.

Access to the wind farm

As access to wind farms is restricted, it always needs to be coordinated with the wind farm operator. Installation and monitoring measures include specific risk assessments and work method statements in order to address any health and safety risks. In the newer projects, most of the reef ball structures are on the scour protection instead of the sea floor. Despite being so close to the turbines, this does not impact turbine operation. Cooperation with the wind farm developer in allocating visiting times is always preferred to reduce costs as well as emissions.

Monitoring plan

Monitoring of environmental restoration needs to be carefully planned. A monitoring plan should be put in place and followed up to adjust if needed in order to ensure optimal outcomes. Monitoring plans are always tailor-made to the specific project and objectives. Examples of monitoring techniques are the use of underwater cameras such as drop-cams or bait-cams as well as ROVs, water sampling for eDNA analysis and abiotic measurements such as temperature, salinity, flow, etc.

Impacts and positive changes

Nature enhancement in wind farms is a relatively recent development, with the first pilot project in 2018. Currently, active nature enhancement measures in Dutch wind farms consist of:

1 Adapted scour protection designs to increase reef function (size, type of material) for nature-inclusive design, potentially resulting in nature restoration or habitat creation, depending on location.

2 Actively adding target species (including flat oysters) for nature restoration or habitat creation, depending on location.

3 Placing artificial reef structures for nature inclusive design/habitat creation.

- **The effects of nature enhancement** measures depend on environmental factors and are linked to the location and conditions. In addition to the circumstances and location, the type of structure on which the measures are taken can also influence the outcome.
- **Only one pilot has so far yielded definitive result:** the 2018/2019 pilot in Luchterduinen with 'Reef Balls' and oyster cages with live flat oysters. During this pilot, an increase in biodiversity was observed compared to the surrounding sandy sea floor, with 19 different taxa detected on the structures. Water quality and food supply were sufficient for the mature flat oysters to reproduce. The construction of the cages did not withstand the conditions on the seabed, which meant that they were partly covered in sand. The oysters covered by sand did not survive. The currently running projects therefore show initial positive results.

Transferability

Offshore wind farms are desperately needed in the fight against climate change. The number of wind farms in the North Sea is expected to grow strongly in the coming years. This large-scale construction of wind farms has far-reaching consequences for both nature and spatial planning in the North Sea. At the same time, offshore wind farms offer opportunities to make a positive contribution to marine biodiversity, in addition to sustainable energy.

The current projects provide a blueprint for underwater nature enhancement in offshore wind farms, which can be applied as a standard in new wind farms to be built in the Netherlands and beyond.

Links

- **The Rich North Sea**
  https://www.derijkenoordzee.nl/en
- **Platte oesters in windpark Eneco Luchterduinen**
  https://www.derijkenoordzee.nl/locaties/eneco-luchterduinen
- **Natuurversterking in windparken op zee Bureaustudie MONS project 51**
  https://noordzeeoverleg.nl/documenten+nzo/HandlerDownloadFiles.ashx?idnv=2230672

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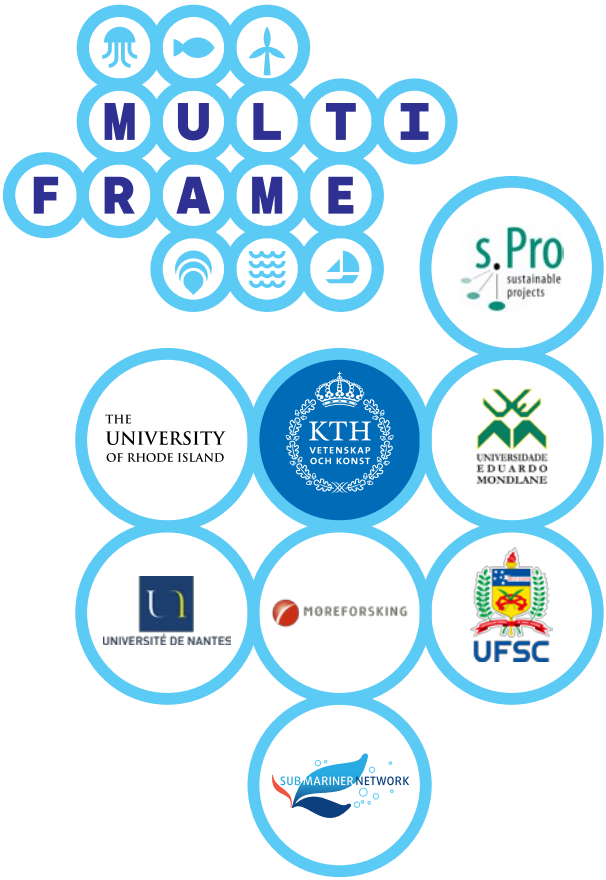

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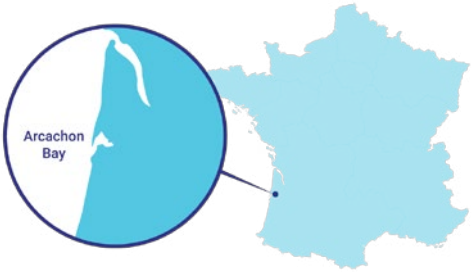
MULTI-USE BLUEPRINT

Aquaculture, Fishing, and Tourism
in the Bay of Arcachon, France

Location

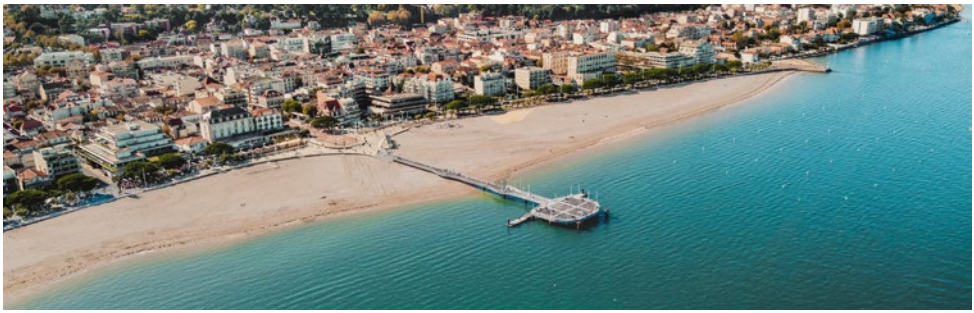
The Bay of Arcachon is located on the French Atlantic coast, in the Gironde Department, near the city of Bordeaux. It is a semi-closed basin covering approximately 150 km^2 of shallow waters between Cap-Ferret and Pyla-sur-Mer.



The local economy is driven by two activities: aquaculture and tourism. The bay is where oyster farming was first introduced in France in the 1860s. Nowadays, it is the most important shellfish production zone at the national level, with 37 000 tons of cupped oyster produced in 2012. Arcachon was also one of the first sea resorts of the French Atlantic coast established in the mid 19th century. By the 1960s, the Cap Ferret peninsula started attracting high-income, temporary residents, while the rest of the bay consolidated its position as a major tourism hotspot. In 2018, the Bay of Arcachon was, after Bordeaux, the second most visited area in Gironde with 10.8 million overnight stays and 76 millions euros of revenues.

Description

In the Bay of Arcachon, relationships between aquaculture and tourism are complex. On the one hand, the increasing number of tourists and secondary residences generate real-estate and development pressures. On the other hand, there are many synergies between tourism, aquaculture and, to a lesser extent, fishing. Oyster farming participated in shaping this territory, its landscapes, its identity and therefore constitutes a key touristic attraction. In return, tourism represents an opportunity for shellfish farmers and fishers to increase their revenues. Aquaculture-related tourism developed significantly over the last decade, as reflected by the growing number of restaurants selling oysters and seafood or tours around the bay and surrounding harbours. Since 2010, local shellfish farmers started to take tourists onboard so they can visit their farm and know more about their job. Even though this form of “pescatourism” is not as profitable as other tourist products, it provides short and long-term benefits to shellfish farmers: not only do visits generate direct revenues, but tourists usually become their clients and ambassadors.



Enabling conditions and tools

Common interests of local stakeholders

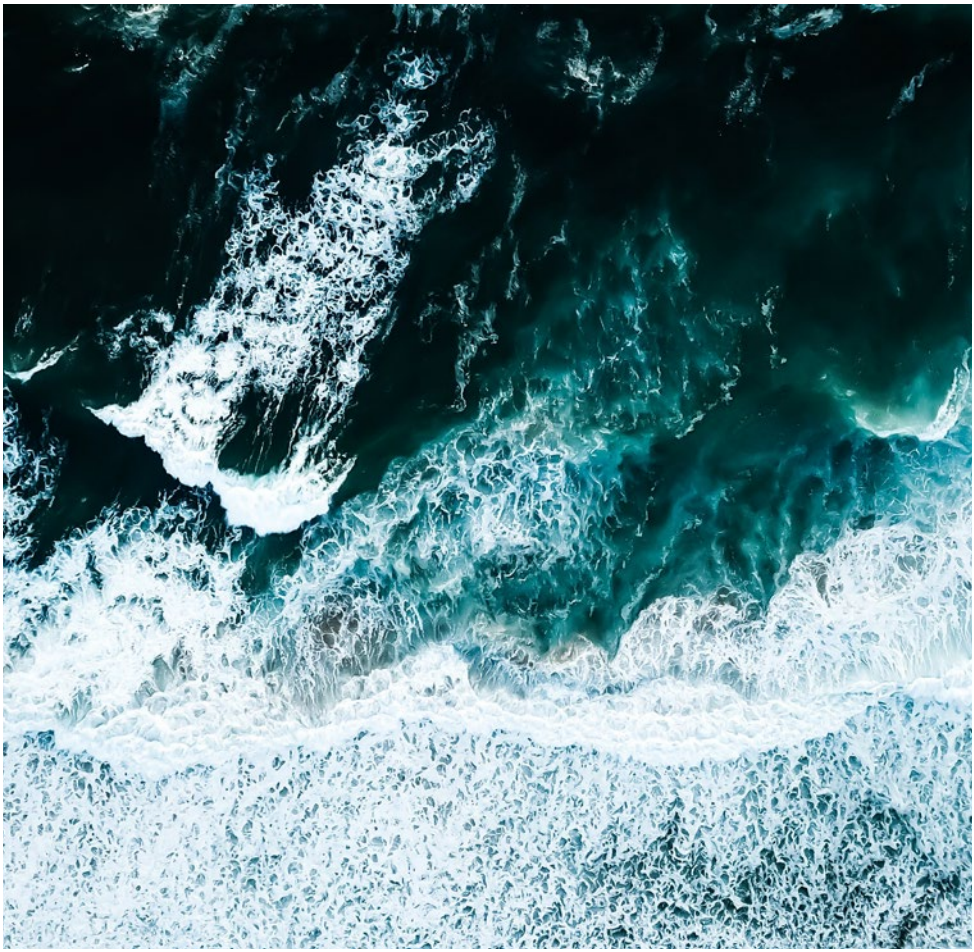
Aquaculture-based tourism in the Bay of Arcachon was enabled by a joint effort of local stakeholders to further involve oyster producers in tourism based on the pescatourism model. This multi-use was intended to reverse oyster production decline resulting from economic and environmental changes. The Fishing and Marine Breeding Committee and the Shellfish Farming Committee played an active role in representing and assisting oyster producers interested in diversifying their activity through tourism. The Intercommunal Association of Arcachon, a public authority representing the municipalities surrounding the bay, helped them to design, implement and promote a new touristic offer aiming at discovering oyster production sites, techniques and traditions. It launched in 2010 the initiative called "Embarquez avec les ostréiculteurs et les pêcheurs du bassin d'Arcachon" and integrated it into its local development strategy. Aquaculture-based tourism became a pillar of the ecotourism offer which developed together with the Marine Park created in 2014.

Financial and technical assistance

of the AGLIA and the European Union. Shellfish farmers received technical assistance and financial support of the AGLIA (Association of the Great Atlantic Coast) and the European Union. The AGLIA led a global analysis of the legal framework regulating pescatourism and assisted oyster producers in obtained necessary permits and licenses. It also helped them to adapt their activity and businesses to tourism. The European Union also supported oyster producers financially through the FARNET program and the European Maritime Fund (EMF).

Impacts and positive changes

Nowadays, about 15 shellfish farmers and 3 professional fishers joined the initiative. Although the functional integration between oyster farming, fishing and tourism needs to be further developed, this multi-use fully achieved its goals. It strengthened the local economy and the regional identity while building new pathways towards sustainability. Nowadays, Arcachon Bay is the largest aquaculture-based tourism zone and a model a diversification through tourism which can inspire, like Italy and Greece, other coastal communities.



Links

- **Elody Etechegaray – Association du Grand Littoral Atlantique:** *elodie.etchegaray@aglia.fr*
- **AGLIA report on pescatourism on the Atlantic coast** *https://www.aglia.fr/wp-content/uploads/2019/10/40-4p_pecatourisme_1.pdf*
- **AGLIA presentation of pescatourism in the Bay of Arcachon** *https://www.aglia.fr/le-pescatourisme-presente-dans-le-cadre-du-projet-europeen-multi-frame/*
- **Webpage of the Shellfish Farming Committee of Arcachon** *https://www.aglia.fr/le-pescatourisme-presente-dans-le-cadre-du-projet-europeen-multi-frame/*
- **Flyer presenting tours to the shellfish farms in Arcachon** *https://bassin-arcachon.com/wp-content/uploads/2017/02/LIVRET-PESCA-TOURISME-MAJ-04-2021.pdf*

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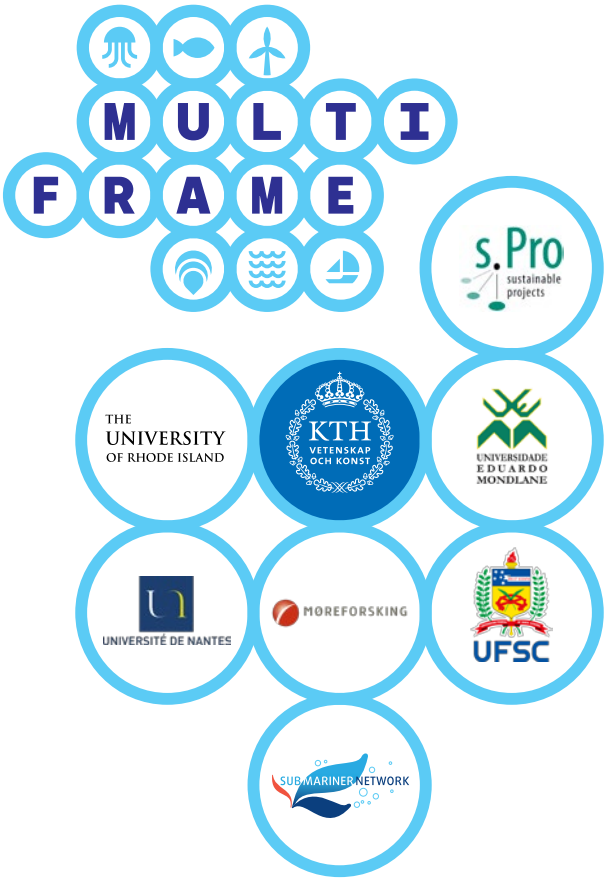

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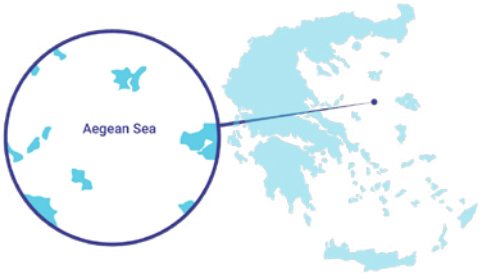
MULTI-USE BLUEPRINT

Aquaculture and Tourism
in the Aegean Sea, Greece

Location



Greece has been shaped by its special relationship with the sea. It is one of the leading nations in the shipping industry. Small-scale fisheries still play a very important role in many coastal communities, although aquaculture now represents about 80% of the total value of fish, crustaceans and molluscs commercialised at the national level. Beyond maritime industries, tourism is one of the major drivers of Greece's economy. In 2019, the country hosted 34 million foreign visitors and tourism generated approximately 39 billion euros. Attica, which includes Athens, is the richest administrative region of Greece, and its southeast coast remains relatively well preserved. The area is less afflicted by mass tourism, though the Sounio National Park, which was established in the hinterland in 1974, as well as Cape Sounio and its temple attract visitors. While there are many diving sites along the seashore and islands such as Makronisos, fish farms can be found south of Attica's coast.

Description

The multi-use comprises diving next to fish farms located between Patroklos Island and the mainland. It is a joint venture between Planet Blue, a scuba diving centre based in Lavrio, and Kastelorizo, an aquaculture company located in Patroklos. The history of Kastelorizo was defined by economic diversification. It was created in 1985 by fishermen looking for new sources of income. Since then, it grew quickly to become a major player in the aquaculture industry. It is mainly dedicated to produce sea bass and black sea bream for local restaurants. Since 2019, Kastellorizo decided to allow scuba diving next to its installations in order to promote aquaculture and change the perceptions of fish farms held by foreign and Greek tourists. Planet Blue take tourists to the fish farms on an occasional basis, depending on tourist demand and the availability of Kastelorizo workers. It directly benefits Planet Blue, as it is a way to diversify its tourism offer and thereby to differentiate itself from competitors. In fact, the fish farms represent an exceptional diving site where numerous and rare species can be observed, including sea mammals.

Enabling conditions and tools

Proactivity of local stakeholders

This multi-use results from the alignment of interests of Kastellorizo and the Blue Planet centre. Developing it did not require special licenses or permits, only teamwork to develop a new touristic product.

Support of the UNITED project

This multi-use was developed as a pilot case of the UNITED Horizon 2020 project. Kastellorizo and Blue Planet received technical assistance from multi-use experts and benefited from the experience and feedback of other stakeholders involved in creating synergies between different activities at sea. Being part of an international project such as UNITED is a way to promote this multi-use worldwide.

Impacts and positive changes

The multi-use development faced challenges due to the Covid pandemic: not only did the number of visitors decline dramatically in 2020, but some tourists are still afraid to use diving gears. However, diving tours in the fish farms started to increase again with the rebound in tourism. Kastellorizo and Planet Blue benefit from each other and converted this experience in a sustainable multi-use example.

Links

- **Kostas Thoctarides:** *info@planetblue.gr*
- **Diving School Planet Blue:** *https://www.planetblue.gr/*
- **Case description:** *https://www.h2020united.eu/about/39-aquaculture-and-tourism-in-greece*

Imprint

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Date published: 20 September 2022

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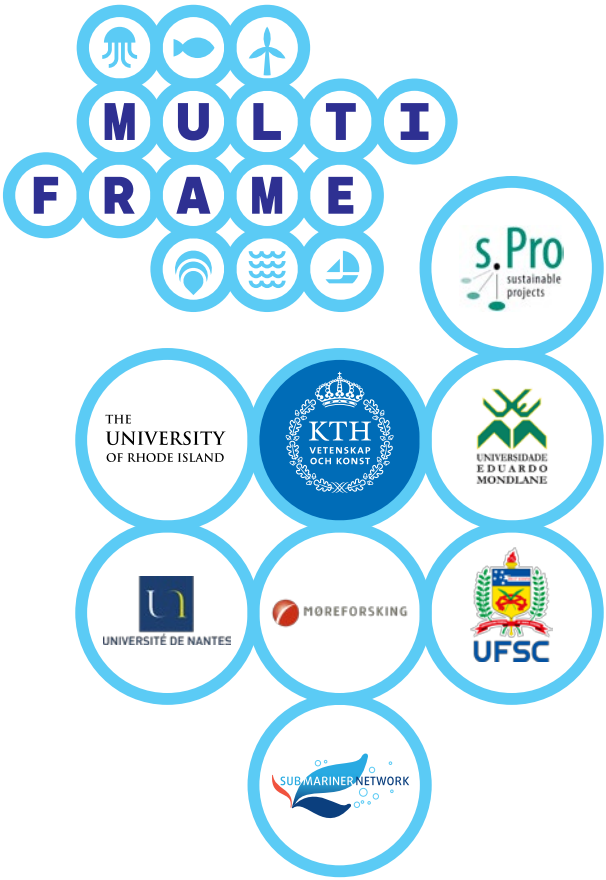

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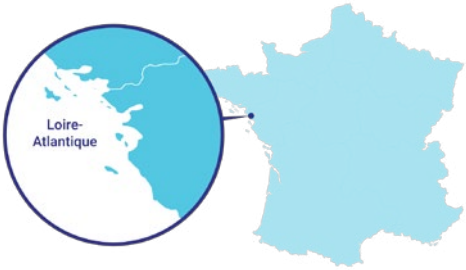
MULTI FRAME

MULTI-USE BLUEPRINT

Offshore Wind and Fishing
in Loire-Atlantique, France

Location



The “Banc de Guérande” offshore wind park is located on the French Atlantic Coast, 15 km West of Saint-Nazaire city (Loire-Atlantique, France). Developed under the first offshore wind call to tender, it was put into service in late 2022 and became the first operational wind park at sea in France. It is composed of 80 Haliade-150 monopile wind turbines distributed within an area covering 78 km². The park is expected to produce a maximum of 480 MW, which represents about 20% of the total electric consumption of Loire-Atlantique. The Banc de Guérande is situated off the Loire estuary, a coastal zone home to numerous and diversified activities. It is frequented by local smallscale fishers although most of their catches are from further offshore. It is also located on commercial shipping routes from and to Saint-Nazaire, one of the major ports of France. Finally, as the park is not very far from the seashore, it may interact with coastal activities such as shellfish farming, tourism or sailing. The Banc de Guérande project therefore poses challenges regarding the co-existence of offshore wind production and other sea uses.

Description

The development of the Banc de Guérande wind farm generated, like other similar projects, tensions with established sea users, especially with fishers. In fact, navigation and fishing activities will be limited within the park due to safety issues. However, wind developers, fishers and other stakeholders succeeded in reaching agreements to ensure their co-existence. The park was designed based on a distance of 1 km between each turbine so navigation will still be possible. Its construction and connection to the electrical grid were staggered to reduce socio-economic impacts in space and time. Fishers using passive gears will be allowed within the park and those using active gears will receive financial compensations. These agreements cannot really be considered as multi-use since they don’t generate synergies between activities. Nevertheless, they correspond to the minimal definition of multi-use: the joint use of resources in close geographic proximity by multiple users. In this respect, the Banc de Guérande project is considered a success story in France since many offshore wind projects are delayed or even stopped due to conflicts with sea users and coastal communities.

Enabling conditions and tools

Favorable historical and geographical context

The Banc Guérande offshore wind park is often considered a specific case, the success of which resulted from favorable historical and geographical contextual factors. First, the existence of previous marine renewable energy projects involving the same developer (EDF-R) facilitated its development. Second, as the project progressed faster than elsewhere, fishers obtained generous mitigation and compensation measures compared to other projects. Third, not only is the park located in a minor fishing zone, but fishers using passive gears will be allowed to keep fishing within the park. Fourth, local fishers are less resistant to the wind industry since there are (still) fewer projects in the Atlantic than the English Channel, where fishers are heavily impacted by Brexit. Fifth, the construction, operation and maintenance of the offshore wind park partly benefits Saint-Nazaire city and its shipbuilding industry.

Discussions between stakeholders within planning arenas

The constructive dialogue between the energy developer, fishers' representatives and other sea users was also critical to the success of the Banc de Guérande project. For more than a decade, they actively discussed within Maritime Spatial Planning and ad hoc arenas about the location, design, construction, and operation of the wind farm. This is how they agreed upon navigation and safety rules, as well as measures aiming at avoiding, limiting and compensating the impacts of wind energy production on fishing activities and other sea uses.

Impacts and positive changes

Beyond local specifics, the Banc de Guérande project proves that offshore wind energy can co-exist, or at least reach a middle ground, with other activities at sea, especially with commercial fishing. Through this project, fishers gained experience and became partners for future marine renewable energy projects in the Atlantic and other maritime spaces.

Links

- **Benoît Figarède – EDF-R:** *benoit.figarede@edf-re.fr*
- **Project presentation** *https:\parc-eolien-en-mer-de-saint-nazaire.fr\le-parc-eolien-en-mer\presentation-projet*

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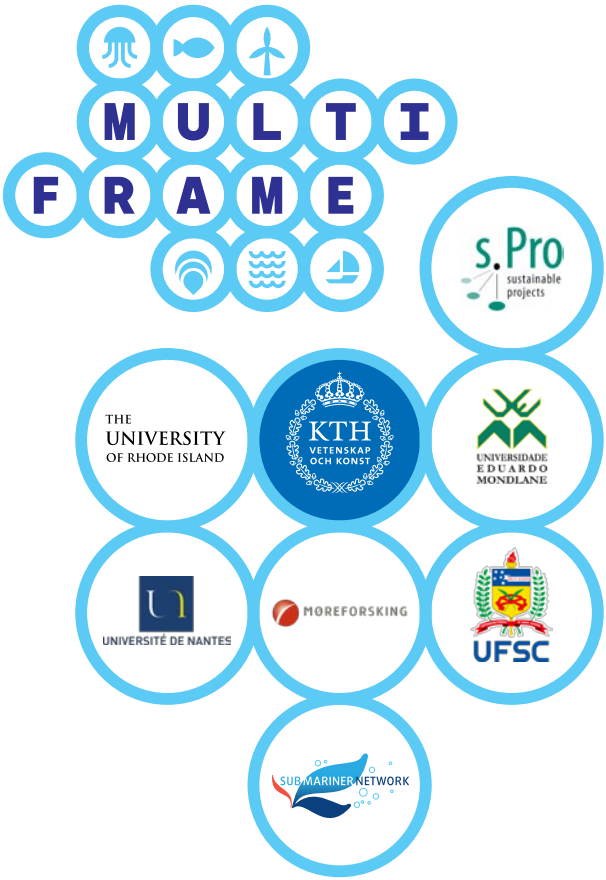

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MULTI FRAME

MULTI-USE BLUEPRINT

Fishing and Tourism on the east coast
in Sardinia, Italy

Location

Sardinia is an Italian island located in the Western Mediterranean Sea basin, south of Corsica. It is the second largest island of Italy (24 090 km^2) after Sicily, but one of the least populated regions of the country (1,6 million inhabitants). Traditionally, Sardinia was a land of agriculture, and mining; fishing never played an important role regionally, although it sustained local coastal communities. Nowadays, the local economy is mainly driven by the services and the tourism industries: Sardinia is the 12th most visited region of Italy, with approximately 14 million visitors in 2019. Despite the average income per capita being the highest of the Mezzogiorno, the unemployment and aging rates are higher than in other regions. Sardinia is facing socio-economic challenges, exacerbated by its insularity, and needs specially adapted pathways towards sustainability.

Description

Sardinia has increased synergies between tourism and fishing over the last decade, especially on the Eastern coast. A growing number are engaged in pescatourism – taking onboard tourists for fishing trips and unique local experiences. During these daily tours, visitors have a go at fishing and enjoy local seafood. Pescatourism is based on a mutually beneficial relationship between fishing and tourism. On the one hand, fishers take advantage of tourism to diversify and sometimes increase their revenues while reducing pressures on fish stocks and marine ecosystems. On the other hand, they can promote their job, traditions, and territories without leaving their primary activity like those engaged in ittitourism (tourist accommodation and restoration in fishing communities) or operating boat tours. In this sense, pescatourism is a true "win-win" combination which builds local pathways towards sustainability. It became popular in Sardinia, converting this island into a major pescatourism hotspot in Italy and the Mediterranean as a whole.

Enabling conditions and tools

A clear and well established Italian regulatory framework

Pescatourism on the Eastern Sardinian coast was facilitated by the Italian legal framework. In fact, Italy was one of the first countries to recognize and encourage pescatourism. This concept was officially defined in 1982, with fishing-tourism activities being allowed in 1992 and regulated in 1999 through the Decree No. 293 of the Ministry for Agricultural and Forestry Policies. Since then, Italy is a world leader of pescatourism together with Greece. The Italian legislation, which allows tourists to participate in fishing activities, was improved in 2012 to give fishers easier access to pescatourism permits and licenses.

Pescatourism as a socio-economic development strategy

Beyond the national context, pescatourism in Sardinia was enabled by the proactivity of local stakeholders. About 120 professional fishers, seven aquaculture farmers, inland fishing cooperatives and representatives from public authorities united in 2010 to create the East Sardinia Fishery Local Action Group (FLAG). The FLAG led a socio-economic analysis to define a Local Development Strategy (LDS) based on key priorities and actions to foster pescatourism. The Autonomous Region of Sardinia and local municipalities fully supported the FLAG and integrated pescatourism into their development plans to reverse local fisheries decline and fragmentation, in order to address broader socio-economic challenges such as poverty, unemployment and an aging population

Support from European Institutions

The East Sardinia FLAG was created to request technical assistance and financial support from the European Union. Most actions defined within its LDS called "East Sardinia in 2020" were funded through the European Fisheries Fund (EFF) between 2010 and 2013. The FLAG defined a more ambitious plan in 2014 which was supported by European Maritime Fisheries Fund (EMFF). Integrating European programs was also an opportunity to create links with other groups engaged in pescatourism in Italy, France and Greece.

Impacts and positive changes

Pescatourism is now well established in East Sardinia: in 2013, about 40 professional fishers were engaged into pescatourism, both in the Tortoli Lagoon and the Mediterranean Sea. Although pescatourism still remains a market niche compared to conventional tourism, it stimulated, together with itti-tourism, small-scale fisheries by providing new opportunities and prospects to fishers and to coastal communities in general. It also attracted more visitors to the Eastern coast of Sardinia and thereby boosted local economies. Finally, the Sardinian experience represents, beyond its peculiarities, a successful example and even a model of how to foster, locally, sustainable combinations between fishing and tourism.

Links

- **Franet magazine #9**
  https://issuu.com/sergegomesdasilva/docs/farnet_magazine_09_en_0
- **Farnet - fisheries and tourism**
  https://www.aianta.org/wp-content/uploads/2018/05/FARNET_Fisheries_and_Tourism-9_EN-002.pdf/
- **Flag Sardinia**
  http://www.flagsardegnaorientale.it/wp-content/uploads/2016/10/Blue-economy-and-best-practices.pdf/

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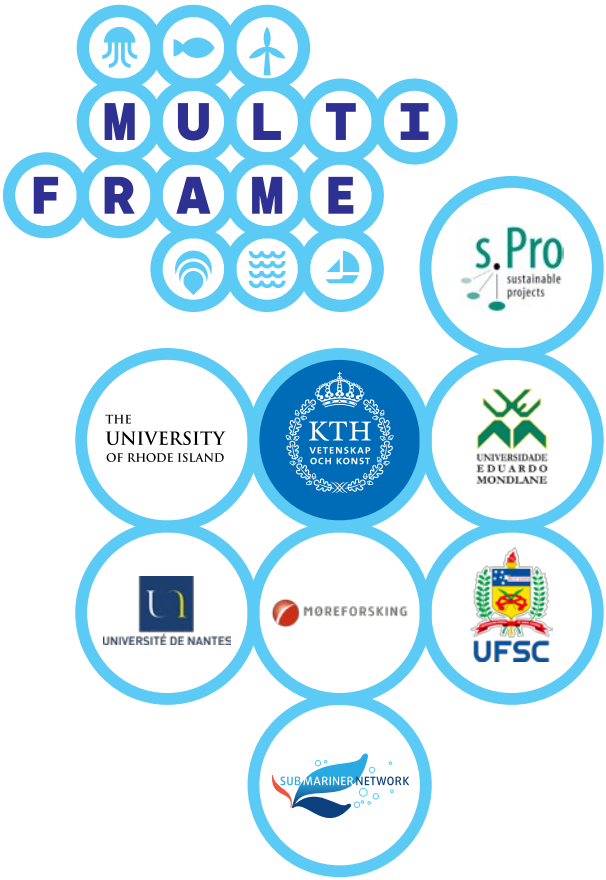

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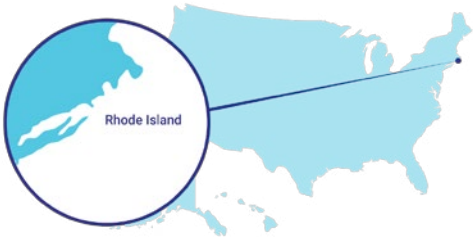
MULTI FRAME

MULTI-USE BLUEPRINT

Aquaculture, Recreational Fishing and Boating
in Rhode Island, United States

Location



Located in the New England region of the Northeastern US is Rhode Island, the smallest (by area) yet the second most densely populated U.S. state, that borders the states of Connecticut and Massachusetts, and the Atlantic Ocean. Its official nickname is the "Ocean State", a reference to its 400 miles (640 km) of coastline and the large bays and inlets that comprise about 14% of the state (169 sq miles (438 kilometers)). From high-tech defense spurring innovation, to world-class marine trades and composites contributing to the state's reputation as the sailing capital of the world, to internationally respected oceanographic research and strategic military educational institutions tackling complex issues and training future leaders to solve local and global challenges, Rhode Island's economy, culture, and society significantly depends on the ability to access and share its healthy ocean and coastal resources. The Rhode Island Coastal Resources Management Council (CRMC) is obligated under its state enabling legislation to "preserve, protect, develop, and, where possible, restore the coastal resources of the state." – basically to balance all these often-competing uses, encourage synergies, including protecting the fragile natural resources. An example of this undertaking is CRMC's efforts to minimize conflict and encourage appropriate economic growth and synergies between traditional uses, such as recreational fishing and boating, with the aquaculture

Description

Aquaculture, primarily for oysters run by local farmers, is one of the state's fastest growing enterprises with a nearly $6.07 million value of aquaculture products for consumption and seed sales in 2019 covering more than 340 acres of the coastline. Farmers and community members often disagree about whether and how the industry should operate in these pristine waters, and what farms should look like above and below the surface. Most aquaculture farmers implement best management practices, such as keeping their farms tidy and clean and only working on their farms during certain times of the day and/or year to minimize conflict. There is recognition by many about the habitat and water quality benefits of shellfish aquaculture, however issues including the use of some gear types, such as floating gear, and the growth of aquaculture development is escalating the concern by other resource users and coastal property owners about loss of Bay use and visual aspects. CRMC, with input from other state agencies, The University of Rhode Island (URI), property owners, and resource users is working to minimize these conflicts and offer ways to synergically share these areas.

Enabling conditions and tools

In accordance with its regulatory policy, the CRMC supports commercial aquaculture in locations where it can be accommodated among other uses of Rhode Island waters and recognizes that responsible shellfish aquaculture has a net positive effect on the environment. R.I. General Laws specify that aquaculture should only be conducted within state waters in a manner consistent with the best interest of the public, specifically in terms of impacts on the free and common fishery, navigation, and the marine environment. CRMC has developed other strategies that support the sustainable aquaculture growth and when possibly synergies between other resource users:

5% rule

In the early 2000's CRMC organized a working group made up of resource users, environmental organizations, academics, resource managers and regulators to respond to the potential environmental and social impacts taking place due to the growing aquaculture industry. The group made several suggestions that allowed for the continued growth of the aquaculture industry while protecting the environment and decreasing the possible conflicts with other user groups. The most wide-ranging recommendation of the group was a limit on the area allowed to be occupied by aquaculture of 5% within the state's Salt Ponds. This limit was arrived at by studying the available peer-reviewed scientific literature on ecosystem carrying capacity and adapting examples from other parts of the world and adapted to RI specific conditions and has contributed to easing the tensions between the aquaculture industry and other resource users.

Resource user involvement

The Rhode Island Marine Fisheries Council, made up of the state's natural resources management agency (serving as chair) and eight private citizen members all who have the skill, knowledge, and experience in the commercial fishing industry, sport fishing industry, and the conservation and management of fisheries resources, advises CRMC potential impact of aquaculture applications on wild-harvest fisheries.

Narragansett Bay Special Area Management Plan (Bay SAMP)

With the expansion of aquaculture in Narragansett Bay, in 2020 CRMC undertook the development of the Bay SAMP initiative that engages the public in the gathering, synthesizing, and sharing Bay science and best management practices for the purpose of updating state policy to guide Rhode Island's use and management of Bay resources and activities. The Bay SAMP Aquaculture Element has led to implementation of administrative changes that contributes to the shared use of the Bay resources. Specifically, it: 1) enhances the aquaculture notification process; 2) Provides additional support and detail during the preliminary phase of the permit application process; 3) and Implements guideline recommendations regarding low-profile growing gear. In addition, CRMC has contracted URI to work with the recreational fishing community to develop a sustainable and stakeholder supported tool that will assist CRMC to better understand recreational fishing use throughout Narragansett Bay. URI will also develop recommendations for draft CRMC policies to assist in minimizing user conflict and guide future Bay decision-making.

Impacts and positive changes

While multi use, in the form of co-existence, is supported, there continues to be tensions amongst the different Bay resource users. The aquaculture industry encourages fishermen and boaters to fish and travel through the farm if they don't damage the gear or animals. While some enjoy and appreciate fishing and "touring" through these structures, others consider the shared use of these areas as a threat to their traditional use of this area. There also has been studies and discussion around the concept of harvesting the mussels growing on the Block Island Wind Farm platform (located in state waters), however this has not been pursued in part due to the offshore wind energy developers concern about safety and liability. Applying a public and transparent process, CRMC recognizes the need to continue to develop policies, tools, and relationships to find multi use solutions towards minimizing conflict between these resource users.

Links

- **Partners:** Rhode Island Department of Environmental Management, University of Rhode Island Coastal Resources Center, Rhode Island Sea Grant
- **Benjamin Goetsch**, Aquaculture Coordinator, RI Coastal Resources Management Council
- **Rhode Island Coastal Resources Management Council**
  http://www.crmc.ri.gov/
- **CRMC Aquaculture**
  http://www.crmc.ri.gov/aquaculture.html
- **Narragansett Bay SAMP**
  https://web.uri.edu/crc/narragansett-bay-samp/

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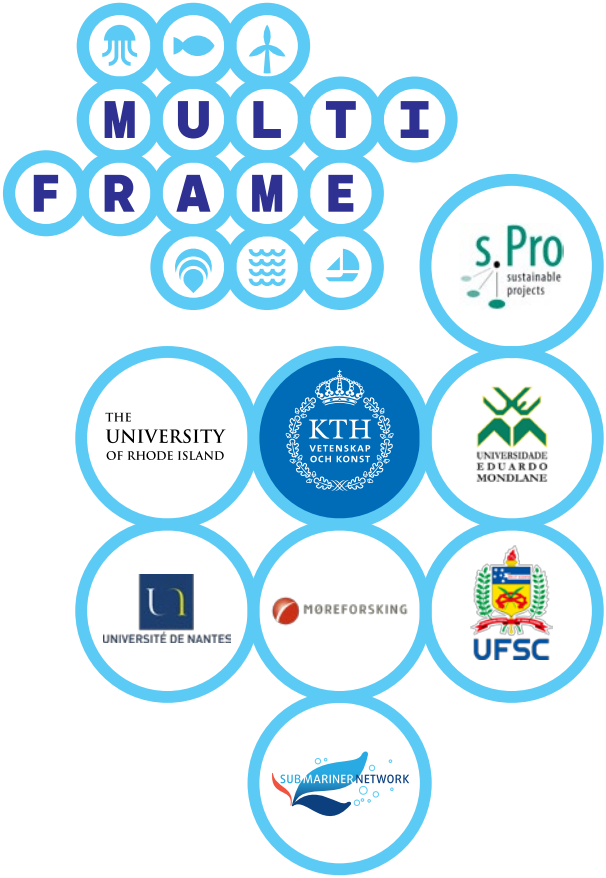

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MULTI FRAME

MULTI-USE BLUEPRINT

Research and Tourism in Stellwagen Bank, United States

Location

Stellwagen Bank National Marine Sanctuary is located completely within Federal waters, 3 nautical miles from Cape Ann and Cape Cod at its northern and southern ends, respectively, and about 40.2 kilometers (25 miles/21.7 nautical miles) east of Boston. At 1,355 square kilometers (638-square-nautical-miles), the Sanctuary encompasses much of the mouth of Massachusetts Bay, with Stellwagen Bank serving as its major (and central) geological feature. The Bank's discovery in the mid-nineteenth century was deemed significant as an aide to navigation at night or foul weather. Today, the bank is understood to be a significant factor in supporting the high productivity of the area. Designated by US Congress under the Oceans Act of 1992 (signed into law by President George H. W. Bush on November 4, 1992), the Sanctuary is managed by the National Oceanic and Atmospheric Administration (NOAA) to conserve, protect, and enhance the region's biodiversity, ecological integrity, and cultural legacy. Among the goals of the designation were to increase protection of the great diversity of marine creatures that depend on these waters for all or part of their life cycle, to advance research to aid management, and to educate the public about resources and conservation issues. Major human uses, such as tourism (whale watching, recreational fishing, diving) and commercial fishing, frequent this area due in part to its biodiversity and its relative closeness to the mainland. The Sanctuary is recognized as one of the world's top whale watching destinations and provides significant economic benefits to the surrounding communities. Its location near a major metropolitan center and numerous ports and harbors make it a location for active commercial shipping and high vessel traffic.

Description

Through the establishment of a healthy partnership between the Sanctuary and the whale watching industry, the Sanctuary has been able to both increase its research to understand the marine mammals frequenting the area and enhance the knowledge of thousands of Sanctuary visitors. In fact, the Sanctuary team implements a robust whale conservation and education agenda to build the awareness and conservation commitment of the public. Many whale watching companies contribute to this agenda by voluntarily agreeing to become a member of Whale SENSE.

Whale SENSE is an education and recognition program offered to commercial whale watching companies in the U.S. Atlantic and Alaska Regions. The program is sponsored by NOAA and Whale and Dolphin Conservation. Developed in collaboration with the whale watching industry, Whale SENSE recognizes whale watching companies committed to responsible practices. Whale watch naturalists provide research data (e.g., photos of whales for identification) to enhance the sanctuary's research agenda, while also serving as education ambassadors. Sanctuary provides the industry with educational information and research results to their trained naturalists, who then use it to enrich the ecotourism experience to their passengers. The sanctuary also offers its own educational programs for whale watching visitors (e.g., tips for taking whale images and tips for whale watching) to enhance their understanding and experiences.

Enabling conditions and tools

Stellwagen applies the following tools to maintain the commitment, capacity, and constituency necessary to achieve the sanctuary's mission.

Authority

Stellwagen is managed under NOAA's Office of National Marine Sanctuaries which is located within the National Ocean Service line office of the National Oceanic and Atmospheric Administration (NOAA). The National Marine Sanctuaries Act (NMSA) provides authority to issue regulations as necessary to protect the resources and qualities for which individual sanctuaries were designated. This would include regulations for certain fishing activities if determined necessary to protect sanctuary resources or qualities. The scope of a sanctuary's regulatory authority is further defined in its designation document.

Formal management

Regulations and guidelines, research and education permits, periodic reviews, including condition reports, management plan revisions, and a commitment from partners help achieve the sanctuary mission and help protect natural and cultural resources for today's users and for future generations.

Enforcement

Marine patrol officers from two federal and one state agency enforce sanctuary rules and regulations, as well as other applicable regulations such as for fisheries and marine mammals. Primary enforcement responsibility rests with the NOAA Office of Law Enforcement (OLE). Policing sanctuary waters can be a daunting task due to the size of the sanctuary (842-square-miles/638-square-nautical-miles) and the large number of vessels that transit the area. A NOAA enforcement officer is assigned to Stellwagen Bank National Marine Sanctuary and is based at the sanctuary's Scituate campus.

Online article: https://stellwagen.noaa.gov/protect/enforcement.html

Guidelines

Guidelines have no legal enforcement status but provide a recommended code of behavior that help protect marine life. Guidelines for whale watching were developed by the sanctuary with NOAA Fisheries and the whale watching community. Involvement of the whale watching community into guideline development helped ensure their commitment and uptake of the guidelines.

Online article: https://www.fisheries.noaa.gov/new-england-mid-atlantic/marine-life-viewing-guidelines/whale-watching-and-wildlife-viewing-new

Assessments

The 2020 Condition Report best available science and most recent data to assess the status and trends of various parts of the sanctuary's ecosystem, including water quality, habitat, living resources, and maritime heritage resources. In addition, this new condition report includes the status and trends of ecosystem services—how humans either derive benefit or accrue costs from different ecosystem attributes that people care about for their lives and livelihoods. Ecosystem services evaluated in this report include heritage, food supply, consumptive and non-consumptive recreation, sense of place, science, and education.

Online article: https://sanctuaries.noaa.gov/science/condition/sbnms/

Guidance and Support

The Sanctuary Advisory Council is the formal organizational link to the sanctuary's user community and others interested in the management of this nationally significant area of the marine environment. The non-governmental members are selected to represent local user groups, conservation and other public interest organizations, scientific and educational organizations, or members of the public interested in the protection and multiple use management of sanctuary resources. Major responsibilities for this community-based body are to advise the sanctuary superintendent on issues relevant to the effective implementation of the sanctuary management plan and serve as a liaison between communities and the sanctuary by keeping sanctuary staff informed of issues and concerns, as well as performing outreach to their respective communities on the sanctuary's behalf.

Sanctuary Advisory Council Members: https://stellwagen.noaa.gov/management/sac/member.html

Public engagement

In addition to the Sanctuary Advisory Council, Stellwagen organizes public scoping sessions to assess needs, opportunities, and challenges. Some of the challenges recently identified include responding to global concerns - climate change, overfishing, pollution, habitat protection, whale conservation, enforcement, additional research needs, and greater public outreach. Many of the comments included calls for greater protection of sanctuary resources by limiting extractive uses (e.g., sand and gravel) in the sanctuary. The Sanctuary also offers an informal speakers' program, where staff members give talks on a variety of topics, ranging from bird identification to whale research results. Presentations at government meetings, industry conferences, academic institutions, schools, and public events bring sanctuary information before a wide range of audiences.

Impacts and positive changes

• **Economy:** According to a recent study, whale watching on Stellwagen Bank translates to roughly 1,400 jobs annually, with $76 million in labor income, and $182 million in sales annually to sanctuary communities.

• **Minimizing impact:** Stellwagen uses its research and local knowledge to make informed management decisions. For example, in 2007 upon a petition from the Sanctuary and partners, the International Maritime Organization (a United Nations entity) made a 12-degree northward adjustment of the Boston Traffic Separation Scheme (shipping lanes). This change protected the critically endangered North Atlantic right whale by moving ships away from their feeding ground. It also protected other baleen whales (e.g. humpbacks and finback) by moving ships into a less desirable foraging area. This adjustment reduced the risk of ship strikes to critically endangered right whales by up to 58 percent and to other large baleen whales by up to 81 percent.

Contacts and links

- **Partner:** The sanctuary partners with many organizations, either formally or informally, for a variety of projects, both large and small. Formal partnerships involve a Memorandum of Agreement or Memorandum of Understanding. In many cases, partnerships are developed between staff members to forward work on projects that will benefit the environment and the interests of the participating organizations. Partners include Federal and state agencies, museums/aquariums, Academia, NGOs, Business and Industry Associations. *https://nmssanctuaries.blob.core.windows.net/sanctuaries-prod/media/docs/20202-sbnms-accomplishment-report.pdf*
- **Partner:** The not-for-profit National Marine Sanctuary Foundation provides direct financial support for programs and projects at individual Sanctuaries for science and conservation, connecting people and communities to sanctuaries, and creating the next generation of ocean stewards through in- and out-of-school education. *https://marinesanctuary.org/our-work/programs/*
- **Ben Haskell, NOAA Stellwagen Bank National Marine Sanctuary**
  ben.haskell@noaa.gov (781) 546-6005
- **Anne Smrcina, NOAA Stellwagen Bank National Marine Sanctuary**
  anne.smrcina@noaa.gov or (781) 546-6007 or (781) 738-2242
- **Stellwagen Bank National Marine Sanctuary**
  https://stellwagen.noaa.gov/

Imprint

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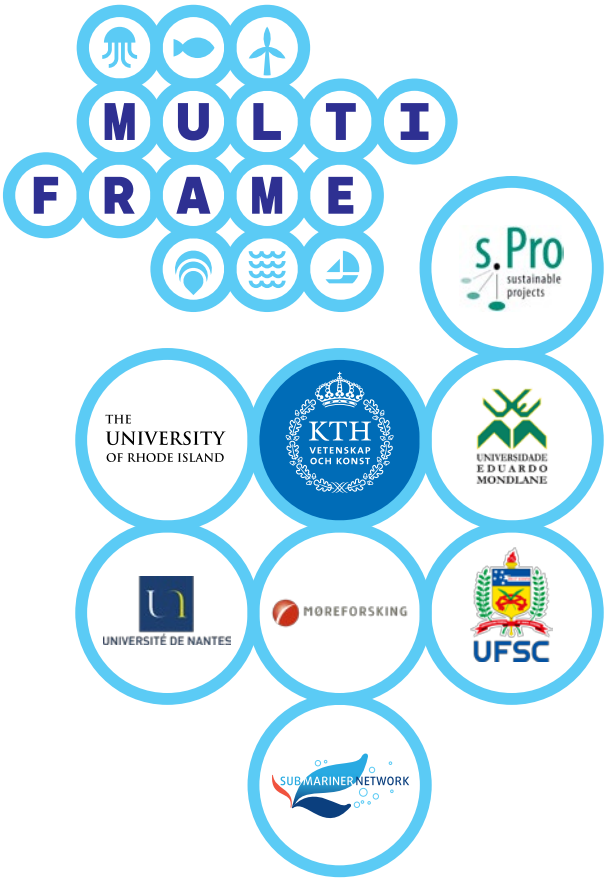

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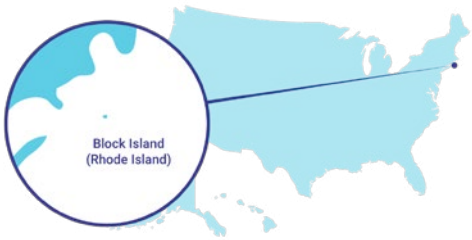
MULTI FRAME

MULTI-USE BLUEPRINT

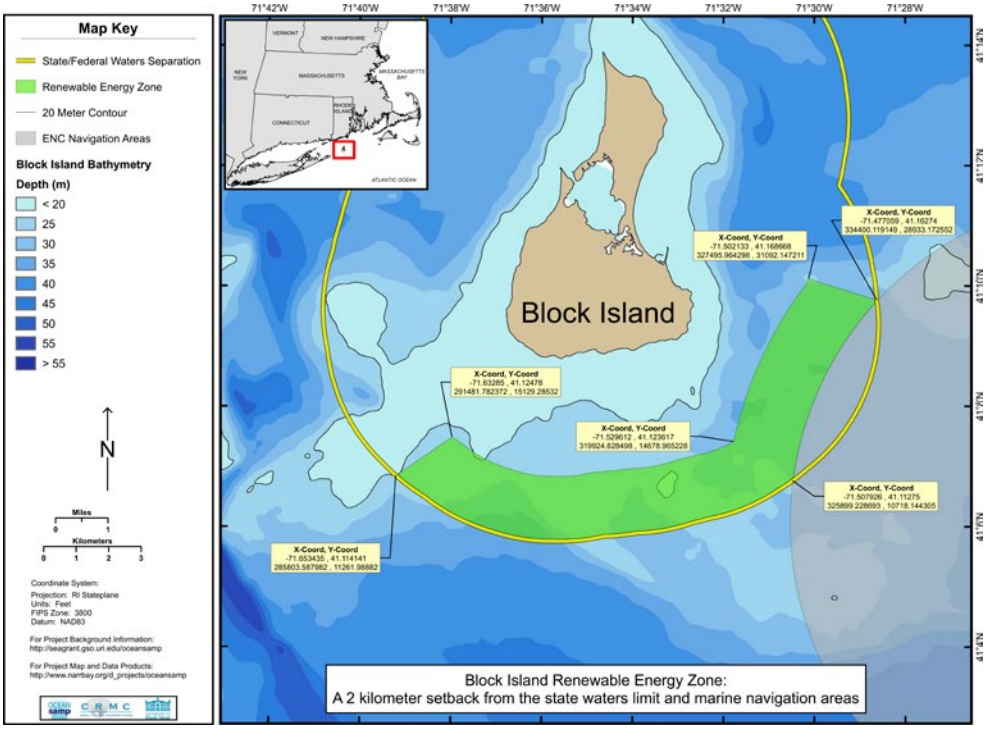
Fishing, Offshore Wind Energy & Tourism
in the Block Island wind farm, United States

Location



Located about 3 miles (4.8 km) southeast of Block Island, Rhode Island, and about 16 miles (25.7km) from the Rhode Island mainland, the Block Island Wind Farm (BIWF) is the first offshore wind farm in the United States (U.S.) and began energy production in 2016. Block Island is in the state of Rhode Island, a state in the New England region of the Northeastern US. The smallest U.S. state by area, Rhode Island borders Connecticut Massachusetts and the Atlantic Ocean. The 30 megawatt, five-turbine demonstration project produces more than 125,000 megawatt hours of electricity annually.

Rhode Island Ocean Special Area Management Plan (SAMP)



Source: Ocean SAMP Practioners Guide
http://www.crmc.ri.gov/samp_ocean/reports/Ocean_SAMP_Practioners_Guide.pdf

Power is transmitted from the turbines to the electric grid along a 21-mile (34 km) transmission submarine power cable buried under the ocean floor, making landfall north of Scarborough Beach in Narragansett, Rhode Island. Based on the analysis of information including wind speeds, water depth, substrate types, existing uses (e.g., shipping, fishing, tourism and recreation, military testing), and protected areas, as well as considering the potential effects of offshore wind turbines on wildlife and existing uses from renewable energy, the Ocean SAMP designated Renewable Energy Zone (REZ), which is now the location of the BIWF.

Approximately 2 kilometers (1.2 miles) wide and 34 square kilometers (13 square feet) long, this area extends from the east to the south-west of Block Island, just landward of the state water boundary. Because the BIWF developer, Deepwater Wind, submitted development proposals for the BIWF within the REZ within two years of Ocean SAMP approval, it was able to use data from the SAMP to complete its permitting process, expediting the permitting process.

Description

The Ocean SAMP, a federally adopted regulatory management plan, applies an ecosystem-based management approach to foster a properly functioning ecosystem that is both ecologically sound and economically beneficial. A major driver for this plan was to identify a location in Rhode Island's offshore waters to site offshore wind that had the least amount of impact on wildlife and Rhode Islanders. While a science and knowledge-based public process served to steer the development of this plan, policy tools anchored the plan's success. Within the REZ, activities including tourism, commercial and recreational fishing and boating, essential fish habitat protection, and cooperative research take place within the BIWF.

Enabling conditions and tools

The Ocean SAMP provides a supportive framework that prioritizes multi-use, especially within the REZ. The following conditions and tools continue to be applied to maintain this multi-use support:

Integrated local knowledge and expertise

Through the establishment of the CRMC Ocean SAMP Habitat (HAB) and Fishermen's (FAB) Advisory Boards, key stakeholder groups, including fishing, environmental and research interests, have a well-defined means of officially engaging in this state driven decision-making process – giving them assurance of their involvement in and influence over the process. Specifically, during the Ocean SAMP process and after, the HAB and FAB met frequently with CRMC staff and Deepwater Wind (the BIWF developer) to discuss such issues as cable siting, mitigation, and research and monitoring design and implementation. Because these activities were taking place in state waters and CRMC prioritized the value of HAB and FAB expertise, this process established trust and enhanced communication between the fishing industry, researchers, e-NGO's, state government, and developers, which resulted in the sharing of this area. While OWE, the newest maritime use in the area, and commercial fishing, one of the oldest uses, use this area all year long, other activities such as tourism, including recreational fishing and boating, takes place mostly during late Spring to early Fall. While the HAB and FAB continue to engage in the current federal OWE development siting processes, as required by the Ocean SAMP policies, much of this trust has deteriorated in part because HAB and especially FAB members feel their concerns or requests have not been valued or considered as decisions are being made by the developers or government.

Clear policy to support streamlined decision-making

Through the REZ and associated regulations, the BIWF was permitted in 2014 relatively quickly and efficiently, with extensive input from stakeholders including highly- affected groups, like fishermen, the Narragansett Tribe, and environmental non-governmental groups, with minimal conflict. This support was possible in part because the Ocean SAMP process (2008–2010) responded to their concerns and access to the ocean area was not going to be significantly impacted and the natural resources were going to be protected.

Authority

The Rhode Island state policy authorizes CRMC to encourage multi-use in areas with the Water Classification Type 4 (multipurpose) zone. Originally in a Type 4 zone, the REZ has been modified as Water Classification Type 4E to show that while this is the preferred site for large scale renewable energy projects in state waters, other activities including but not limited to habitat protection, tourism, fisheries, or research should not be hindered. The regulations are specific to requiring that in these Type 4E waters essential fish habitat should remain protected and there are no significant long-term negative impacts to Rhode Island's commercial or recreational fisheries. Long-term impacts are defined as those that affect more than one or two seasons.

Impacts and positive changes

Based on current research and in part anecdotal data, commercial and recreational fishing, tourism, research, and conservation activities have had no significant negative impacts because of the BIWF. In many cases, multi-use within the area has been enhanced. Because of FAB involvement, cooperative research has in many cases produced more trusted data on the effects on fish and fish habitats because of the wind farm. Researchers have documented that the BIWF serves as an auxiliary attraction to other recreationist or tourist activities. The recreational fishermen state that the turbines are serving as artificial reefs and the local tourism industry recognizes that tourists are buying tickets to travel to the wind farm just to observe it. Researchers, students, government officials and others interested in learning the Ocean SAMP story, seeing the nation's first offshore wind farm, or understanding the economic and environmental opportunities surrounding offshore wind development flock to Rhode Island. The wind developer is allowing research equipment on structures and social and physical research is being funded. While commercial fishing does take place within the wind farm during fair weather days, there is still a concern about safety by commercial fishermen during more inclement days. In addition, while mussel harvesting from the turbine structures has been considered this possible multi-use opportunity has not taken place for economic, safety, insurance, and logistical reasons.

Contacts and links

- **Partners:** Rhode Island Department of Environmental Management, University of Rhode Island, Rhode Island Sea Grant
- **CRMC web page Wind Energy**
  http://www.crmc.ri.gov/windenergy.html
- **Ocean SAMP Practitioners Guide**
  http://www.crmc.ri.gov/samp_ocean/reports/Ocean_SAMP_Practioners_Guide.pdf
- **Offshore-renewable energy –** planning and policy
  https://web.uri.edu/offshore-renewable-energy/planning-and-policy
- **Analysis of Effects of the Block Island** Wind Farm on Rhode Island Recreation and Tourism Activities
  https://web.uri.edu/offshore-renewable-energy/research/analysis-of-effects-of-the-block-island-wind-farm-on-rhode-island-recreation-and-tourism-activities/

Imprint

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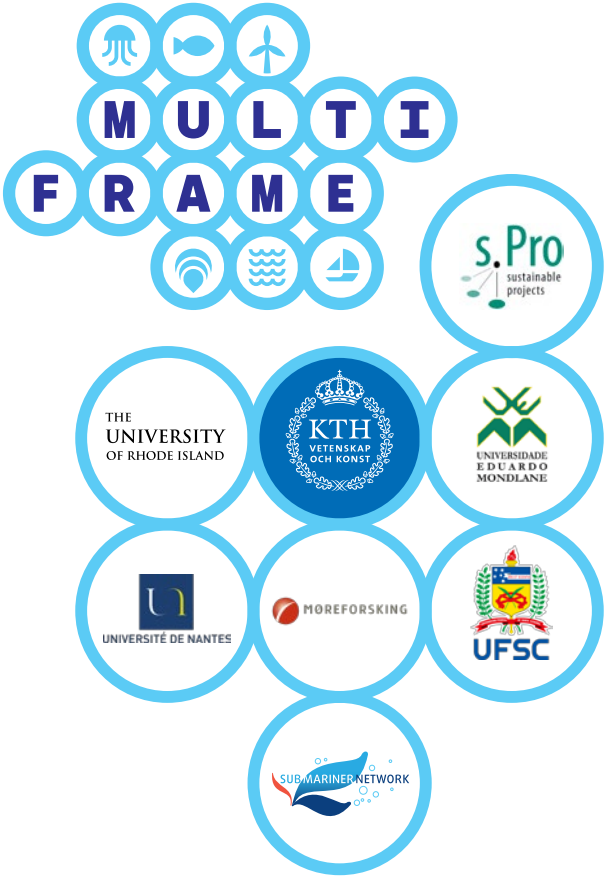

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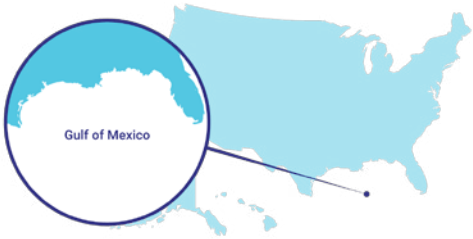
MULTI FRAME

MULTI-USE BLUEPRINT

Recreational fishing, Biodiversity, Oil & Gas Platforms
in the Gulf of Mexico, United States

Location

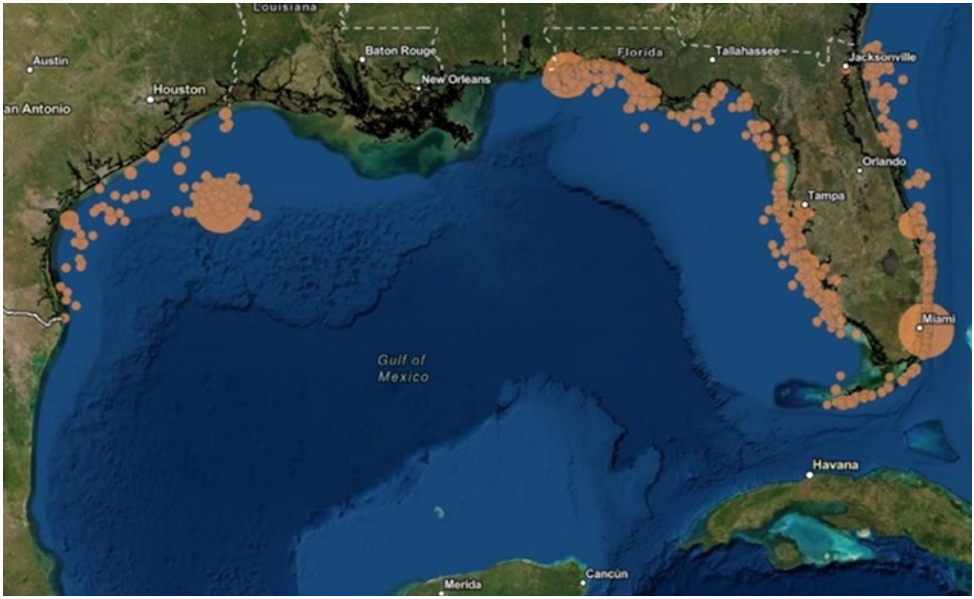


Surrounded by the U.S. states of Alabama, Florida, Louisiana, Mississippi and Texas, and the Mexican states of Tamaulipas, Veracruz, Tabasco, Campeche, Yucatan, and Quintana Roo, the Gulf of Mexico (Gulf) is a place where the environment and the economy both coexist and compete. While a major resource for the American, Mexican, and Cuban commercial and fishing industries, the Gulf also serves as a popular beach destination and an international maritime highway fueled by vast hydrocarbon reserves. Specifically, in 2003, the Gulf of

Gulf of Mexico Open Data Platform

Source: *https://gmod-portal-gomalliance.hub.arcgis.com*

Mexico's ocean economy employed more than 562,000 people, paid wages of more than $13.2 billion, and contributed over $32 billion to the region's gross state product. Tourism and recreation comprised 71 percent of the employment in the Gulf region's 2003 ocean economy . Because of increased interest and participation in fishing at offshore oil and gas platforms and widespread.



Description

The U.S. Bureau of Safety and Environment Enforcement (BSEE) is responsible for permitting the placement and eventual removal of temporary facilities on the Federal Outer Continental Shelf (OCS). When an OCS lease expires and/or development and production operations cease, companies are obligated to decommission and remove their facilities and clear the seabed of all obstructions. An operator may choose to completely remove this infrastructure from the water, as required, or work with BSEE and the appropriate Gulf state to consider the appropriateness of transferring ownership of the platform into that state's artificial reef program. For the operator, the decision to remove the infrastructure or engage in the Rigs-to-Reef program usually depends primarily on the cost of removing the infrastructure from the water, as many operators find the Rigs-to-Reef program an opportunity to minimize decommissioning costs while also establishing good will with the recreational fishers and conservation community. In the Gulf, the respective state receives a payment from the operator, which is used to maintain the state's Rigs-to-Reef program.

Enabling conditions and tools

The BSEE led Rigs-to-Reefs program implements several tools and techniques to nurture the enabling conditions towards a successful multi-use initiative within the Gulf. Some of these tools and techniques include:

Federal and state partnerships

Through a cooperative agreement mechanism, BSEE coordinates with the National Marine Fisheries Service, the Gulf states and their universities, and the oil and gas industry to implement the following five objectives:

1 Develop a national policy that recognized the artificial reef benefits of oil and gas platforms;

2 Prepare a Rigs-to-Reefs program plan for the Gulf of Mexico;

3 Establish standard procedures to ensure and facilitate timely conversion of obsolete platforms as reefs;

4 Identify research and studies necessary to optimize the use of platforms.

Support from diverse sectors

Due to the enhanced marine life activity which has resulted in increased fishing activity, both the recreational fishing and environmental not-for profit organizations are actively engaging in the enhancement and support of this program. In addition, the oil and gas industry supports this program as they recognize the reduced cost for decommissioning.

Clear goals

The Rigs-to-Reefs Program has both clear environmental and economic goals and benefits, thus sustainably responding to the needs of many stakeholders.

Capacity

Each Gulf state has an artificial reef plan and coordinator, providing them with the capacity to plan and implement a state program and engage regionally. The state coordinator identifies offshore areas which are suitable for reefing, whether existing or newly proposed reef sites, works with the operator to develop a reefing proposal, secure the required permit, and negotiate the terms of an agreement for a donation from the operator to the state. In most cases, half of the cost benefits to the operator are donated to the state's artificial reef program.

Impacts and positive changes

While research to better understand the biological and economic impacts of the Rigs-to-Reefs program is needed, other considerations, including the potential impact from the significant decline of oil rigs in the Gulf of Mexico is at the forefront. In general, it is believed that the Rigs-to-Reefs program does enrich the marine life. Specifically, according to the Coastal Marine Institute, a typical eight-leg structure provides a home for 12,000 to 14,000 fish and a typical four-leg structure provides two to three acres of habitat for hundreds of marine species. In addition, the Programs allows for the repurpose of obsolete structures saving fuel emissions that otherwise would be expended transporting and disposing of the structure. Also, because of the enhanced artificial reef system from the offshore oil and gas platforms, many recreational fishermen and divers consider the Gulf as a sports fishing paradise.

Contacts and links

- **Partners:** The Bureau of Safety and Environment Enforcement (BSEE); The Gulf states
- **Bureau of Safety and Environmental Enforcement's Environmental Compliance Program:** *https://www.bsee.gov/what-we-do/environmental-compliance/environmental-programs/rigs-to-reefs*
- **Alabama Artificial Reef Program** *http://www.outdooralabama.com/artificial-reefs*
- **Florida Artificial Reef Program – counties** *http://myfwc.com/conservation/saltwater/artificial-reefs/*
- **Mississippi Artificial Reef Program** *http://www.dmr.ms.gov/marine-fisheries/artificial-reef*
- **Louisiana Artificial Reef Program** *https://www.wlf.louisiana.gov/page/artificial-reefs*
- **Texas Artificial Reef Program – 100 miles EEZ – can be out to the EEZ – enabling legislation** *http://www.tpwd.state.tx.us/landwater/water/habitats/artificial_reef/*

Imprint

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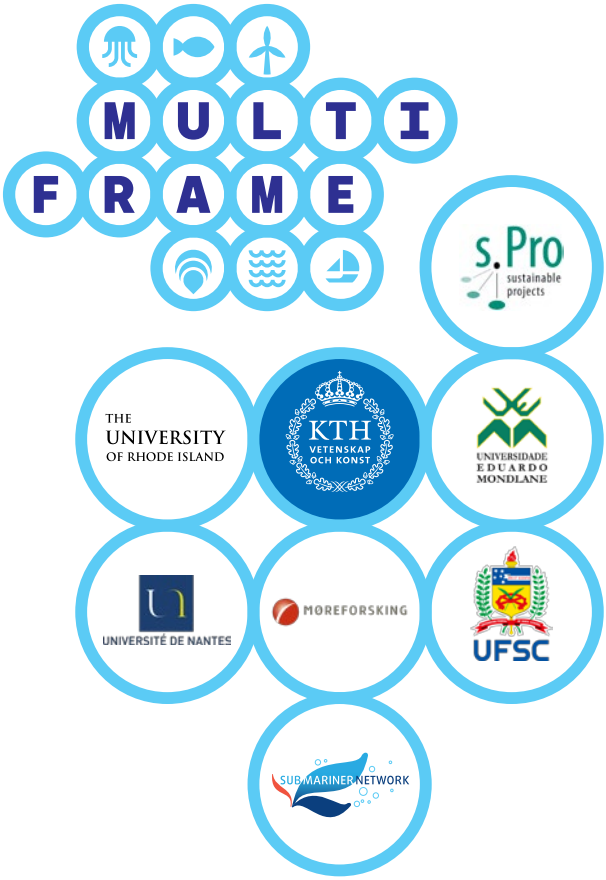

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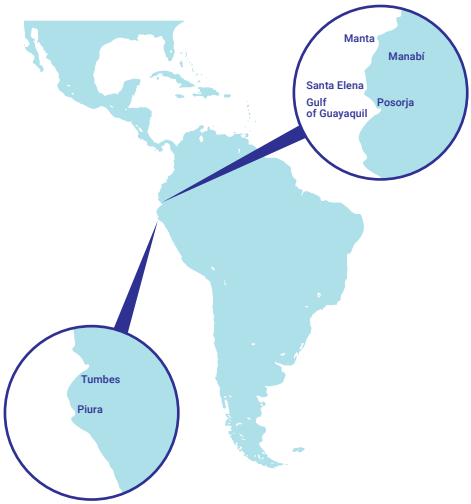
MULTI FRAME

MULTI-USE BLUEPRINT

Artisanal, small-scale fisheries and mangrove restoration –
Transboundary Coastal Fisheries Initiative,
Peru & Ecuador

Location

A transboundary multi-use between artisanal, small-scale fisheries and mangrove restoration takes place in two specific locations in Ecuador and Peru.



Location in Peru:
Piura (Sechura, Manglares de San Pedro de Vice, Virrilá Estuary, Negritos, Illescas National Reserve) and Tumbes.

Number of small – scale fishers:
88,000

Source: *Ministerio de la Producción 2021*

The Ministry of Production (Produce) indicated that artisanal maritime and inland fishing contributed **64.1%** of the total resources for direct human consumption (CHD) to the fishing sector in the last five years.

Nominal artisanal catch registered between 2015 and 2020, fluctuates between **800,000** and **1,200,000** MT. In 2020 Piura records a total of **710,951** MT.

Artisanal fishing in Piura is valued at **676,032,002.14** dollars (**2,578,724,138** soles) per year.

Location in Ecuador:
Posorja, Gulf of Guayaquil, Manta and Manabí.

Number of small-scale fishers in Ecuador:
28,510

Source: *Superintendencia de la Economía Popular y Solidaria (SEPS) 2021.*

Small scale fisheries exports per year:
100 **millon USD**

Source: *Conferencia plurinacional e intercultural de soberania alimentaria.*

Description

The Coastal Fisheries Initiative in Latin America (CFI) project is implemented in Ecuador and Peru.

The two project locations are rich in fishing resources, biological diversity is high and fishing sector is important to local communities. Nevertheless, the sector has had an uncontrolled expansion driven mainly by an increase in market demand, open access policies and the lack of regulations, surveillance or sanctions. In the face of this, CFI aimed to apply a holistic ecosystem-based management approach towards enhanced management of the Southeast Pacific coastal fisheries.

This is done through the implementation of three components that aim to:

1) improve fisheries governance, mainly in artisanal and small-scale fisheries (Mahi mahi, Titi shimp, pustolse ark, mangrove crab and tuna pole and line);

2) support authorities in marine and coastal spatial planning;

3) exchange experiences and knowledge through spaces for dialogue between key binational stakeholders, as well as documentation and dissemination of lessons learned, and good practices generated during project implementation.

The project promotes the generation of enabling conditions to improve the participatory management of marine ecosystems, especially into mangrove areas. Participatory management encourages the participation of fishing communities in the management of natural areas and sustainable fisheries management.

In participatory management fishing communities are the custodians of the preservation and restoration of ecosystems. The communities are responsible for monitoring the state of the mangrove flora and fauna, and if there is evidence of loss of vegetation or species, they must report it to the environmental authorities so that together they can implement restoration actions.

The project has worked to strengthen the management capacities of fishing communities, local authorities and other stakeholders to improve the sustainable management of fisheries and marine ecosystems in the intervention areas.

Ecotourism has also been promoted in mangrove zones, the project have worked with fishing associations that are in charge of this activity and also with the environmental authority to promote sustainable tourism in the area.

Enabling conditions and tools

Participatory governance

The project promotes the management of natural areas through a participatory approach. This means that communities, the public sector, the private sector and other stakeholders that are related in some way to a natural area can work together to make decisions and take actions for the conservation and preservation of its biodiversity.

It also includes the active participation of communities in the management of natural areas and their resources. In Ecuador, fishermen's associations have an agreement with the Ministry of the Environment for the use

and custody of mangrove areas. Through this agreement, the fishing communities are responsible for the sustainable management and conservation of the mangroves. To this end, they carry out monitoring and surveillance actions, as well as self-imposed closures and other actions that allow them to not only benefit from the extraction of their resources but also ensure the sustainable development of the area.

In Peru, a similar model is being implemented in the Tumbes National Sanctuary, where the Consorcio los Manglares del Noroeste del Peru is the manager of the mangrove zone with the local environmental authority. The Consortium implements actions to regulate resource extraction and monitors the area's flora and fauna.

Regulation

The project has promoted the generation of formal instruments of participatory governance such as: i) National Action Plans for sustainable management of mangrove crab, mahi mahi and pustulose ark in Ecuador, ii) in Peru territorial management agreements signed between fishermen and authorities for the management of mangrove crab and pustulose ark, and iii) management plans for natural areas and coastal marine spatial planning instruments.

Use of technology

Installation of onboard cameras and use of QR code tracking of mahi mahi value chains in order to create a traceability pilot plan, development of electronic systems such as apps, and online platforms for data fisheries and administrative collection to improve management of artisanal fisheries.

Research

The project finances the research for the laboratory production of pustulose ark seeds. This is one of the mangrove's most important resources and right now is considered an endangered species. The investigation purpose is to create pustulose ark seeds in the laboratory and then plant them in the mangrove to support the restocking of this species.

In Perú the “Consorcio los Manglares del Noroeste del Perú” and in Ecuador “Los Isleños association” are involved in this planting and conditioning phase, and oversees transporting, planting, and monitoring the growth of the implanted seeds. The activity aims to have an environmental and a production approach that benefits the ecosystem but also the fishing communities.

According to recent studies by the Peruvian research institute in the Tumbes Mangroves, an increase in the availability of this species from 0.9 to 1.2 per square meter has been observed. However, it is too early to assure that the research has contributed to the totality of these results, but it is estimated to have had an impact on it.

The project has invested around 165 thousand dollars for this research, which will continue to be carried out with funds from other public and private projects, so it is a highly sustainable activity that will have a positive impact on the ecosystem in the future.

Federal Commitment

The commitment of the national government in two countries was of particular importance for the implementation and uptake of the project outcomes. The CFI is executed in Peru by the Ministry of Environment (MINAM), Ministry of Production (PRODUCE), the Regional Governments of Tumbes and Piura (GORE Tumbes, GORE Piura), and in Ecuador by the Ministry of Production, Foreign Trade, Investment and Fisheries (MPCIP) and Ministry of Environment, Water and Ecological Transition (MAATE), through its executing partners World Wildlife Fund for Nature (WWF) and Conservation International (CI) Ecuador. The project in both countries has the technical cooperation of the United Nations Development Programme (UNDP) as the implementing agency of the Global Environment Facility (GEF).

Impacts and positive changes

In Ecuador, the project has contributed to improving participatory governance in five artisanal. To this end, actions have been implemented from different aspects that intervene holistically in governance. On the one hand, the project has worked on the generation or updating of national action plans for fisheries, which are formal documents that regulate the use of fishery resources and aim to promote the sustainable management of marine biodiversity through public policy. Also, participatory monitoring systems have been implemented, in which fishing communities are involved in the collection of data on catches and the status of the species they catch. This data, which is collected by the communities, is shared with the fisheries research institute so that regulatory measures can be adopted with this information, such as closed seasons, minimum sizes and others that ensure the conservation of the species that are caught. Finally, the project has promoted the implementation of a traceability pilot with the mahi mahi fishery in which cameras have been installed on board to determine the origin of the species, so that both authorities and consumers can be certain that the product that is caught and consumed has a sustainable origin.

To complement these actions, a Coastal Marine Spatial Planning Plan has been developed for the Gulf of Guayaquil, where the capture of fishery resources related to the scope of the project is carried out. For the development of this plan, a promoter group was created with the participation of representatives from the public sector, communities, and the private sector with the purpose of bringing together all the actors involved in a natural area through conservation activities, tourism, and resource extraction to create joint actions for conservation and sustainable use.

With this same holistic management approach, the estimation of the Ocean Health Index in the provinces of Santa Elena and Manabí was carried out, an evaluation that aims to know the state of the oceans in an area in order to use this information to promote the generation of management and public policy measures that are addressed with the different actors that interact in an area.

A similar approach has been taken in Peru, working with governmental actors, communities, and the private sector to promote good governance in the management of artisanal fisheries.

In Peru, 1,258 hectares of mangroves in the Mangrove Tumbes National Sanctuary are protected and conserved through

a community governance system based on the joint action of the authorities and the community of 240 traditional fishers, who formally manage the protected natural area in an organized manner, respecting the regulations of the national authority and a master plan that defines the sustainable development of the area through three strategic axes: environmental, economic, and social.

The Project has promoted participatory research to pustulose ark seed reproduction technology in the laboratory for repopulation purposes, strengthened fishermen's capacities for surveillance and participatory control and monitoring, and added value to different hydrobiological products such as crabs, artisanal shrimp, and other pelagic species.

The project has also made it possible for more than 362 families to access collective financing for productive investments, based on the formation of credit and savings unions led by women and the improvement of the business skills of women entrepreneurs.

The project has also contributed to the modernization of artisanal fishing administration by implementing technological systems for managing processes and generating fishing information, thus contributing to the sector's transparency.

In another area of governance, the project has contributed to generate enabling conditions for approximately 222,000 ha of Sechura Bay in Piura to initiate marine-coastal spatial planning processes. For this, methodology tools for marine spatial planning were developed, also technical capacities of stakeholders have been improved and practical exercises has been carried out. So far, local authorities have been supported in implementing their natural area management plans. This has included the installation of signage, implementation of solid waste management plans in natural areas, and support has also been provided for the generation of studies that will allow for the re-categorization of three natural areas. The aim of this recategorization is for the environmental authorities to allocate resources for the preservation and conservation of these areas.

In both countries, work has been carried out from a holistic approach and actions have been implemented by the public sector, the private sector and fishing communities. The benefits of implementing actions from the different aspects of governance is that it is understood that in a natural area there are several actors involved, and these actors are obtaining benefits from this ecosystem, so implementing action measures from, for example, only the vision of the authorities will have repercussions in that the actors do not comply with the measures.

Therefore, to take management and sustainable development measures, the participation and voices of the people and actors that intervene in this natural area must be included. This ensures that the measures adopted for the sustainable management of the ecosystem and its resources are respected and promoted by all stakeholders.

Under this same vision, actions should be approached from the conservation, production, social and economic points of view, and only with the participation of all will effective sustainable management be achieved.

Transferability

Environmental degradation due to increased economic demand caused by weak governance structures is not only a problem in the fisheries sectors in Latin America, but it also affects all other sectors extracting common resource goods all over the world. This binational project shows that establishing integrated costal management plans, using nature-based solution to secure the income of local communities, increasing biodiversity by restoring marine habitats and the actively involving women in men-dominated sectors can only be successful through the creation communities of practice, capacity building and knowledge transfer at regional, local, national, or even global level.

Contacts and links

- **INTERNATIONAL WATERS LEARNING EXCHANGE & RESOURCE NETWORK**
  https://iwlearn.net/iw-projects/9124
- **Project website**
  https://cfi-la.org/es/
- **UN Evaluation Report**
  https://erc.undp.org/evaluation/evaluations/detail/8873
- **Project Video**
  https://www.youtube.com/channel/UCI-MEB0avufmEfqgJIIUqig

Imprint

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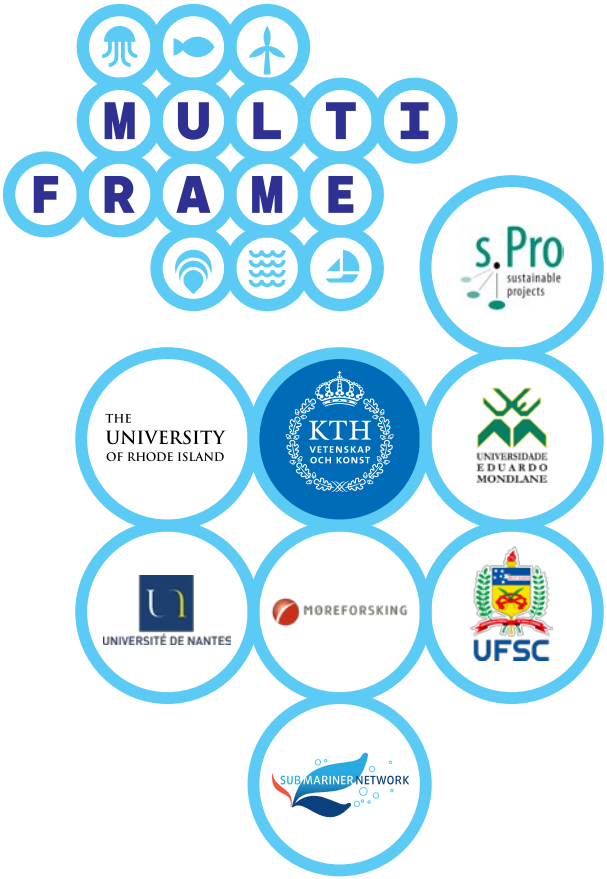
Photo: Unsplash.



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Common Conclusions

While multi-use requires trade-offs, negotiation, patience and especially a long-term commitment, generally it may result in economic, environmental, and cultural benefits. Key benefits of ocean multi-use reflected in the 11 blueprints include sustainable economic growth, reduction of conflicts over marine space and resources, nature restoration, and ocean literacy, to name a few. Multi-use solutions often emerge as part of wider environmental strategies addressing Anthropocene challenges such as climate change and marine biodiversity degradation. In addition, the scale and intensity of multi-use activities range from basic (e.g., kayaks and fishers within an aquaculture farm) to advanced (e.g., tourist climbing a wind turbine). While the multi-use strategy is not appropriate in all ocean spaces, it is one that can be considered in ocean spaces in great demand. Upon review of the 11 Blueprints, the Project Team observed the following:

Regulation

Enabling or hindering multi-use: Regulatory structure at the local, regional and in many cases national levels, plays a significant role in determining the likelihood of advanced multi use. For example, in the Netherlands, offshore wind developers are required to consider integration with nature restoration and protection, which is even included in the tendering procedure as a non-financial award criterion. While in many European countries multi-use is encouraged and, in some cases required, in other parts of the world the permitting and regulatory process does not proactively encourage and likely discourages intense synergies between marine uses in the same location.

Identifying actual multi-use: Pinpointing active or successful multi use cases can be contentious, as regulations and definitions of multi use may vary from place to place. In some cases regulators may state that multi-use or co-existence has been achieved, but upon closer inspection, such scenarios are more about two users tolerating each other with little to no synergistic relationship.

Stakeholder hesitancy due to uncertainty: In addition, many marine users hesitate to engage in advanced multi use activity (e.g., working in close shared spaces and/or times) due to the concern of losing their insurance because of the potential and perceived increase in accidents e.g. in case of safety issues the responsibility is not well defined between the actors responsible for the uses. Stronger regulatory clarity around multi use and associated legal aspects (e.g. that cover insurance requirements) would make it more attractive and reduce perceived risks.

Political will: In the cases where regulation does not advance multi-use, the political will must be bolstered, the regulatory landscape reviewed and adjusted, technical advancement and training established to assist in finding solutions to minimize safety risk, and prioritization strategies established, e.g. for established activities to continue to preserve valued traditional uses of an ocean area, while allowing for new sustainable growth. At the same time, many combinations were developed through pragmatic bottom-up approaches outside usual regulatory processes (e.g. see Arcachon, France and Greece blueprints), laying foun-

dations for future multi-use developments. These experiences can help to both adapt national and local regulations to multi-use needs and to promote this concept globally.

Location

Distance from shore appears to be one of the key influencing factors for the feasibility of multi-use. A careful selection of a location that fits all users and mitigates the risk of conflicts with other uses is crucial. For example, for many tourism related multi-use examples, development close to shore may be more suitable for the benefit and safety of transporting tourists. On the other hand, the offshore maritime realm is subject to lower social, political and environmental pressures and therefore could represent a laboratory to experiment new and innovative assemblages of human activities and environmental objectives, even if distance and exposure to marine conditions (e.g. bad weather) can be challenging for the tourist sector (e.g. resulting sea-sickness amongst tourists). Thus, marine spatial planning and coastal zone management may play an important role in initial pre-selection of zones that may be suitable for several potentially compatible uses.

A strong governance structure

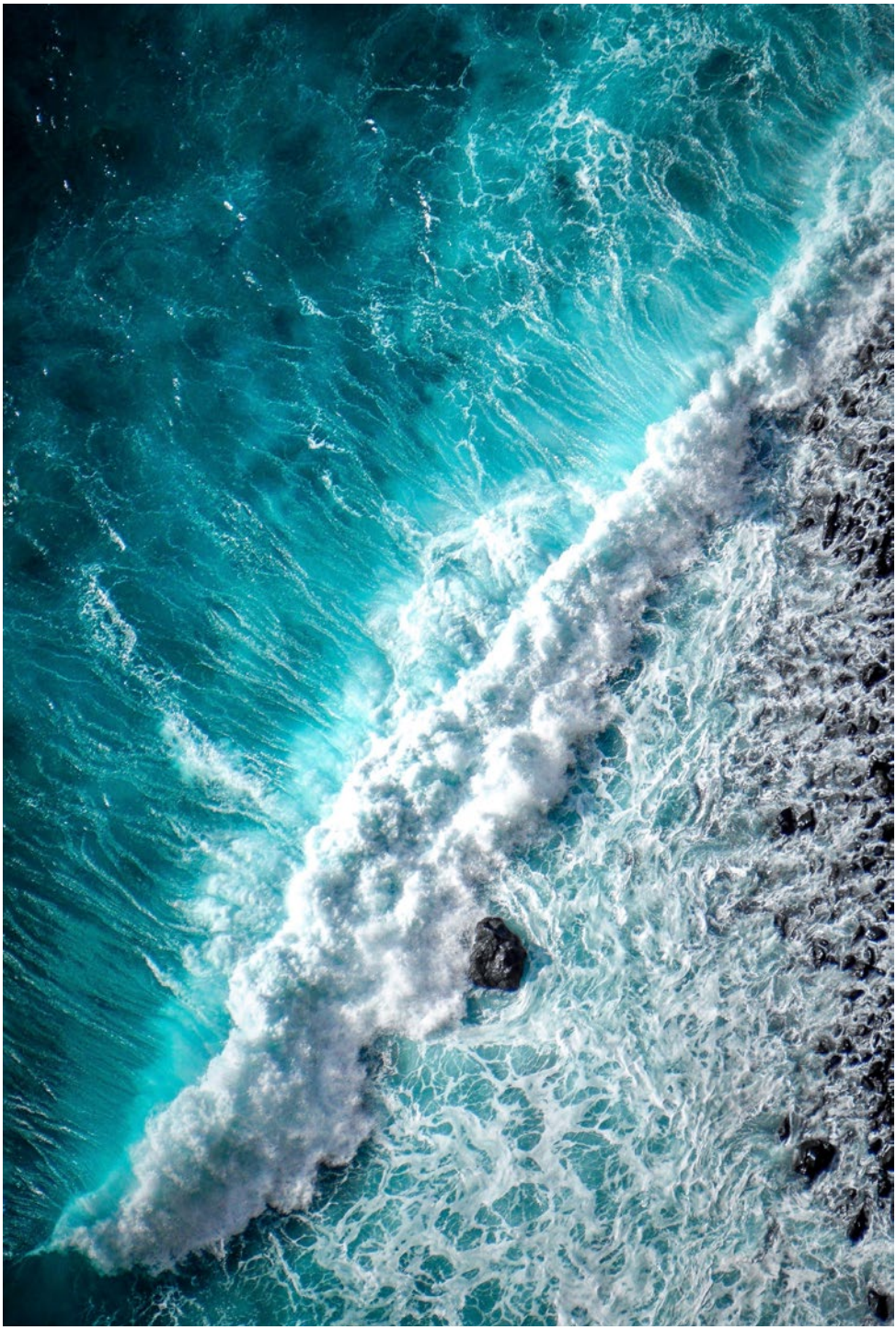
Constituent support by informed stakeholders, including marine users, resource managers, government and others, has proven to be one of the key factors for the successful development of multi-use solutions. A well-managed engagement initiative with clear goals and ample funding significantly contributes towards successful multi-use. Commitment towards strengthening these enabling conditions will likely enhance trust and build the capacity necessary for advancing multi-use.

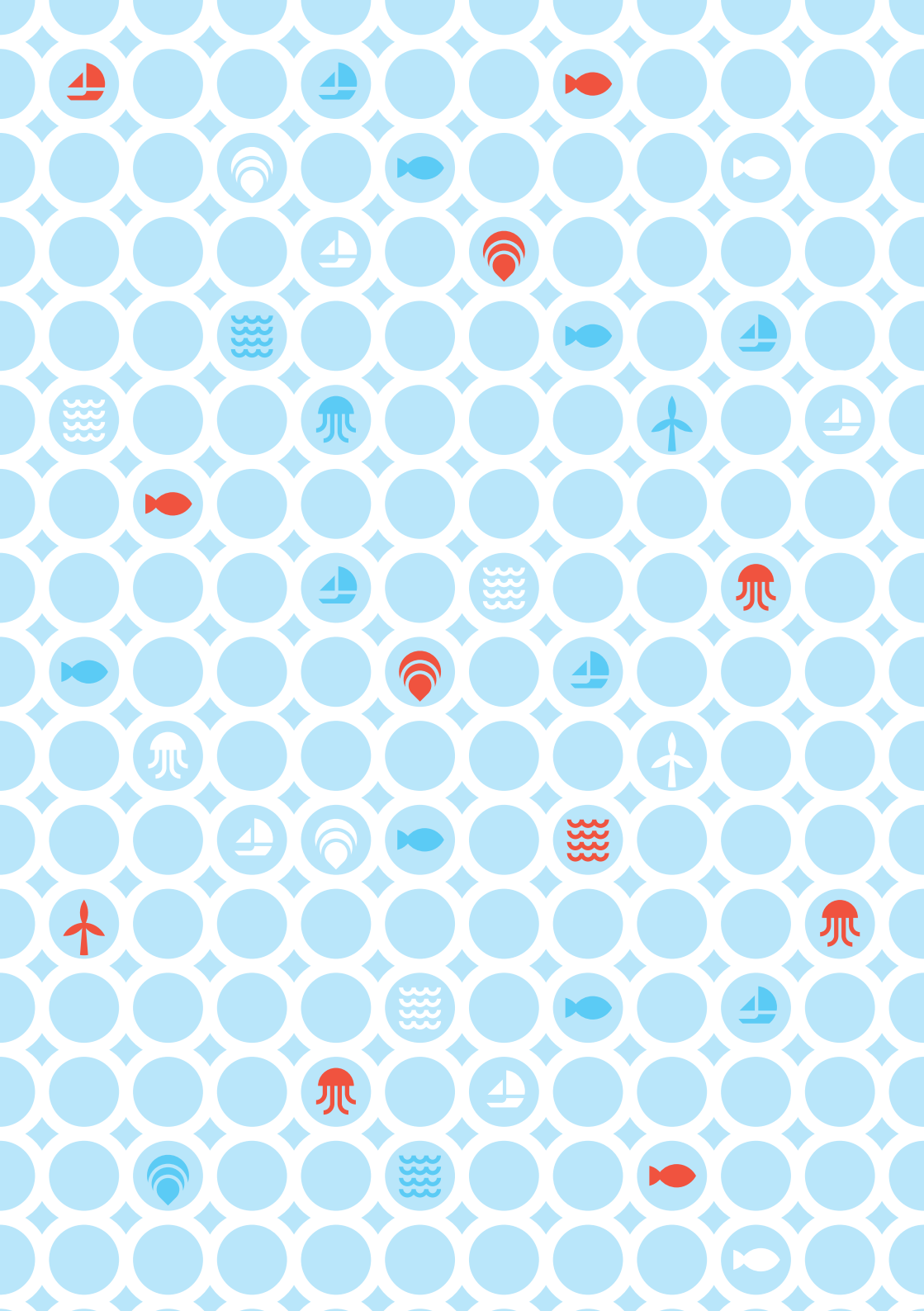
Partnerships that enhance innovative solutions and economic gain

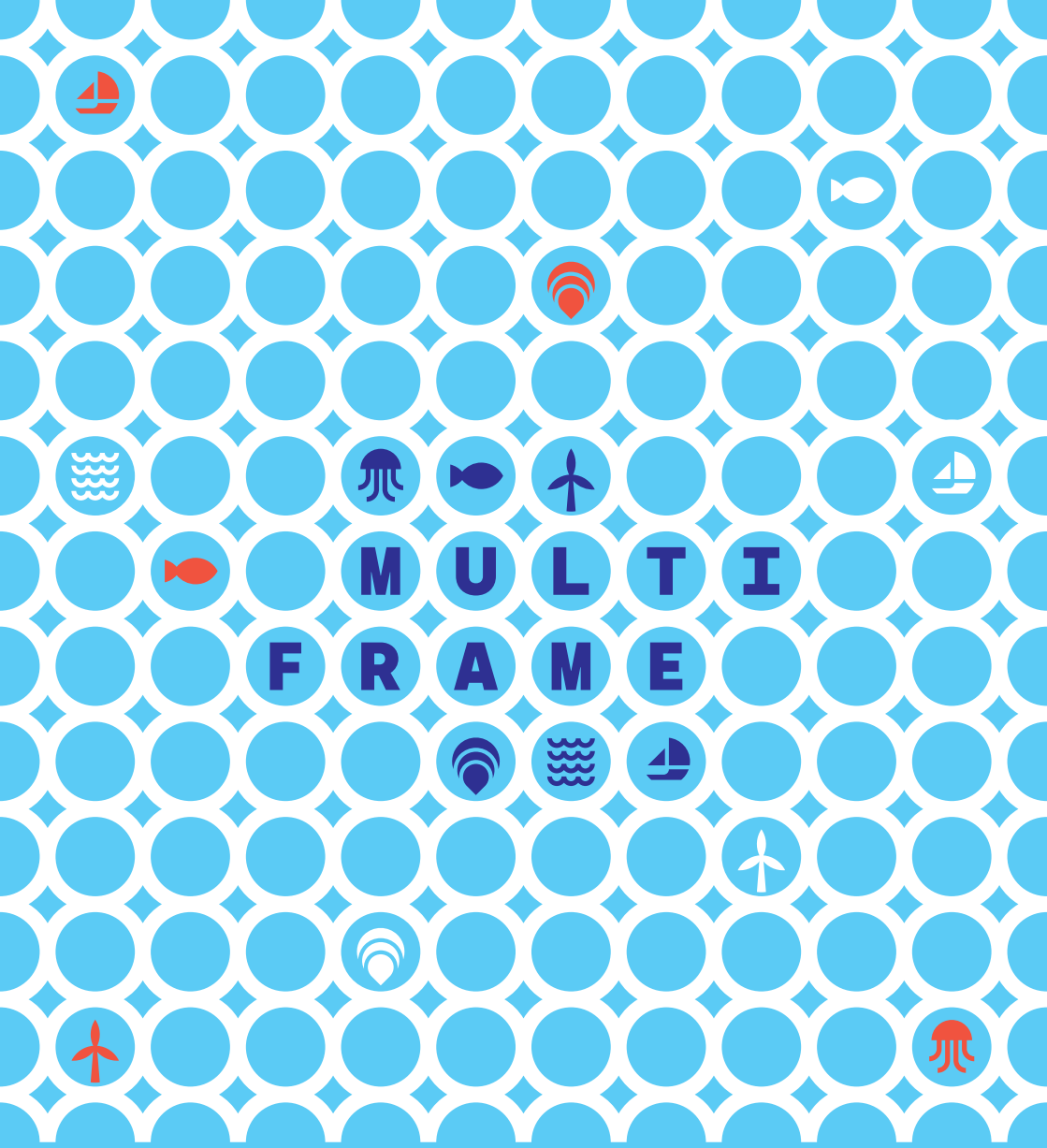
Partnerships help to effectively respond to capacity gaps, enhance creative solutions, and bolster commitment for successful multi-use consideration. This may include, for example, the involvement of a research and innovation entity or tech firm that could provide technological solutions to a multi-use obstacle or partnering with a local community group that can enhance local support and trust in the effort. Collaborations often contribute to minimizing cost and encouraging local business opportunities, and can lead to positive rebound effects that enhance the blue economy.

Sound science and knowledge integration leads to sustainable management and development:

Integrating the knowledge of marine users that spend significant time working on the water, with academic research and governance agents results in an enhanced understanding of the natural environment and how realistic multi use activities may be. This marrying of information allows the data and research findings to inform local knowledge observation resulting in both buy-in for innovative solutions that could result in multi-use as well as the advancement of suitable technologies, economic development, and support for conservation measures.







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