



BLUE MARINE
FOUNDATION

TURKEY CASE STUDIES

BLUEPrint for Marine Protected Areas:
A guide to establishing and managing MPAs



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AKD (the Mediterranean Conservation Society), began work in the Bay, it had been overfished to the point of reporting the lowest abundance of fish per square metre in the whole Mediterranean basin. Invasive species were rife, and ghost nets and rubbish littered the sea floor.

Alongside AKD, Blue Marine has supported the implementation of six no-take fishing zones in the Gökova area, covering 27 square kilometres of rich waters, complete with coordinated daily patrols. Research shows that since the implementation of the no-take zones, income for the small-scale fishing community has increased by a huge 400 per cent, and the number of fish per square metre is ten times what it was.



INFORMATION: MONITORING

Species monitoring using underwater cameras

In Gökova MPA, Turkey, MPA managers have installed two different types of camera systems to monitor monk seals and sandbar sharks; two species which are only now starting to recover after the implementation of no-take zones and fishing gear regulations. Monk seals have done particularly well under the new measures, with populations quadrupling in the eight years of protection. In addition, several underwater caves where the seals house their pups (appropriately named pupping caves), which had collapsed have now been restored, complete with night-vision cameras installed to monitor success. In all restored caves, monk seals have returned and are breeding.

A shallow marine ledge within a no-take zone is an additional location for another underwater camera system. In this area, sandbar sharks move into the shallows for unknown reasons and at unpredictable times; researchers monitor this behaviour via a website linked to the camera, so as to not disturb the animals while they analyse their behaviour. A tagging programme is another monitoring measure being used; tracking the sharks and identifying any sites which could benefit from greater protection would be of great use to prevent juveniles, who become entangled in static nets and end up as unintended bycatch. The research could inform new codes of conduct and changes to no-take zone boundaries to minimise shark bycatch.

View the camera footage [here](#)



ECONOMICS AND FINANCING: CREATING ALTERNATIVE REVENUES

Creating markets for lionfish and invasive species

The issue of invasive species is one which is occurring increasingly and worryingly more often throughout the Mediterranean and Eastern Europe. Several species make their way up from the Red Sea via the Suez Canal, thriving in the warmer waters climate change has created. The issue is so advanced that researchers predict around five per cent of all marine species in the Mediterranean are now non-native; that's approximately 986 in total.

Small-scale fisheries around MPAs in Turkey started to report higher catches of invasive species than native. Some of these, like the rabbitfish, were immediately targeted for the market as demand already existed. The lionfish, a species which was arguably more prevalent and more destructive to the marine environment as a result of their predatory nature, were targeted less (possibly due to fishers and consumers not being confident in dealing with their venomous spines). The government tried to fix this by providing small subsidies, approximately 50 pence, for each lionfish caught and destroyed, but quickly found it would be far more effective to create a market for lionfish fillets in supermarkets and restaurants instead. Indeed, this is not such a second-rate option: lionfish meat is already a delicacy in parts of the world, as well as being a healthier option due to its high omega-3 and low heavy metals content. A local fish processing plant was identified, and then offered to process the fish pro bono

and distribute the products to market. All the profits went back to the fishermen. Furthermore, a collaboration with local celebrity chefs and high-end restaurants have started to popularise lionfish and encouraged consumers to choose it both for its environmental and culinary benefits. As of 2022, the programme is progressing well and there is growing demand for lionfish. One challenge is that buyers want consistent sizes of fish and high volume. For this reason, refrigerated storage hubs are being installed, where fish can be sorted and stored until the volume is high enough to sell.



Another significant invasive species prevalent in Turkish waters is the pufferfish, which destroys nets and has no food value due to its toxic flesh. A project is underway to isolate the toxin from the pufferfish and use it to produce certain pharmaceuticals. This has the potential to invigorate the fishing community, by both tackling an invasive species and establishing an industry around biopharmaceuticals. AKD has commissioned research to develop nets that are able to catch pufferfish without being damaged, which if successful, could help fishermen catch pufferfish more effectively without loss or damage to their property. Blue Marine is

considering establishment of a revolving fund to give out loans to help cover initial gear purchase costs, which would be repaid with increased profits from selling pufferfish. Furthermore, Blue Marine might also implement a sinking fund that would create a market for pufferfish in preparation of the drug getting approved in order to help fishermen to integrate pufferfish into their catch.

Creating innovative markets for invasive species benefits the fishermen, the environment, and diversifies seafood consumption – moving consumers away from species such as grouper and tuna.



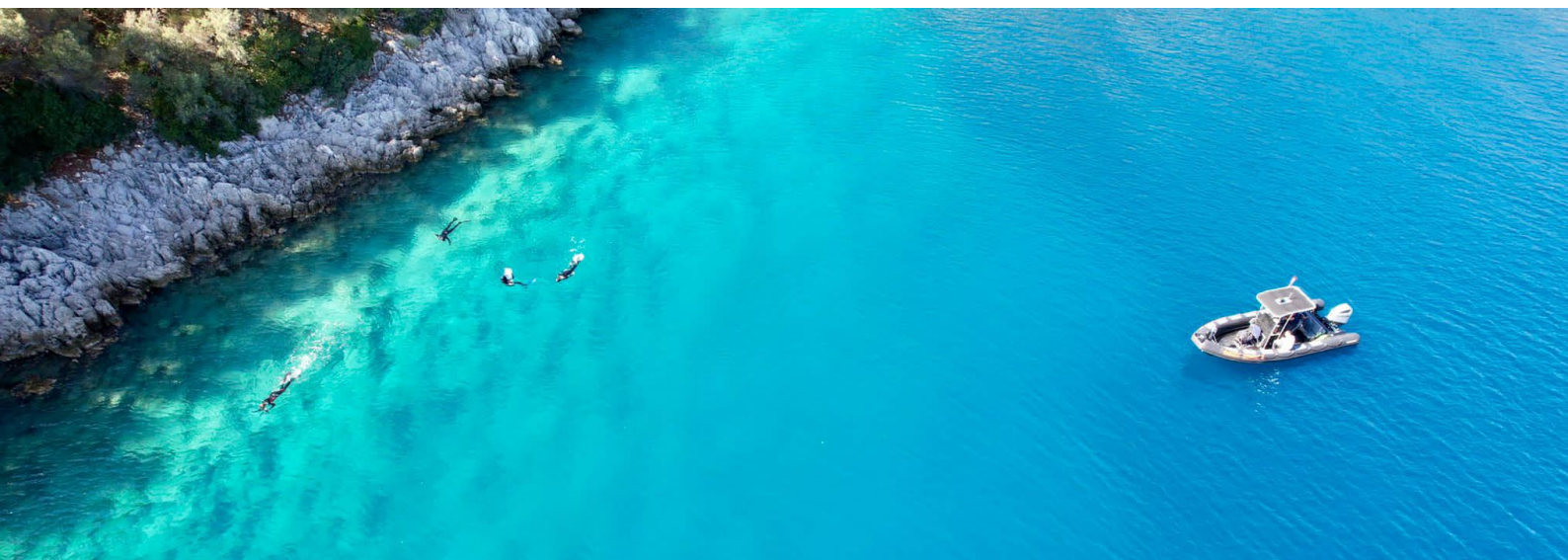
ECONOMICS AND FINANCING: SUSTAINABLE TOURISM REVENUE

Fishing tourism

Fishing tourism, or 'Pesce Turismo' as it's known in Italy where it is common practice among small-scale fishermen during the summer season, is a way for fishermen to fish less while still earning money. Tourists join fishing trips where they help with the daily catch, learn about artisanal fishing and usually BBQ something they've caught before returning to shore. There is however, a certain amount of investment needed to convert boats so that they can safely accommodate tourists while maintaining their function as fishing boats. In Turkey, the first fisherman is preparing his boat for this diversification of his livelihood as a fisherman. A local NGO is assisting with costs and using this as an exemplary model for others to do the same: increasing profit while engaging visitors with sustainable fishing.

Mooring and marina fees

Anchoring on seagrass is one of the most prominent threats to the ecosystem, along with invasive species. Turkey has a significant yachting industry with summer months attracting sometimes over 1,000 boats a day in certain areas. AKD and Blue Marine are looking into the possibility of setting up eco-moorings and charge boats for using them. A small fee from many boats has the possibility to generate a sustainable income for the MPA to cover enforcement and monitoring costs. This proposition is now being negotiated with the government. Similarly Blue Marine is working to set up a voluntary marina fee for boats docking in local marinas around the MPAs. These voluntary fees would be adjusted to the size of the boat and length of stay, and the money would be donated to AKD to further cover enforcement and monitoring costs of the MPA. However, a challenge faced by these programs is the clarification of ownership of the moorings and ensuring willingness to pay of docking and mooring vessels in the area.



ECONOMICS AND FINANCING: INCREASED REVENUE FOR SMALL-SCALE FISHERS

The women of Gökova Bay

Uniquely, approximately one in ten fishers in Turkey is a woman, and there are around 120 female fishers in Gökova Bay alone. Blue Marine, alongside partners AKD, are the only NGOs in the country working specifically with these women. Despite hardships in the wider area, they are doing unprecedentedly well; AKD's research, in collaboration with local fishing cooperatives, shows that the incomes of small-scale fishers in the Gökova Bay area improved by 50 per cent in 2019.

The Lyme Bay model is being adapted for use with these fisherwomen, and other small-scale fishers in the Mediterranean. Individuals have been identified to act as spokespeople for their communities; both to find out how an NGO such as Blue Marine could help them fill their nets in a sustainable way, but also to facilitate future knowledge exchange events with other small-scale fishers from across Europe. As a start to this, AKD held a workshop in Gökova Bay at the end of 2021 to encourage fishers to collaborate on efforts to share data, and to voice their support for the criticism of IUU fishing.

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ECONOMICS AND FINANCING: MONETISING BENEFITS

Carbon and biodiversity credits

Protecting parts of the ocean leads to a multitude of benefits such as climate regulation, coastal protection, fisheries recovery, and nutrient filtering. Carbon sequestration and increases in biodiversity are being increasingly recognised as essential and monetizable benefits of MPAs. With the presence of significant seagrass cover in Turkish waters, the opportunity to quantify and map the scale and state of seagrass within protected areas can unlock private and public funding. Carbon credits represent a unit of a single ton of CO₂ that has been sequestered, a unit which can be valued and sold. AKD has undergone a mapping project to locate and quantify the amount of carbon in the area, as well as sent off over 600 seagrass sediment samples to assess the carbon stock value. With this information they will begin to quantify the amount of

carbon being lost due to the degradation of seagrass and quantify the carbon credit value that could be awarded through protection. However, there is the potential this value could be kept for Turkey's own national determined contributions which would mean they could not be up for sale.

A similar strategy is being taken to quantify biodiversity. With ten years of biodiversity recorded in Gökova Bay demonstrating a significant increase in biodiversity the MPA is poised for the potential application of a novel biodiversity credit. Though in its nascent phase, biodiversity credit standards and methodologies are being developed across a variety of organisations. With vast amounts of data already available, Blue Marine believes Gökova Bay could be a brilliant pilot site for biodiversity credits, which could provide sustainable financing in the future.



MANAGEMENT: ADAPTING TO NEW MANAGEMENT MEASURES

Training fishermen and graduates as rangers

In Turkey, a training programme was developed to train ex fishermen and environmental management graduates to become rangers within the MPAs. The rangers are trained to captain patrol boats, identify illegal fishing, educate fishers and visitors about the local regulations and to use state of the art equipment for maximum efficiency of enforcement. The rangers are full-time staff members of the local NGO and also work closely with local fishing communities (many of which they have close links with) to encourage community driven management, supported through government legislation. Rangers carry live camera systems and long-distance radio equipment, so any interventions are legally binding, which is especially important to effectively reduce illegal fishing and encroachments into no-fishing zones. The rangers also check fishing gears and monitor sensitive breeding areas such as monk seal caves. It is most important that the rangers have secure positions with fair wages. This builds pride in their own work. The more experience the rangers gain, the more effective they are so low levels of staff turnover is paramount.



The rangers are full-time staff members of the local NGO

MANAGEMENT: NO-TAKE ZONES

Establishing no-take zones

The area of water where the North-East Levantine Sea and the Central Aegean meets provides an ideal environment for a host of endangered and protected species, such as Mediterranean monk seals, dusky grouper, sperm whales, loggerhead turtles and bluefin tuna. Gökova Bay is also the only MPA in the entire Mediterranean with its own population of sandbar sharks. The value of the waters here is obvious. Yet before Blue Marine's partners, AKD (the Mediterranean Conservation Society), began work in the Bay, it had been overfished to the point of possessing the lowest abundance of fish per square meter in the whole Mediterranean basin. Invasive species were rife, and ghost nets and rubbish littered the sea floor.

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In a studied no-take zone, over 5-years, apex predator (grouper and snapper) populations tripled, which clearly reduced the presence of invasive herbivorous fish, which led to the re-establishment of macro-algae. With the macro-algae, we see the recovery of general biodiversity, feeding grounds, spawning areas and an overall higher resilience to climate change and invasive species (the two main threats apart from fishing).



The main findings in Gökova Bay are:

- Increased artisanal fishers' catches and income (+600% in some cases)
- Recovery of macro-algae
- Increase in fish biomass
- Increase in apex predators
- Recovery of endangered species (monk seals and sandbar sharks)
- Reduction of invasive species
- Climate change mitigation if the seagrass meadows remain healthy and un-trawled.

To note: the no-take zones are generally surrounded or 'buffered' by no-trawling zones (1-3 miles).

One significant challenge is to prevent recreational fishing in no-take zones. The government has been reluctant to apply legislation that completely prevents recreational fishing in any marine zone. This is due to fear of losing political support in coastal communities and a misunderstanding of the potential impact of these unlicensed fisheries. Recreational fishers target high-value fish and often sell illegally to restaurants. It makes it almost impossible to accurately monitor fish catches in an area, creates conflict with licensed fishers and reduces the efficacy of no-take zones.



MANAGEMENT: ENFORCEMENT

Patrol boats and enforcement

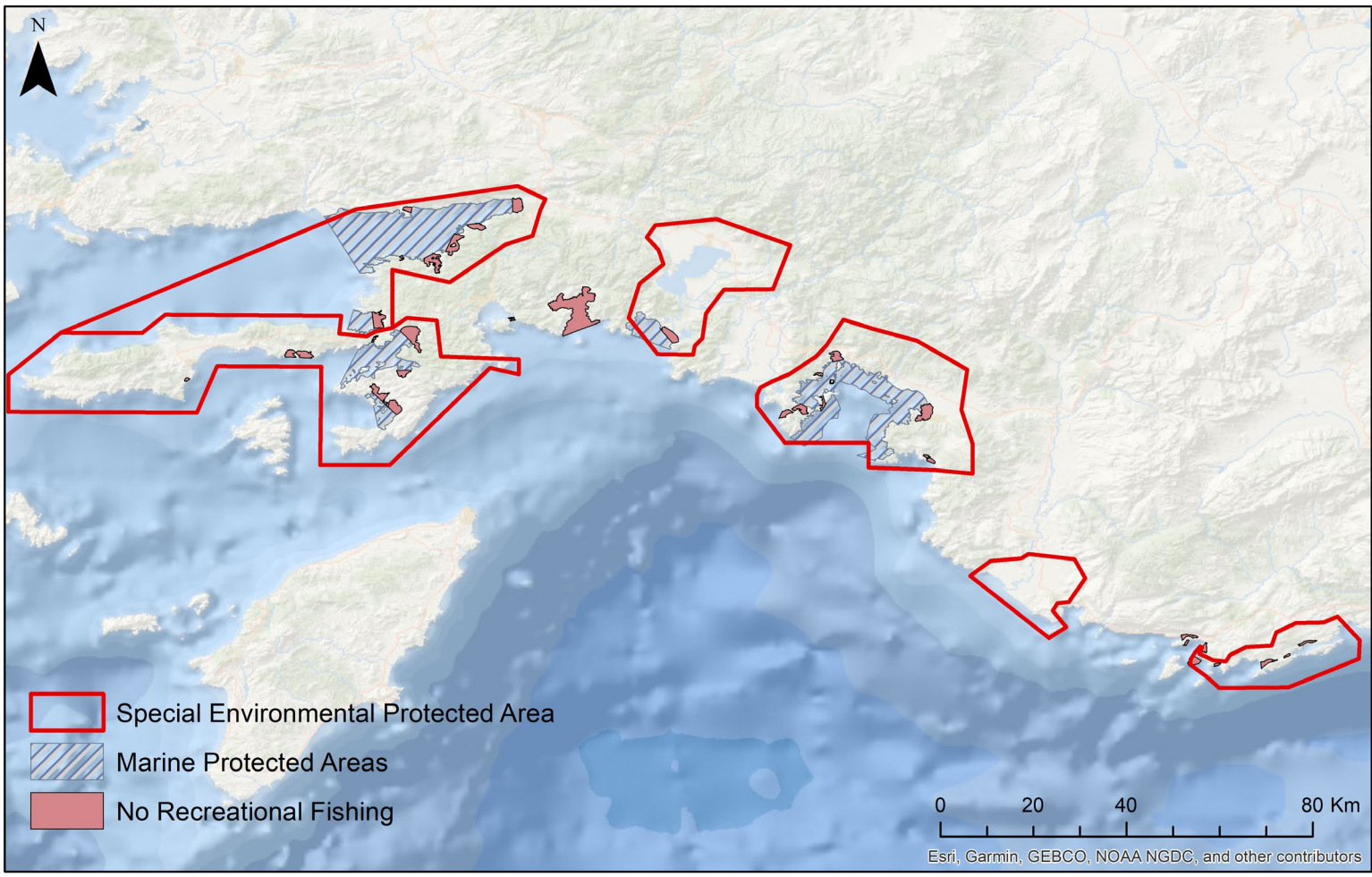
Funding raised by Blue Marine was used to purchase a patrol boat which monitors the waters around Gökova daily, searching for evidence or incidences of illegal fishing, which is then reported to the coastguard for investigation. As well as catching IUU (illegal, unregulated, unreported) fishers in the act, the boat serves as a deterrent to those wanting to avoid the fines and sanctions that are being more regularly doled out as a direct result of better enforcement.

The rangers are equipped with real-time camera systems, Vessel Monitoring Systems (VMS) and long-range communication radios so that infractions can be reported immediately and accurately. This is also important evidence when fishing crimes are prosecuted in court.

In the extreme wildfires of August 2021, the patrol boat further increased its value for money by posing as a rescue vessel for fishermen stranded in their remote homes on the peninsula, carrying them to safety via the water.

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