

# The use of local ecological knowledge of fishers and other sea users in the monitoring of the effects of climate change in Tyre Coast Nature Reserve

Climate change is having a dramatic impact on the Mediterranean. The **Tyre Coast Nature Reserve (TCNR)** is the richest in **Lebanon**. However, the reserve is struggling to offset the impact of invasive alien species, exacerbated by the effects of climate change.

In a process facilitated by MedCities, TCNR managers initiated the establishment of regular monitoring of climate change impacts, based mainly on the use of local ecological knowledge of experienced fishermen or other sea users to reconstruct historical changes in species abundance and distribution, to detect new species at an early stage, and to regularly monitor climate-sensitive species of both native and exotic origin.



Source: [www.wikipedia.org](http://www.wikipedia.org) / © Roman Deckert

## CHALLENGES ADDRESSED

- Monitoring the impacts of climate change
- Early detection of invasive alien species
- Monitor changes in biodiversity and observe the introduction and subsequent distribution of invasive alien species within the TCNR
- Making use of local knowledge
- Involving fishers, professionals, and sea users in the protected area management process
- Making management decisions based on sound science
- Systematic data collection based on agreed protocols
- Anticipate potential environmental and socio-economic problems that may arise from climate change and invasive alien species

## MAIN OBJECTIVES

- Assist the Tyre Coast Nature Reserve managers in implementing a regular monitoring of the impacts of climate change
- Involve experienced fishers, divers and other marine users in the monitoring and management of the Tyre Coast Nature Reserve
- Strengthen the capacity of stakeholders in the Tyre Coast Nature Reserve to monitor the effects of climate change
- Generate datasets to support decision making and the marine protected area management



Project type

Climate Change & Environment Monitoring



Funding

European Union – ENI CBC Med programme  
Approximately 8.000€



Partnership

Tyre Coast Nature Reserve, MedCities



Dates

October - November 2023



Source : Tyre Coast Nature Reserve / © Bilal Kachmar

## PROJECT DESCRIPTION

Climate change is having a dramatic impact on the **Mediterranean Sea**, which is warming three times faster than the global average. Mediterranean marine protected areas are already experiencing, or are expected to experience within the next few decades, major biodiversity and functional alterations due to climate change. There is therefore an urgent need to mitigate these risks and explore adaptation options in partnership with local communities, decision-makers, civil society organizations, research institutions, and other socio-economic actors at local, national, and regional levels.

The **Tyre Coast Nature Reserve (TCNR)** is the richest in Lebanon. The reserve strives though to offset the impact of invasive alien plant and fish species exacerbated by the climate change effects.

The “**ENhancing Socio-Ecological RESilience in Mediterranean coastal areas**” (ENSERES) project is a capitalisation project funded by the European Union's ENI CBC Med programme. It focuses on transferring, replicating and scaling up successful and effective Integrated Coastal Zone Management (ICZM) and ecosystem-based management tools and practices developed from past and ongoing initiatives in the project pilot areas (including Tyre and TCNR).



## IMPACTS AND RESULTS

- Capacity building of 12 participants from the Tyre Coast Nature Reserve (TCNR) staff and stakeholders, as well as the Lebanese University
- Provided an opportunity to involve fishers and other sea users in the monitoring and management of the reserve
- Fishers felt listened to and involved
- Establishing links and a longer-term partnership between TCNR and the network of Mediterranean scientists dedicated to monitoring the effects of climate change in marine protected areas
- Opening up TCNR for possible collaboration with international climate change monitoring networks such as T-MEDNet and the "Observadores del Mar" network





Source : Tyre Coast Nature Reserve / © Bilal Kachmar

In this light, the TCNR stakeholders have selected, in a participatory manner, the most appropriate tools to respond to local priorities. In this context, the TCNR and MedCities have chosen to implement, through a mentoring process, the "Monitoring Climate Change Impacts in Mediterranean MPAs" tool, which includes the following protocols

- Explore Local Ecological Knowledge to reconstruct historical changes (LEK-1) – this protocol can be used to interview experienced fishers or other sea users to gather information on historical changes in species abundance and distribution and to detect new species at an early stage.
- Explore Local Ecological Knowledge for periodical monitoring (LEK-2) – this protocol can be used to interview experienced fishers or other sea users to regularly monitor climate-sensitive species of both native and exotic origin.
- Conduct a fish visual census of climate change indicators – this protocol can be used to assess the abundance and distribution of specific fish species selected as reliable indicators of climate change in Mediterranean marine protected areas. Local species targets can be added by protected areas based on local monitoring needs, ease of recognition, interaction with fisheries, increase/decrease in the area, and potential impacts on the environment/fisheries/human activities.



Source : Tyre Coast Nature Reserve / © Bilal Kachmar

[ENSERES project web](#)  
[TCNR website](#)  
[References images & videos](#)  
[Publications: final report](#)

A specialised **training programme** was delivered by a scientific expert to TCNR staff and associated stakeholders. The training focused on the LEK-1 and LEK-2 protocols. In addition, the programme aimed to provide the skills necessary to implement underwater visual census techniques to **monitor the effects of climate change** in the reserve. This training took place from 23 October to 1 November 2023 and included theoretical courses, fieldwork intersessions by trainees, followed by debriefing sessions with the trainer.