



Mediterranean
Action Plan
Barcelona
Convention



MANAGEMENT PLAN OF TYRE COAST NATURE RESERVE (TCNR) (2023-2028)



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List of acronyms

ABCL	Association for Birds Conservation in Lebanon
ACE	Association for Community & Environment
ADR	Association for the Development of Rural Capacities
AMWAJ	Amwaj for Environment
ALDFG	Abandoned, lost, discarded fishing gear
APAC	Appointed Protected Area Committee
APE	Association for Preserving the Environment
CNRS	National Council for Scientific Research
DPSIR	Driving Forces-Pressures-State-Impacts-Responses
EEZ	Exclusive Economic Zone
IUCN	International Union for Conservation of Nature
LAG	Tyros Local Action Group
LU	Lebanese Universities
LRA	Litany River Authority
LPA	Lebanese Petroleum Administration
LMTA	Lebanon Mountain Trail Association
MedPAN	Le réseau des gestionnaires des Aires Marines Protégées en Méditerranée
MEET	Mediterranean Experience of Ecotourism
METT	Management Effectiveness Tracking Tool
MoA	Ministry of Agriculture
MoC	Ministry of Culture
MoE	Ministry of Environment
MoEW	Ministry of Energy and Water
MoF	Ministry of Finance
MoIM	Ministry of Interior and Municipalities
MoPWT	Ministry of Public Works and Transport
MoT	Ministry of Tourism

MPA	Marine Protected Area
NCMS	National Center for Marine Sciences
NGOs	Non-Governmental Organizations
NIS	Non-Indigenous Species
SLWE	South Lebanon Water Establishment
SPAMI	Specially Protected Area of Mediterranean Importance
SPA/RAC	Specially Protected Areas Regional Activity Centre
SPNL	Society for the Protection of Nature in Lebanon
SWOT	Strengths, weaknesses, opportunities, and threats.
TCNR	Tyre Coast Nature Reserve
UN	United Nations
UNDP	United Nations Development Programme
UNERWA	United Nations Relief and Work Agency for Palestine Refugee and the near East
UNEP/MAP	United Nations Environment Programme / Mediterranean Action Plan
UNESCO	United Nations Educational, Scientific and Cultural Organization



1 Introduction

1.1 Location

Tyre Coast Nature Reserve (TCNR) is one of the three Marine Protected Areas (MPA) along the Lebanese coast. It is situated between a longitude of 35° 12' East and a Latitude of 33° 17' North at c.1-15 m of altitude (Annex 1), south of Tyre city (Figure 1). TCNR was declared a Lebanese nature reserve under Law N°. 708 (attached in Annex 2) on the 5th of November 1998. The marine reserve has a total area of 126.82 km² comprising a terrestrial surface area of 1.763 km², with 0.0612 km² of sandy beach and territorial waters of 125 km². (Surface of the water area:125 km² if we will count it till the territorial water, and 37.06 km² if we will count it only till the continental slope).

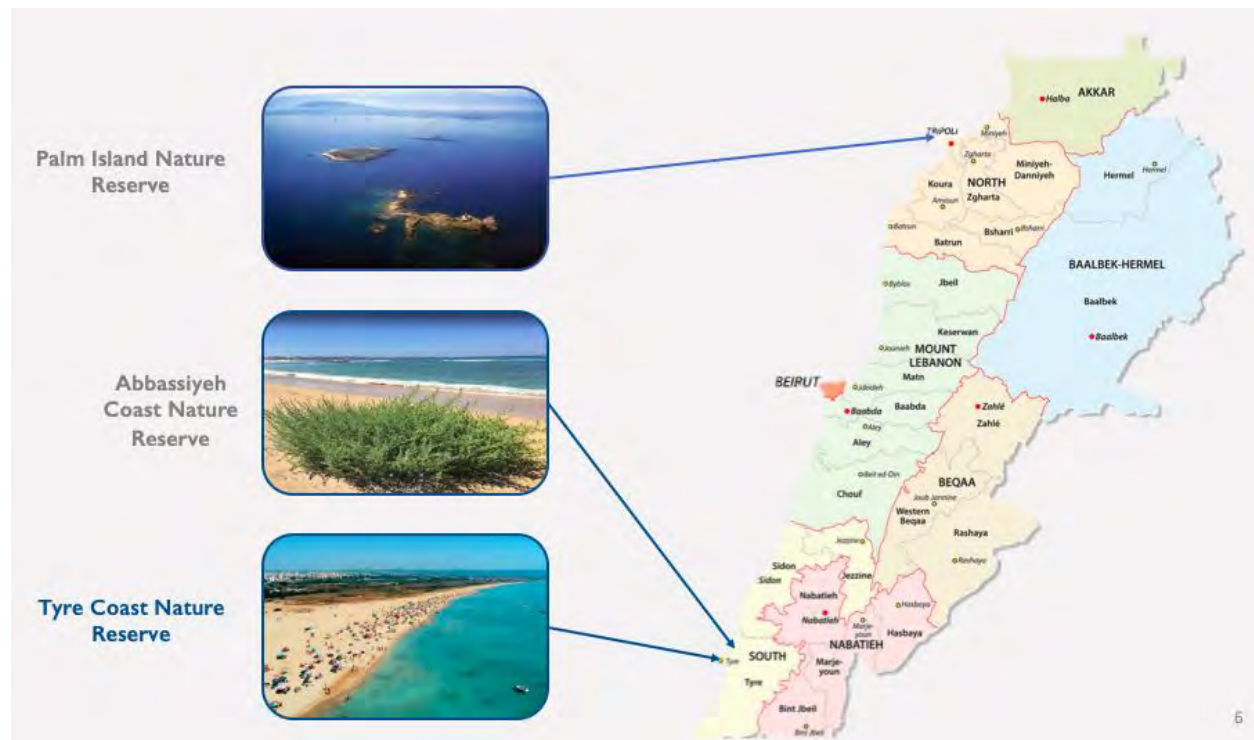


Figure 1 : Map of TCNR location in Lebanon

TCNR's terrestrial area is divided into three zones: Touristic Zone, Conservation or Scientific Zone, and Agricultural Zone as shown in Figure 2. It is worth noting that TCNR is divided into two segments by the Rashidiyeh refugee camp that lies alongside the principal road and extends to the sandy beach. The northern part of the reserve includes the public sandy beach and the Conservation Zone: the public sandy beach is always open for public access, especially during the summer season for recreation purposes, while the conservation zone is opened only for the scientists and researchers, and has limited access to the public to minimize the disturbance to wildlife. The southern part includes the beach facing Rashidiyeh refugee camp, the agricultural zone, and the Ras Al Ain artesian wells, and is controlled by the Lebanese Army for security purposes.

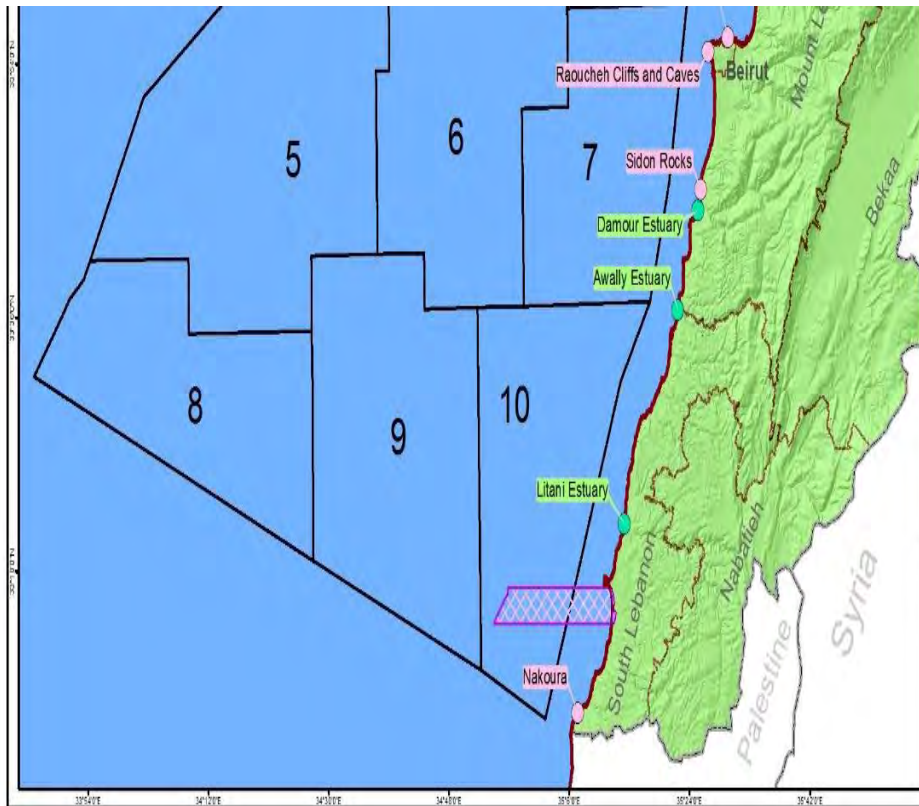


Figure 2 : TCNR location and zones, including the water zone

1.2 Policy and Legal Status

1.2.1 Legal framework applicable to TCNR

The main legislation governing TCNR is Law N°. 708 of 1998 that established the Nature Reserve (Annex 2). In addition, Lebanon has numerous environmental legislations that support TCNR conservation. These include, but not limited to, the National Environmental Law (444/ 2002), the hunting Law (508/ 04), the new Water Resources Law (77/2018), the Integrated Waste Management Law (80/2018), and Protected Areas Law (130/2019), Law on the control of marine and coastal fishing (issued as decision N°. 2775 dated 1929). Several decrees and decisions support the implementation of these laws. Annex 3 provides detailed information on these legislations and how they apply in the case of TCNR. A draft new law related to sustainable fisheries and aquaculture is also being reviewed for adoption by the Lebanese parliament. Furthermore, many Ministerial Decisions regulating fishing and fishing techniques are issued by the Ministry of Agriculture (MoA). The fishing decisions listed in Table 1 constitute an important legal and regulatory tool in conserving marine biological diversity and exploitation of such resources within the TCNR marine zone. Additionally, the fishing decisions comply with international and regional agreements ratified or approved by Lebanon regarding environmental protection, control of pollution, and conservation of natural resources.

Table 1 : National Decisions regulating fishing in Lebanon

Decisions	Brief Description
N°. 202/1 of 1997 (Amending Resolution No. 254/1 of 1995).	Regulating fishing-diving sport.
N°. 385/1, dated 26/1/1997.	Prohibiting fishing activities in all estuaries all year long. All human activities are banned except for those of scientists and the Coast Guard.
N°. 125/1 dated 23/9/1999.	Banning the fishing of marine turtles, monk seals, and whales, as well as selling, using or trading of any derivatives from the mentioned species.
N°. 93/1 dated 14/3/2008.	Regulating the scuba-diving industry including permitting procedures and safety measures and scuba-diving fishing.
N°. 346/1 dated 15/07/2010.	Regulating and defining some fishing types and equipment and prohibiting the use of nets with small mesh sizes, trawling nets, and fishing with scuba diving equipment.
N°. 8/1 dated 04/01/2012.	Organizing and defining some fishing types, gears, and equipment.
N°. 1160/1 dated 10/12/2013.	Setting general provisions for shark fishing.
N°. 396/1 dated 12/5/2014.	Banning the catching of marine birds.
N°. 1044/1 dated 25/11/2014.	Setting general conditions to protect Cetaceans.
N°. 1045/1 dated 25/11/2014.	Setting general conditions to catch Sharks.

Decisions	Brief Description
Decision of the Minister of Agriculture N°. 1/385, issued on 1997.	Prohibiting fishing activities in all estuaries all year round. The protected area involved extends over 500 m on each side of the estuary, 500 m inside the river and 2 km seawards. All human activities are banned except for those of scientists and the Coast Guard.

1.2.2 International Conventions and Agreements affecting TCNR

TCNR was designated as a Ramsar site (or Wetland of Special International Importance under the Ramsar Convention) number 980 in 1999. In this context, TCNR should therefore focus on (i) maintaining the reserve’s ecological characteristics, and (ii) sustainably using the site’s resources. Moreover, TCNR was designated a Specially Protected Area of Mediterranean Importance (SPAMI) in 2012 under the 1995 Barcelona Convention, specifically under its protocol on specially protected areas and biodiversity in the Mediterranean, also TCNR is part of Tyre city which is classified as a World Heritage Site by UNESCO in 1984. Furthermore, Ras-Al-Ain springs within the agricultural zone of TCNR were also designated as a National Heritage by the Lebanese Ministry of Culture (MoC). The Ministry of Environment (MoE) is also working on classifying the marine reserve as a potential Important Bird Area (IBA) because of its strategic location for migratory birds. On the other hand, TCNR management is influenced by several international conventions and agreements (refer to Annex 4) that have either been signed or ratified by the Lebanese government.

1.2.3 Land Rights and Governance of TCNR

TCNR is a state land that is under the mandate of the Ministry of Finance. However, due to the diverse uses of the site, the legal rights and mandates are distributed over different institutions, including:

1. MoE is mandated to conserve and manage TCNR’s biodiversity, and the MoE appoints an Appointed Protected Areas Committee (APAC) to ensure the local management of the reserve. The APAC includes representatives from Tyre municipality, the governor of Tyre caza, the local NGOs, and scientists. The APAC works under the supervision of the MoE.
2. Ministry of Agriculture (MoA) regulates and controls fishing activities in all the area.
3. MoPWT is responsible for the regulation of the maritime area in Lebanon and is responsible for sea transport, boat registration, and harbors management, including Tyre port.
4. Ministry of Culture, through the Directorate General of Antiquities, is mandated over all archeological and historical sites of TCNR.
5. Tyre Municipality is mandated to offer yearly funds to TCNR and is represented in the APAC where the latter is usually headed by the representative of Tyre municipality.
6. Ministry of Defense and Lebanese Army are responsible for controlling the coastline and the sea for security reasons, illegal smuggling and human trafficking, and patrolling the area and inhibiting poaching activities.

2 Background of TCNR

2.1 TCNR natural, cultural, socio-economic, and scientific values

Based on the latest ecological and socio-economic baseline assessments of TCNR, it prevails that the reserve plays a very important role in Tyre precisely and the Mediterranean region in general. Many features of TCNR are of major conservation importance, both at the local and national level, and in some cases at the regional (Middle East and/ or Mediterranean) and international/ global levels. The key values of TCNR revolve around its biodiversity richness, cultural heritage significance, and socio-economic importance, as highlighted in Table 2.

Table 2 : TCNR natural, cultural, socio-economic, and scientific values

Natural values	
1.	Large sandy beach with considerable scenic and recreational value. It is an important sea turtle nesting site for Mediterranean Loggerhead and the globally endangered Green sea turtles.
2.	Streams and marshes located only a few meters from the sea, creating a brackish interface forming a unique freshwater-marine ecosystem and playing a significant role in the local community's livelihood, in terms of water resources used by local farmers to irrigate a vast agricultural area.
3.	The presence of sand dunes acting as nature-based ecosystem for coastal erosion protection.
4.	Wetlands as habitat for endemic fauna and flora and resting sites for migratory birds.
5.	Low water table level and fertile lands enabling the cultivation of a variety of crops.
6.	The habitat and nursery for high diversity and number of fish species with commercial and economic values.
7.	The habitat of rare, threatened, and endemic marine species of Macroalgae Fucales, Rhodobiontes/ Rhodolithes, Mollusca, Sharks, and Cetaceans.
8.	The habitat of Vermetid reefs, as an important coastal ecosystem in the Mediterranean Sea.
9.	The habitat of rare and endangered seagrass meadows species (<i>Cymodocea nodosa</i>).
10.	The habitat of endangered Mediterranean marine turtles.
11.	The habitat of nationally and internationally significant birds.
12.	The habitat of endemic species of terrestrial mammals, amphibians, and reptiles.
13.	The habitat of threatened, rare and endemic plants, including medicinal, culinary, and aromatic plants.
Cultural values	
1.	Strategic location in a coastal city designated as a World Heritage Site by UNESCO in 1984.
2.	Presence of historical artesian wells in Ras Al Ain with the Roman aqueducts representing a historical water resource supply for the entire region of Tyre until today.
3.	Presence of archeological and historical monument in the conservation zone (newly discovered).
4.	Presence of an old water mill located on the agricultural land, although not functional nor well maintained, still represents what is left of the cultural and traditional old practices in the area.
5.	Submerged archeological ruins nearby TCNR (Al Ziri, Al Fanar and Al Jamal areas) which represent an extension of Tyre old city and an attractive site for divers.
6.	Recreational and touristic landmark for local, regional, and international visitors known for its clear blue water and the long stretch of sandy beach.
7.	Highly desired area not only for ecotourism and its ecological and natural values, but also for education and cultural tourism due to its cultural values.

Socio-Economic values
<ol style="list-style-type: none"> 1. Touristic zone promoting direct and indirect jobs creation and helping sustain the livelihood of many households, especially during the summer season (F&B kiosks, water sports activities providers, cleaners, parking staff, guides, etc.). 2. Location of TCNR in a renowned coastal area famous for its archeological sites and clean blue waters attracts many regional and international visitors, especially during the summer season which boosts the local economy (hotels, B&Bs, local shops, etc.). 3. Fertile lands host around 170 farmers in the agriculture zone of TCNR who depend on crops cultivation and selling for their living favoring the cultivation of diverse citrus fruits and vegetables, contributing to the livelihood of local farmers. 4. Richness of the marine fish species as a result of decreasing illegal fishing activities imposed by the presence of the reserve. This is indirectly resulting in the spill-over of fisheries where the abundance of fish species is creating favorable conditions for fishers by enhancing their catch and thus increasing their revenues generation. 5. Abundant freshwater resources from Ras El Ain springs that supply the city of Tyre and 10 other villages with water, thus offering a basic human need. 6. Job opportunities for many families (Lebanese, Syrian, Palestinians) during summer through working in the beach kiosks and the agricultural land of the reserve. 7. TCNR is considered as a land of opportunities for volunteers/ students/ fishers/ divers working altogether for the implementation of TCNR activities, guaranteeing the effective management plan of the reserve.
Scientific values
<ol style="list-style-type: none"> 1. The reserve is a natural laboratory to study the biodiversity of species and their habitats on both land and sea. The diversity of fauna, flora, landscapes, and ecosystems could translate into high educational value for ecological field studies. Some of the unique educational, nature-study, and scientific activities at TCNR are: <ul style="list-style-type: none"> ○ TCNR is characterized by particular marine ecosystems/ habitats and associated biodiversity (including taxa with special interest). It is a unique area to study, monitor, and follow the ecological status of main threatened marine ecosystems and associated fauna and flora. ○ TCNR is also important to monitor in order to better understand the effect of sea warming, acidification, and Non-Indigenous Species (NIS) on the Lebanese ecosystems and associated native biodiversity. ○ The geographical position of TCNR allowed researchers to conduct field experiments and study endemic species limited to this area along the Lebanese coast. It is also a critical hotspot to discover new species for Lebanon. ○ TCNR is a particular site to study and monitor the activities of the Mediterranean marine turtles that feed, nest, and hatch on the sandy part of the reserve. ○ TCNR is also an Important Birds Area where many migratory species, and species with special interest can be found. ○ TCNR is characterized by its terrestrial fauna and flora with species of special interest. ○ TCNR is also an effective area to make research and studies related to hydrology, water quality, importance of brackish saline interface, importance of sand dunes, and impact from some natural threats (e.g., erosion). ○ TCNR, with its agricultural zone, is also an effective area to undertake studies and research related to agriculture.



Photos 1 & 2: Sea turtles in TCNR beach (© Ali BADREDDINE) and water (© Hasan DBOUK).



Photo 3 & 4 : Archaeological monuments in TCNR in water (© Hasan DBOUK) and on land (© Ali BADREDDINE).



Photos 5 & 6: Marshes in TCNR agricultural zones © Ali BADREDDINE.



Photos 7 & 8: Ras-Al Ain ponds and water flow coming from the ponds © Ali BADREDDINE.



Photo 9 & 10 : Agricultural land and Ras-Al Ain aqueduct © Ali BADREDDINE.



Photos 11 & 12: Natural freshwater ecosystem and the sand dunes © Ali BADREDDINE.






2.2 Key Challenges and threats

Based on the gap analysis included in the previous management plan, the SPAMI and METT evaluations, as well as stakeholder engagement conducted to develop this updated management plan, key challenges and threats were identified and are listed in Table 3.

Table 3 : Key Threats and Challenges Facing TCNR

Challenges and Threats	Description
Governance, operational and management challenges	<ul style="list-style-type: none"> • No visibility of the reserve at a local and national level, mainly due to the absence of a communication strategy and engagement and community outreach strategy, which resulted in most of the local stakeholders not being aware that the sandy beach is part of a protected area or even that the agriculture area is part of TCNR. • Absence of clear land demarcation of the reserve’s zones and interpretative signs that showcase the values of the reserve, the uses of the different zones, and their corresponding rules and regulations. • Lack of trust between the reserve’s management team and the local community, where the latter possesses a wrong perception of the reserve as a restricted zone and that it negatively affects people’s livelihood. • Weak governance and capacity of the management team to perform, which poses a critical problem in prioritizing and implementing strategies and actions, as well as ensuring proper communication internally between the team and APAC, and externally with the stakeholders. • Unsustainable and/or mismanagement of financial resources to (1) sustainably and efficiently operate (e.g., staff resources, equipment and programs acquisitions, etc.), (2) implement activities to enhance the protection and conservation of natural resources and biodiversity, and (3) create services and activities that in return can regenerate substantial revenues for the reserve. • Lack of data monitoring and mapping. • Lack of education/ research and awareness. • Low involvement of local community (especially divers and fishers). • Non-inclusion of the Marine zone in the reserve’s management. • Understaffed and insufficient capabilities of the reserve’s management team. • Absence of an integrated touristic sector in the city of Tyre, i.e., no central tourism office that links visitors and tourists to the key touristic sectors in Tyre including TCNR • Lack of integration of the Rashidiyeh camp within TCNR. • Weak expertise of the team, especially in resource mobilization, needs assessment, as well as financial and business planning. • Weak coordination between the APAC and the reserve. • No Monitoring, Evaluation and Learning (MEL) processes. • No day to day management.

Challenges and Threats	Description
<p>Anthropogenic threats affecting TCNR ecosystems</p>	<ul style="list-style-type: none"> Waste littering especially plastic bottles/bags and cigarette butts, nearby illegal waste dumpsites, and discharge of untreated wastewater, especially during summer. <div data-bbox="602 327 1414 630"> </div> <p>Photos 13 & 14: Threats in the Agricultural zone: Littering © Ali BADREDDINE.</p> <ul style="list-style-type: none"> Abandoned, lost, discarded fishing gear (ALDFG), nets (Ghost nets) or fishing lines. Anchoring from ship vessels and recreational boats. Trampling on Sand dunes and Vermetid reefs. Illegal hunting of birds (especially in the agriculture zone), excessive use of chemicals (fertilizers and pesticides) in the agriculture zone. Overexploitation of fisheries within the marine area of the reserve. Poaching and vandalism activities. Surpassed carrying capacity in the touristic sandy beach during the summer season, which increases light and noise disturbance, and impacts plants that play a role in fixing sand dunes. Illegal fishing methods (dynamites, blast), especially from the Rashidiyeh camp. Litter and solid waste coming from the sea with the sea currents, especially during winter (marine litter). The use of horses and trampling on the sandy beach of the conservation zone (critical problem, especially during the sea turtles nesting season). <div data-bbox="613 1220 1339 1459"> </div> <p>Photos 15 & 16: Use the sandy beach of TCNR for horsing and drifting © Bilal Kashmar.</p> <ul style="list-style-type: none"> Apiculture, Grazing, especially in the agricultural zone of the reserve. <div data-bbox="618 1566 1339 1829"> </div> <p>1.</p>

Challenges and Threats	Description
	<p>Photos 17 & 18: Threats in the Agricultural zone: Apiculture/ Grazing © Ali BADREDDINE.</p> <ul style="list-style-type: none"> • Birds Hunting, especially from the Rashidiyeh camp. • Use of Pesticide and herbicides by the farmers. • Environmental accidents (e.g., oil spills). • Light disturbance during the sea turtles nesting season coming from the beach kiosks, especially during summer. • Sand erosion, especially in the touristic and scientific zone. • Plant picking. • High maritime traffic (fishers/ divers/ tourist boats).
Non-Anthropogenic Threats	<ul style="list-style-type: none"> • Sea warming and acidification due to climate change causing the loss of endemic and endangered species (e.g. Mollusca <i>Dendropoma anguliferum</i>, and Cnidaria <i>Cladocora caespitosa</i>); proliferation of toxic algae (e.g., harmful algae); Migration of Non-Indigenous Species, especially coming from the Red Sea via the Suez Canal, and some of them became invasive. • Reproduction of Bacteria (e.g. <i>Vibrio</i> sp.) causing the witness of some marine species (Spongia <i>Crambe crambe</i>, and Cnidaria <i>Cladocora caespitosa</i>, <i>Oculina patagonica</i>). • Presence of Non-Indigenous plants.
External Threats	<ul style="list-style-type: none"> • Strong presence of political influence, corruption, and favoritism impacting the different zones of the reserve and hindering its progress in the implementation of its management plan. • Weak enforcement of regulations and laws. • No patrolling system. • Poor infrastructure related to wastewater treatment and solid waste treatment facilities in the city. • Presence of an unregulated settlement camp that divides the reserve. • Poor maintenance of the infrastructure. <div style="display: flex; justify-content: space-around; align-items: center;">    </div> <p>Photos 19, 20 & 21: Weak maintenance of TCNR Infrastructure: Educative trail and Bird tower in 2010 (Photo 19) © Nabigha DAKIK- 2023 (Photo 20 & 21) © Bilal Kashmar.</p> <div style="display: flex; justify-content: space-around; align-items: center;">   <ol style="list-style-type: none"> 2. 3. 4. 5. 6. </div> <p>Photos 22 & 23: Weak maintenance of TCNR Infrastructure: Ras-Al Ain Bridge in 2010 (Photo 22) © Nabigha Dakik- 2023 (Photo 23) © Ali BADREDDINE.</p>

2.3 On-going initiatives

In the past years, TCNR received significant attention from international and national donors to fund initiatives and projects to valorize the reserve’s natural and cultural resources, provide basic equipment, rehabilitate the infrastructure, ensure the monitoring and protection of habitats and species, overcome human/ natural pressures, build capacity, increase the involvement of stakeholders, increase the visibility of the reserve, improve enforcement of laws and regulations, and improve the overall management of the reserve. Some of the projects and proposed activities that are mentioned in the previous management plan are still ongoing (Table 4).

Table 4 : List of activities ongoing within TCNR

Activities	Description
Infrastructure (maintenance/ rehabilitation/ construction)	<ul style="list-style-type: none"> • Demarcating the conservation zone. • Implementing a solar-energy infrastructure for the visitor center. • Installing toilets for people with special need in the touristic zone. • Rehabilitating/ and changing the target of the educative trail and bird towers in the conservation zone. • Rehabilitating the main entrance of the visitor center of the reserve and the two bungalows in the touristic zone. • Installing a signage system according to the needs. • Establishing a scientific laboratory with basic equipment. • Developing and establishing a sea turtle rescue center. • Equipping TCNR with chairs used for people with special needs to visit the reserve. • Establishing a wooden platform passage to facilitate access for visitors with special needs to the touristic areas (i.e., blind people, handicapped) which extends from the parking to the sea, as well as a tent with a food menu customized according to their needs. • Installing CCTV cameras across the main entrances.
Environmental (monitoring/ protection/ conservation)	<ul style="list-style-type: none"> • Promoting initiatives to reduce the use of plastics by focusing on awareness campaigns. • Monitoring Marine Non-Indigenous Species. • Planting Gemayz tree within the conservation zone. • Conducting a bibliography study of Ras-Al Ain springs and establish a geotourism plan for this zone. • Enhancing the integration of fishers in the activities of Tyre. • Studying the impact of macro/micro litter in the sea waters of TCNR. • Studying the impact of marine litter in stranded sea turtle. • Developing a mitigation action related to single-use plastic. • Working with main hotels, and restaurant as a communication action for increasing the visibility of TCNR.

Activities	Description
	<ul style="list-style-type: none"> • Increasing the involvement of fishers and students in Tyre through an awareness campaign focusing on TCNR values, threats, and challenges. • Organizing visits to TCNR for students and local community. • Publishing research on international scientific journal done within TCNR.
Laws (enforcement/ application/ agreement)	<ul style="list-style-type: none"> • Reducing the human pressures coming from the kiosks, especially during summer by signing an agreement focusing on reducing the light, especially during the sea turtles nesting season. • Issuance of the Protected Areas Framework Law (number 130/2019) which gives -among others- the APAC the authority to independently manage the financial resources of the reserve, entitling the APAC the ability of ownership of facilities, equipment, and tools, and the collection of fees from the public such as entrance fees to the reserve and fees to practice additional ecotourism activities in the reserve (such as diving, snorkeling...). • Increasing the support of Municipalities of Tyre and the Union of Tyre caza municipalities through enhanced cooperation and collaboration to enable the implementation of TCNR needed activities, and the establishment and rehabilitation of infrastructure and address challenges.
Twinning programme	<ul style="list-style-type: none"> • Establishing a twinning programme with Kas-Gokova MPA Turkey (with a special focus on implementing pescatourism activities in Tyre) and Parc of Medes Island MPA Spain (with a special focus on implementing an ecotourism strategy in Tyre, including TCNR).



Photos 24, 25 & 26: Rehabilitation of the Bungalows and installation of toilet for people with special needs within the touristic zone of TCNR and installation of the solar system in the visitor center of TCNR and fencing the scientific area of TCNR under the framework of ongoing projects Blue Tyre and UNDP © Ali BADREDDINE.

3 TCNR’s new management plan

3.1 Importance of updating TCNR’s management plan

The current management plan of TCNR was developed in 2004 with no updates on its programmes/ activities for the past 18 years. Many ecological, social, and economic aspects of TCNR have changed over these years including:

- Significant changes in the regulatory framework.
- Changes in natural ecosystems including the (i) decrease in the density of seagrass *Cymodocea nodosa*, (ii) decrease in the number of Marine Turtles nests, (iii) decrease in the number of individuals of *Dendropoma anguliferum* (the main reef-builder species), (iv) erosion of the sandy beach, (v) higher impact of sea warming

on some indigenous species mainly Porifera and Scleractinaria, (vi) increase in abundance and density of terrestrial and marine NIS.

- Changes in activities in the agriculture zone, e.g., herds grazing that ceased, changes in farming practices, surge of new diseases and bacteria impacting the cultivation and growing up of some vegetables/ and fruits.
- Intensified usage of agricultural pesticides and herbicides because of the presence of more diseases.
- Changes in fishing practices (more use of illegal fishing method due to the economic crisis).
- Increase in the number of kiosks from 40 to 49 in the touristic zone.
- Decrease in the water flow of Ras Al Ain Springs.
- Decrease in the quality of the Agricultural land within the Agricultural zone after using a high quantity of pesticides and herbicides during the years.
- Additional practices not undertaken before such as apiculture in the Agricultural zone.
- Increase in the human pressures coming from the Rashidiyeh camp.
- Increase in the population of Rashidiyeh camp.
- Increase in the number of tourists, especially during summer.
- Deterioration of the Ras-Al Ain spring and water mill infrastructure.
- Destruction of some TCNR infrastructure and signage.
- Decrease in the reserve's income.
- No consideration of the marine part of the reserve which now faces threats due to human activities and potential oil and gas exploration and production activities.
- Change in the sandy beach limit due to the erosion of sea water.
- Increase in the chemical pollution in Ras-Al-Ain marshes and ponds due to the use of pesticide and herbicide
- Impact of climate change heavily associated with sea warming and NIS (originally indo-pacific).
- High maritime traffic due to the increase in the fishers/ tourist/ divers boats in the port of Tyre.

The new management plan elaboration and implementation is even more critical given the new socio-economic conditions prevailing in the area and in Lebanon following the collapse of its economy.

Therefore, it has been important to prepare an updated management plan for TCNR to:

- Valorize the ecological, cultural, natural, historical, archeological, touristic values of TCNR.
- Address the changes that took place over the past two decades and propose new programmes and activities, as well as efficient monitoring and evaluation mechanisms.
- Incorporate the gaps that have been addressed during the evaluation of TCNR as a SPAMI site to keep its status as a SPAMI, given that the marine reserve is at risk of losing this designation.
- Include the marine part of the nature reserve in the updated management plan.
- Enhance the importance of the reserve from a touristic point of view.
- Address the new challenges and threats that the reserve is facing.
- Propose action plan and strategy for (i) establishing and guaranteeing a sustainable long term monitoring programme of key habitats and associated biodiversity (especially marine ones), (ii) increasing the

involvement of stakeholders in the activities of the reserve, (iii) Law Enforcement through an effective patrolling system, (iv) increase the income of the reserve through a socio-economic and ecotourism plan, (v) increase the visibility of the reserve, (vi) develop the capacity of the reserve, (vii) develop/ maintain the infrastructure of the reserve, (viii) equip the reserve with the necessary tools, and increase the research and studies.

- Promote further cooperation and partnerships to develop more projects that support the reserve in the monitoring, protection, and conservation of natural and cultural resources.

3.2 Objective of the Management Plan

The Management Plan (MP) provides the management team with a long-term vision for the protected area. It guides the management team towards the efficient planning and implementation of activities and achievement of goals targeting the protection and monitoring of the reserve features while promoting local community livelihoods. It outlines measures to face and overcome the identified challenges and the threats to the values of the reserve. The management plan has a clear set of Key Performance Indicators (KPIs) against which the reserve's management can assess management effectiveness and continuously improve.

The Management Plan includes also an action plan that enables management to allocate staff, financing, and resources required to implement the plan.

Last but not least, the Management Plan acts as a resource mobilization tool as it provides a coherent plan for donors, the private sector and NGOs to participate and contribute to its implementation.

3.3 Structure of the Management Plan

This management plan was prepared after conducting a thorough assessment completed by thorough consultations at both national and local levels of the current contextual background of the reserve including its physical, biological, and ecological features, as well as its environmental, social, and economic strengths, weaknesses, opportunities, and threats, which are highlighted in the Diagnosis Report (SPA/RAC-UN Environment/MAP, 2022)¹.

This management plan consists of four pillars and is designed to facilitate the adaptive management of TCNR as an interconnected ecological and socio-economic system. It is structured around different programmes with objectives, projects and activities.

The four pillars of this management plan are articulated around the following elements:

1. Vision
2. Mission

¹ SPA/RAC-UN Environment/MAP, 2022. Management Plan of Tyre Coast Nature Reserve (TCNR) -Phase I: Assessment/Diagnosis. By Khoury, R., Badreddine, A., Safi, S., Abdallah, P., Samaha L., Samaha, Z., Husseini, M. and Limam, A. Ed. SPA/RAC. IMA/MPA project. Tunis: cc pages. In press.

3. Goals: long-term objectives
4. Programmes: where operational objectives and their associated projects/activities are listed.

TCNR management plan operational programmes are categorized as follows:

1. Marine and Coastal Habitats and Species Conservation Programme
2. Terrestrial Habitats and Species Conservation Programme
3. Cultural Heritage and Archeological Sites Management Programme
4. Livelihood Management Programme
5. Tourism and Visitor Management Programme
6. Capacity Building Management Programme
7. Community Engagement Management Programme
8. Education, Awareness, and Communication Management Programme
9. Networking and Partnership Building Management Programme
10. Environmental Management Programme

Each of the above Programmes include the following:

- Rationale
- Objectives with key performance indicators including baseline and target values
- Management actions/activities:
 - Listing all identified activities required to meet each specific objective
 - Identifying responsible party
 - Indicating the budget and resources needed to implement the activity
 - Indicating whether the activity is in synergy with those implemented by other active parties

3.4 Participatory and inclusive approach

To ensure a comprehensive understanding of the ecological and socio-economic values of the MPA and stakeholders ownership in the implementation of the management plan, it has been prepared in a highly participatory approach that involves consultation with all relevant stakeholder groups (Annex 5).

Stakeholder engagement is integral to the Management Plan development and ensures key actors, experts, and citizens are involved in the planning processes.

Stakeholder engagement enabled the management planning team to gain key insight and opinions, enhance strategic recommendations, and solicit public feedback to improve the protection and monitoring of the reserve.

The stakeholder's participatory approach undertaken by the team of experts included two types of consultations (Annex 6 and Annex 7 for more details):

- *Focused consultation meetings* (virtual and in-person): these involved local farmers, divers, fishers, local community, kiosks/ hotels/ restaurant owners, presidents of the municipality of Tyre and the Union of Tyre,

surrounding MPAs/ and Hima (Mansouri Hima team, and Abbasiyeh Coast Nature Reserve Team), and national and international NGOs/ experts already working in TCNR.

- *Public consultation meetings* (in-person): multi-stakeholder workshops with the presence of local, national, and international stakeholders.

It is worth noting that the multi-stakeholder engagements involved divergent points of view and conflicts. However, they provided an enormous opportunity for bringing together various vantage points, skills, and knowledge for aligning interests and innovative problem-solving. It facilitated the understanding of key challenges and helped find common solutions that can be logged as future activities in the MP programmes.

Moreover, involving stakeholders at an early stage of the management plan preparation enabled a participatory problem-solving approach to the identified challenges or threats (Figure 3). Relevant stakeholders act as advisors and rely on their skills and knowledge to suggest solutions that can be formulated as future activities and projects in the MP. This exercise is critical as it gives a sense of co-management to stakeholders or a sense of “ownership” of certain initiatives; thus, gaining their buy-in on the management plan and leading to more successful management implementation in the long run.



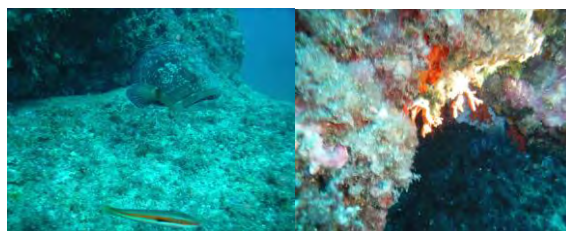
Figure 3. Stakeholder Participatory Approach Steps (source: Walton et al., 2013)².

For example, fishers’ engagement is a key attribute to improving the management of TCNR by collecting data through a participatory approach (e.g., citizen-science). Therefore, it is important to engage the fishers’ community in the management activities of the reserve (i.e., co-managing), and to offer them trainings and workshops that would increase their knowledge, and shape their traditional mentality towards more involved and responsible cooperation. The reflection box (Figure 4) explains one of the important topics for the fishers’ association. Another example would be to engage scuba-divers as they are instrumental for the collection of data and for securing revenues for the reserve through a clear ecotourism plan.

² Walton A. Gomei M. and Di Carlo G., 2013. STAKEHOLDER ENGAGEMENT. Participatory Approaches for the Planning and Development of Marine Protected Areas. World Wide Fund for Nature and NOAA— National Marine Sanctuary Program. 36 pages.

Box 1: Importance of No-take Marine Zone and Fisheries Spill-Over

Previous case studies of Mediterranean MPAs and global reviews show that well-managed MPAs can substantially increase fish size, density, biomass, and species richness. As fish populations recover within the no-take marine zone of the MPA, juvenile and adult fish can spill over across the boundaries and replenish fishing grounds. For example, in Apo Island of the Philippines, surgeonfish, and jackfish represent 40-75% of local fishery yields. Since the establishment of the MPA, their population has tripled, resulting in an increase in catch per unit effort by 50%, supporting the livelihoods of local fishermen (i.e., in terms of increased income). Additionally, MPAs can export larvae into adjacent areas. In Gekova MPA, Turkey, endangered species (e.g., groupers, seagrass) have increased in density and abundance (Ali Badreddine.fishers.pers.communication). In Medes Island Par Natural Reserve, Spain, critically endangered species reappeared, such as Corals *Corallium rubrum*, and endangered fish increased in size and density (Ali Badreddine. pers. observation).



Photos 27 & 28: Big size grouper and coral in Medes Island (MPA)- ©Ali BADREDDINE.

3.4.1 Benefits of TCNR

TCNR ecosystems, if well conserved, protected, and maintained can offer numerous social and economic benefits to different stakeholders. Therefore, the interrelation between healthy ecosystems and society is an integral part of the management practices of the reserve, which is considered in the different proposed programmes of the management plan. Table 5 lists some key benefits that the MPA can offer to different stakeholders.

Table 5 : Positive impacts of the MPA on key stakeholders

Stakeholders	Positive Impact of the MPA
Fishers	<ul style="list-style-type: none"> • Improved catch mix. • Increased income and jobs, for professional and pleasure fisheries. • Increased catch (spill-over effect). • Built up fishery recruitment. • Reduction of overfishing helps increase the density/ size/ abundance of local fish (very expensive locally such as the Groupers). • Protection of spawning stocks. • Undisturbed spawning sites/habitats. • Increased data availability (especially non-indigenous species) to find solution of the most invasive one (e.g. Puffer fish). • Anticipation of the invasion of NIS that can have a major impact on some indigenous species and the whole marine habitats and decrease in the abundance of some commercial indigenous species. • Discovery of new marine species some of which can have economic value.

Stakeholders	Positive Impact of the MPA
Farmers	<ul style="list-style-type: none"> • Increased the good quality of the agricultural land. • Find solutions for some plants diseases. • Increased income and jobs. • Guarantee sale of the farmers' products. • Guarantee the current flow for irrigation. • Guarantee the good quality of the waters used for irrigation.
Scuba-diving schools and eco-tourism providers	<ul style="list-style-type: none"> • Increased number of customers. • Expanded non-consumptive recreation opportunities. • Increased income and jobs for diving and snorkeling. • Increased returns directly (through diving club activities, snorkeling activities, accommodation, meals) or indirectly (through transportation, purchase of materials and equipment, and other induced commercial activities). • Increased income and jobs for eco-tourism providers to offer specific activities in a protected area (e.g., snorkeling, sea watching, scuba diving) or to simply enjoy the setting.
Local lodging facilities	<ul style="list-style-type: none"> • Increased number of national and international visitors given that the reserve will offer a touristic hotspot in Tyre.
Scientists, researchers, and educational institutions	<ul style="list-style-type: none"> • Educational opportunities. • Enhanced research, monitoring, and data collection from untouched sites. • Control areas for assessing human-induced impacts. • Income from scientific meetings. • Solutions for challenges threatened natural resources. • Income for scientists and researchers (budget for their research projects).

4 Vision, Mission, and Goals

4.1 Vision

“Tyre Coastal Nature Reserve is a model Marine Protected Area in the Mediterranean Sea that integrates a World Heritage setting and supports livelihoods while restoring, protecting and enhancing globally, regionally and locally important biodiversity”.

4.2 Mission

To protect, monitor and promote the ecological, touristic, historic, archeological, and cultural values of TCNR while managing it in an integrated and inclusive manner to sustainably secure socio-economic opportunities for its local community and stakeholders.

4.3 Goals

The management plan is based on strategic goals including:

1. Protect, restore and monitor TCNR marine and terrestrial ecosystems and associated biodiversity.
2. Ensure sustainable use of TCNR natural resources.

3. Improve ecological, cultural, recreational, and educational (e.g., researches and studies) opportunities for TCNR.
4. Promote community engagement and awareness programmes related to TCNR.
5. Attain sustainable management of TCNR.

5 Management Programmes and Objectives

The goals of the management plan will be reached once the management strategic objectives are achieved through the implementation of the management/operational programmes. The latter are formulated in relation to the key values of the MPA (i.e., important ecosystems and associated biodiversity) or major areas of management activities (e.g., fisheries, tourism, education, and awareness). The programmes will help managers with planning, measuring progress, and evaluating the success of the MPA.

The strategic objectives of the TCNR management plan are articulated around ten management/operational programmes listed below:

7. Marine and Coastal Habitats and Species Conservation Programme.
8. Terrestrial Habitats and Species Conservation Programme.
9. Cultural Heritage and Archeological Sites Management Programme.
10. Livelihood Management Programme.
11. Tourism and Visitor Management Programme.
12. Capacity Building Management Programme.
13. Community Engagement Management Programme.
14. Education, Awareness, and Communication Management Programme.
15. Networking and Partnership Building Management Programme.
16. Environmental Management Programme.
- 17.

Operational Programmes proposed for the MP and the correspondent Objectives and Activities

Operational Programme 1	
5.1. Marine and Coastal Habitats and Species Conservation Programme.	
Operational Objective 1	
5.1.1. Conserve the marine ecosystems/ habitats and associated species.	
Activities	
5.1.1.1.	Update and regularly evaluate the current status of the key marine habitats (Vermetid reefs, Coralligenous assemblages, Rhodolith/ Maërl Beds, Seagrass (<i>Cymodocea nodosa</i>) meadow/ <i>Cystoseira</i> forests), and prioritize the conservation of those ecosystems.

- 5.1.1.2. Update the list of marine fauna and flora species, with a special focus on rare, endemic, threatened/endangered species, and prioritize the conservation of those species.
- 5.1.1.3. Map the distribution of the key marine ecosystems and the associated fauna and flora species, with special interest.
- 5.1.1.4. Develop a monitoring programme of key marine ecosystems and associated fauna/ flora species with special interest.
- 5.1.1.5. Establish a regular monitoring programme for NIS and define, evaluate and regular follow the status of the most invasive NIS (e.g. apply the actions and recommendations proposed in the National Action Plan for Non-Indigenous Species).
- 5.1.1.6. Develop a manual to monitor key marine ecosystems (Fucal species, *Cystoseira* species, *Cymodocea nodosa* and vermetid reefs and selected flagship (threatened, endangered, and endemic) marine species to be shared and trained to fishers and divers and volunteers (especially students).
- 5.1.1.7. Support the execution of the monitoring programme through the implementation of citizen-science.
- 5.1.1.8. Combine the monitoring programme with the appropriate actions and programmes already proposed on the National Biodiversity Strategy and Action Plan (MoE/UNEP/GEF, 2016)³, the National Monitoring Programme for Marine Biodiversity in Lebanon (SPA/RAC-UN Environment/MAP, 2018a)⁴, the National Action Plan concerning species introductions and invasive species in Lebanon (SPA/RAC-UN Environment/MAP, 2018b)⁵, the National Action Plan for the conservation of Coralligenous Assemblages (SPA/RAC-UNEP/MAP, 2020a)⁶, and the bibliography study done related to vermetid reefs along the Lebanese coast (SPA/RAC-UNEP/MAP, 2021a)⁷.
- 5.1.1.9. Establish and apply a restoration plan and strategy of critical marine habitats (e.g. *Cymodocea nodosa*, *Dendropoma anguliferum*, when possible).
- 5.1.1.10. Establish and apply a restoration plan and strategy of critical marine habitats (e.g. *Cymodocea nodosa*, *Dendropoma anguliferum*, when possible).
- 5.1.1.11. Implement a no-take scientific (i.e. Ban of fishing/ Ban all activities that disturb marine wildlife) marine zone (characterized by key marine habitats/ species) within the marine boundaries of the reserve.
- 5.1.1.12. Enforce the execution of laws (e.g. stop illegal fishing methods (e.g. fish blasting and poisoning and dynamites) – An important decision was already taken by the municipality of Tyr banning the use of Jet ski for the protection and conservation of sea turtles.
- 5.1.1.13. Investigate and follow the available laws on the sustainable use of fisheries resources in Lebanon (e.g., apply the actions and recommendations proposed in the sustainable fisheries programmes and strategy for Tyre).
- 5.1.1.14. Enhance the cooperation and coordination with Mediterranean Experts on Marine habitats and species conservation for sharing new techniques/ experience, and information/ knowledge.
- 5.1.1.15. Create a data bank for scientific collected data within TCNR.

³ MoE/UNEP/GEF. 2016. National Biodiversity Strategy and Action Plan-NBSAP. 113pp.

⁴ SPA/RAC-UN Environment/MAP, 2018a. National monitoring programme for marine Biodiversity in Lebanon by: Bitar G., Ramadan-Jaradi G., Hraoui-Bloquet S., & Lteif M., Ed SPA/RAC EcAp Med II project, Tunis, 111 pp.

⁵ SPA/RAC-UN Environment/MAP, 2018b. Action Plan Concerning Species Introductions and Invasive species in Lebanon. By Bariche, M., Forcada, Ed SPA/RAC, Tunis: 37 pages + Annexe.

⁶ SPA/RAC-UNEP/MAP, 2020a. National Action Plan for the Conservation of Coralligenous assemblages in Lebanon. By Badreddine, A., Samaha, L., Ouerghi, A., Ed. SPA/RAC, Tunis: pages 38 + Annexes.

⁷ SPA/RAC-UNEP/MAP, 2021a. The vermetid reefs along the Lebanese coast. By Badreddine, A., Samaha, L., Limam, A., & Ouerghi, A. Ed. SPA/RAC. The vermetid reefs along the Lebanese coast. Tunis: pages 72 + Annexes.

- 5.1.1.16. Establish cooperation with the Ministry of Agriculture for sharing knowledge of laws and regulations related to fishing activities and share it with the local community for better application and enforcement of the existing laws/ or take new decisions allowing and encouraging protection and conservation of natural resources within TCNR.
- 5.1.1.17. Establishment and implementation of a patrolling strategy to control and ban illegal activities in the reserve (in cooperation with the Municipality of Tyre) including resources needed for patrolling.
- 5.1.1.18. Implement the monitoring programme of the marine mammals (Monk seals, Dolphins, and Cetaceans) in TCNR in cooperation with the National Center for Marine Sciences (NCMS) within the context of the “National monitoring. Programme for marine biodiversity in Lebanon”.
- 5.1.1.19. Implementation within TCNR, in cooperation with the National Center for Marine Sciences (NCMS) of the “National Action Plan for the monitoring of the mammals stranding” that was developed in 2023 by the NCMS in cooperation with IUCN and ACCOBAMS .
- 5.1.1.20. Evaluate the impact of climate change on sea waters including acidification, sea warming, proliferation of phytoplankton (especially harmful toxic algae) and on marine habitats and associated species.
- 5.1.1.21. Apply Mediterranean indices (e.g., CARLIT index, Badreddine *et al.*, 2018⁸) for evaluation of the ecological status of key marine habitats.
- 5.1.1.22. Establish a scientific observatory for analyzing data collected based on the new design of TCNR visitor center proposed in the MP (Annex 8).
- 5.1.1.23. Establish and develop an awareness campaign focusing in increasing the knowledge/ education related to marine ecosystems and associated biodiversity within TCNR.

Operational Objective 2

5.1.2. Protect and Monitor the sea turtles.

Activities

- 5.1.2.1. Continue the work already started for the development of the sea turtle rescue center based on the new design of TCNR visitor center proposed in the MP (Annex 8).
- 5.1.2.2. Equip the sea turtle rescue center (e.g., team/ equipment’s/ integrating the genetic analyzes).
- 5.1.2.3. Ensure a well-trained permanent staff and volunteers to start operating regularly the sea turtles rescue center.
- 5.1.2.4. Establish a well-trained team for monitoring sea turtle activities.
- 5.1.2.5. Develop the awareness campaign launched for the protection and conservation of sea turtles since 2019 (SPA/RAC-UNEP/MAP, 2020b⁹, 2021b¹⁰).
- 5.1.2.6. Implement the monitoring plan during the sea turtles nesting and hatching seasons (e.g., apply the actions and recommendations proposed in the Sustainable monitoring schemes in Tyre to support monitoring and

⁸ Badreddine, A., Abboud-Abi Saab, A., Gianni, F., Ballesteros, E., 2018. First assessment of the Ecological Status in the Levant Basin: application of the CARLIT index along the Lebanese coastline. *Ecological Indicators*, 85 (2018), 37 - 47.

⁹ SPA/RAC-UNEP/MAP, 2020b. Conservation of the Marine Turtles in Lebanon. Results of the 2019 monitoring of the Marine Turtles along the Lebanese coast. By Badreddine, A., Samaha, L., Abderrahim, M., Limam, A., & Ben- Nakhla, L. Ed. SPA/RAC. Conservation of Marine Turtles in the Mediterranean Sea project. Tunis: pages 39.

¹⁰ SPA/RAC-UNEP/MAP, 2021b. Conservation of the Marine Turtles in Lebanon. Results of the 2020 monitoring of the Marine Turtles along the Lebanese coast. By Badreddine, A., Samaha, L., Abderrahim, M., Limam, A., & Ben- Nakhla, L. Ed. SPA/RAC. Conservation of Marine Turtles in the Mediterranean Sea project. Tunis: pages 37.

	conservation post-2022 (SPA/RAC-UNEP/MAP, 2021c ¹¹), and in the National Action Plan for Protection and Conservation of sea turtles in Lebanon, SPA/RAC-UNEP/MAP, 2019 ¹²).
5.1.2.7.	Establish developed techniques for sea turtles monitoring activities (e.g., use of drones for sea turtles monitoring, satellite tracking of the sea turtles).
5.1.2.8.	Study the impact of climate change on the sea turtles nesting activities.
5.1.2.9.	Reduce the negative impact of local community, the touristic activities on the beach during sea turtle nesting and hatching seasons (e.g., light pollution, use of horses (especially in the scientific zone), stepping on the sand during breeding seasons).
5.1.2.10.	Enforce within TCNR the execution of the decision n ⁰ 125/1 issued in 1999 of the MoA banning the taking, selling, use, or trade of marine turtles.
5.1.2.11.	Establish ecotourism based on sea turtles (e.g., apply the actions and recommendations proposed in the ecotourism plan based on sea turtles for Tyre, SPA/RAC-UNEP/ MAP, 2021d ¹³).
5.1.2.12.	Estimate the abundance of sea turtles in Tyre waters (including TCNR).
5.1.2.13.	Map the sea turtle breeding area in Tyre waters (including TCNR).
5.1.2.14.	Continue the study of the impact of marine litter on sea turtles, and develop the National Strategy for COMMON indicator CI24 of the IMAP (SPA/RAC-UNEP/MAP, 2021e) ¹⁴ .
5.1.2.15.	Further develop the sea turtles stranding networks (already established in 2019, SPA/RAC-UNEP/ MAP, 2020c ¹⁵ , 2021f ¹⁶).
5.1.2.16.	Offer facilities (e.g. guesthouses, eco-camping area) for volunteers, especially during the sea turtles nesting season based on the new design of TCNR visitor center proposed in the MP (Annex 8).
5.1.2.17.	Implement a strategy for more involvement of fishers and divers in the sea turtles stranding network.
5.1.2.18.	Encourage studies and research related to sea turtles.

Operational Programme 2	
5.2.	Terrestrial/ and Freshwater Habitats and Species Conservation Programme
Operational Objective 1	
5.2.1.	Protect and monitor the floral species in TCNR
Activities	

¹¹SPA/RAC-UNEP/MAP, 2021c. Sustainable monitoring schemes in Tyre to support conservation and monitoring post 2022. By Badreddine, A., Samaha, L., Abderrahim, M., Limam, A., & Ben-Nakhla, L. Ed. SPA/RAC. Conservation of Marine Turtles in the Mediterranean Sea project. Tunis: pages 15.

¹² SPA/RAC-UNEP/MAP, 2019. Plan d'Action National pour la conservation des tortues marines du Liban. In press.

¹³ SPA/RAC-UNEP/MAP, 2021d. Ecotourism program based on sea turtles for Tyre Coast Nature Reserve - TCNR. By Badreddine, A., Samaha, L., Abderrahim, M., Limam, A., & Ben-Nakhla, L. Ed. SPA/RAC. Conservation of Marine Turtles in the Mediterranean Sea project. Tunis: pages 37.

¹⁴ SPA/RAC-UNEP/MAP, 2021e. Lebanon National strategy for monitoring IMAP Candidate Indicator 24. By Badreddine, A., Samaha, L., Abderrahim, M., Limam, A., & Ben-Nakhla, L. Ed. SPA/RAC. Marine Litter MED project. Tunis: pages 25.

¹⁵ SPA/RAC-UNEP/MAP, 2020c. A Stranding Network for Sea Turtles and Cetaceans & A Protocol for Monitoring the Interaction between Marine Litter and Marine Turtles in Lebanon. By Badreddine, A., Samaha, L., Joumaa, F., Abderrahim, M., Limam, A., & Ben-Nakhla, L. Ed. SPA/RAC. Marine Litter MED project Tunis: pages 19 + Annexes.

¹⁶ SPA/RAC-UNEP/MAP, 2021f. Results of the stranding networks for sea turtles in Lebanon. By Badreddine, A., Samaha, L., Abderrahim, M., Limam, A., & Ben-Nakhla, L. Ed. SPA/RAC. Conservation of Marine Turtles in the Mediterranean Sea project. Tunis: pages 20 + Annexes.

5.2.1.1.	Update the list of flora species, with a focus on species with special interest.
5.2.1.2.	Develop a monitoring scheme of selected key species (threatened, endangered, and endemic, species).
5.2.1.3.	Develop and implement a mitigation plan on the impact of present non-indigenous species on native biota.
5.2.1.4.	Remove or mitigate all threats and obstacles facing the threatened terrestrial plant species in TCNR, including stepping on sand dunes, plant fixing sand, and plants collection.
5.2.1.5.	Develop and implement a plan to control grazing and trespassing in the reserve.
5.2.1.6.	Prohibit the harvest of wild plants and floral species.
5.2.1.7.	Reintroduce or propagate threatened key floral species in TCNR.
5.2.1.8.	Develop and implement a strategy to restore and rehabilitate threatened or degraded terrestrial habitats.
5.2.1.9.	Establish an ecotourism plan based on terrestrial flora species (e.g., add some educative signage).
5.2.1.10.	Develop a long term strategy to eradicate the presence of the invasive plants.
5.2.1.11.	Increase the plantation of trees in and around the reserve.

Operational Objective 2

5.2.2. Conserve and Protect the freshwater habitat.

Activities

5.2.2.1.	Update the list of fauna and flora associated with the freshwater, with a focus on species with special interests.
5.2.2.2.	Develop and establish a regular monitoring programme for freshwater fauna and flora.
5.2.2.3.	Install proper infrastructure to promote conservation of ponds and freshwater reservoirs and improve accessibility to these areas.
5.2.2.4.	Develop and implement a strategy to restore and rehabilitate threatened or degraded freshwater habitats.
5.2.2.5.	Develop awareness campaigns for the conservation of freshwater habitats.
5.2.2.6.	Regularly monitor the freshwater quality to detect if there is pollution and its sources.
5.2.2.7.	Increase the awareness campaign on the importance of freshwater habitat and associated biodiversity.

Operational Objective 3

5.2.3. Conserve the avifauna population in TCNR.

Activities

5.2.3.1.	Update the list of bird's species, with focus on species with special interest.
5.2.3.2.	Implement the monitoring protocol for the birds species in TCNR within the context of the “National monitoring programme for marine biodiversity in Lebanon” and develop a manual for their monitoring in the reserve.
5.2.3.3.	Develop a bird guide for TCNR in Arabic and English.
5.2.3.4.	Maintain the bird observation tower to promote conservation of birds and bird-watching in TCNR.
5.2.3.5.	Ban bird hunting and effectively monitor and control bird-hunting activities.
5.2.3.6.	Develop awareness campaigns for the conservation of different types of bird species, highlighting their ecological and socio-economic importance.
5.2.3.7.	Develop and implement a strategy for conservation and to restore and rehabilitate threatened or degraded habitats.
5.2.3.8.	Develop a long term strategy to eradicate the presence of the Non-Indigenous Birds Species.

Operational Objective 4

5.2.4. Conserve the sand dune habitat in TCNR.	
Activities	
5.2.4.1.	Implement a methodology for sand dune monitoring, stabilization and regeneration using experts in this field.
5.2.4.2.	Control trespassing, horsing, drifting, and grazing activities in this habitat, and the impact of marine litter on this habitat and the associated biodiversity.
5.2.4.3.	Develop awareness campaigns for increasing the knowledge and the conservation of sand dunes, highlighting their ecological and socio-economic importance, enhancing their protection and conservation.
5.2.4.4.	Monitor the invasive plant species detected in the sand dunes (i.e., camphorweed plants belonging to <i>Heterotheca subaxillaris</i> species) and enact an eradication plan.
5.2.4.5.	Fence the sand dunes ecosystems within the scientific zone of TCNR, taking into consideration the movement of the wildlife associated with the sand dunes.
Operational Objective 5	
5.2.5. Restore and rehabilitate the natural flow of Ras Al Ain Estuary to the sea.	
Activities	
5.2.5.1.	Conduct a study to estimate the minimum flow required to maintain a healthy estuarine ecosystem.
5.2.5.2.	Reduce and monitor the impact of anthropogenic activities on the estuary.
5.2.5.3.	Ensure, in the whole water basin, good water quality through sustainable monitoring and removal of pollution at source in case of presence of pollution.
5.2.5.4.	Reduce anthropogenic pressures and especially the impact of Marine Litter.
5.2.5.5.	Ban the use of pesticides and herbicides and replace it with the application of an integrated pest management.
5.2.5.6.	Increase the visibility and ecotourism importance of the area.
Operational Objective 6	
5.2.6. Conserve the sandy beach of TCNR.	
Activities	
5.2.6.1.	Develop an action plan for sand protection from erosion and pollution.
5.2.6.2.	Apply a strict ban on access to marine turtle nesting areas.
5.2.6.3.	By applying the carrying capacity principle, reduce the negative impact of tourists' activities on the beach during the summer.
5.2.6.4.	Reduce the use of plastic, especially during the summer season.
5.2.6.5.	Establish and adopt and effectively implement a strategy to reduce marine litter especially during the summer season.

Operational Programme 3	
5.3. Cultural Heritage and Archeological Sites Management Programme.	
Operational Objective 1	
5.3.1. Access to information.	

Activities	
5.3.1.1.	Erect panels of interpretation with information on history, archeology and other cultural features of the reserve with QR codes. N.B: This activity is currently ongoing and under implementation through the BIOCONNECT project.
5.3.1.2.	Ensure guided tours to cultural and historical sites of the reserve
5.3.1.3.	Produce awareness materials about the cultural and historical sites within TCNR.
Operational Objective 2	
5.3.2.	Searching and discovering of archaeological and historic sites within the reserve.
Activities	
5.3.2.1.	Continue the research of archaeological and historic monuments and sites within TCNR.
5.3.2.2.	Rehabilitate and maintain the discovered archaeological and historic monuments in the scientific zone of TCNR in cooperation with the Directorate General of Antiquities and following the archeological and environmental guidelines.
Operational Objective 3	
5.3.3.	Restore and rehabilitate the artesian wells and the surrounding area.
Activities	
5.3.3.1.	Develop a complete historical study and literature review of the site.
5.3.3.2.	Evaluate, organize, resettle, and control all illegal housing activities (especially the use of the spring waters) in the area that can threaten the functionality of the artesian well by offering them other good options for living taking into consideration the historical, and ecological value of the area.
5.3.3.3.	Develop a landscape master plan for the agriculture zone.
5.3.3.4.	Implement the landscape master plan in the agriculture zone.
5.3.3.5.	Develop an administrative coordination mechanism among all the stakeholders concerned with Ras Al Ain (i.e., South Lebanon Water and Wastewater Establishment, Department of Antiquities, Litani Water Authority, Council for Development and Reconstruction, Ministry of Environment, and the APAC).
5.3.3.6.	Regularly evaluate / and guarantee the efficient use of the water provided by the springs in cooperation with the Litany river authority and Lebanese water authority in the south of Lebanon.
5.3.3.7.	Maintain the good water quality of the springs through a watershed protection plan to be developed in cooperation with the water establishment and MoE.
5.3.3.8.	Rehabilitate and maintain the infrastructure of the artesian wells and spring waters.
5.3.3.9.	Develop and implement a strategy to avoid the loss of excess water from the springs.
5.3.3.10.	Develop and implement an ecotourism (e.g. geotourism) strategy based on the cultural, historic, and archaeological importance of Ras-Al-Ain.
Operational Objective 4	
5.3.4.	Restore and rehabilitate the old water mill.

Activities	
5.3.4.1.	Seek financial resources to rehabilitate and restore the water mill and the house in Ras Al Ain.
5.3.4.2.	Utilize the water mill for agricultural purposes such as grinding flour or (buy/ sell) agriculture products.
5.3.4.3.	Conduct a feasibility study to transform the water mill house into a facility (either a visitor center in the agriculture zone or a place for farmers to meet/rest).
5.3.4.4.	Understand the value of the water mill as an historic and archeological sites (valorization).
5.3.4.5.	Use the water mill (after its transformation to an important archaeological and touristic site) as an ecotourism tool.

Operational Programme 4	
5.4. Livelihood Management Programme	
Operational Objective 1	
5.4.1.	Engage the fishers' community in monitoring and safeguarding the reserve's marine biodiversity while improving their living conditions.
Activities	
5.4.1.1.	Encourage the establishment and implement a pilot project on sustainable fishing in Tyre after consultation with the Ministry of Agriculture.
5.4.1.2.	Help the fishers with legal fishing nets and the proper fishing equipment (when possible through national/ regional projects) after consultation with the Ministry of Agriculture.
5.4.1.3.	Conduct a marine census study on the fish stock of juvenile commercial fish species and their seasonality within/ and outside the reserve.
5.4.1.4.	Promote financial incentives for fishers to help reduce by-catch of important marine species such as sea turtles and dolphins and cartilaginous species.
5.4.1.5.	Offer regularly workshops to promote awareness of the importance of no-take marine zone in the reserve and the spill-over effect.
5.4.1.6.	Engage fishers from the local community in attending progress meetings held by TCNR management.
5.4.1.7.	Regularly train and increase the capacity of fishers, and involve them in the monitoring activities of the reserve (increase the citizen-science), including trainings to help reduce by-catch of important marine species such as sea turtles and dolphins and cartilaginous species
5.4.1.8.	Increase the knowledge and education of fishers (as a tourism promotion way and tool).
5.4.1.9.	Enforce the execution of national laws protecting and conserving the natural resources, and especially marine species. This step will guarantee to increase the abundance and size of marine species, and establishing the balance between fishers and environment (as an important objective of TCNR).
5.4.1.10.	Establish a long-term cooperation with fisher's syndicate.
5.4.1.11.	Encourage the establishment of the pescatourism activities.
5.4.1.12.	Create a group of fishers only working with the reserve.
5.4.1.13.	Empower fisher women and increase their involvement in the reserve activities.

Operational Objective 2	
5.4.2.	Improve the added value of the agricultural practices through direct intervention with Ras Al-Ain farmers.
Activities	
5.4.2.1.	Establish an agro-tourism plan in the Ras Al-Ain Area.
5.4.2.2.	Implement a pilot plan for organic farming in a demonstration plot.
5.4.2.3.	Develop an integrated pest management strategy for the agricultural areas in the reserve.
5.4.2.4.	Train local farmers to produce and package environmentally friendly products/ and involve them to the reserve projects/ and activities.
5.4.2.5.	Create retail outlets for the agricultural products of the site (e.g., collaboration with kiosks owners for selling primary products, creating organic market days in the touristic zone (when possible)).
5.4.2.6.	Create a certification system to ensure that products reach reliably high standards and access wider markets.
5.4.2.7.	Construct a packaging center for all the products and crops in TCNR with the reserve's logo.
5.4.2.8.	Create a cultural kitchen kiosk in the touristic zone selling mortar or products from the seasonal agriculture harvest of the reserve engaging local women in the production.
5.4.2.9.	Assess market functioning and prices to maintain competitive production.
5.4.2.10.	Promote the production of compost from rotten or unsold agriculture products to be used as natural fertilizers.
5.4.2.11.	Encourage the rural tourism / agro-tourism.
Operational Objective 3	
5.4.3.	Revive traditional knowledge and indigenous practices of the local community in and around the site.
Activities	
5.4.3.1.	Conduct a thorough survey to identify all traditional knowledge and indigenous practices of the local communities in the conservation of TCNR.
5.4.3.2.	Develop a proper marketing strategy to promote the identified practices and the knowledge for income generation.
5.4.3.3.	Encourage local food by involving local women on the tourist strategy.
Operational Programme 5	
5.5. Tourism and Visitor Management Programme.	
18. N.B: Ecotourism actions have been proposed according to each Operational Programme.	
Operational Objective 1	
5.5.1.	Develop a visibility and a communication strategy for TCNR.
Activities	
5.5.1.1.	Create a specific communication sign (e.g. emblem) for TCNR.
5.5.1.2.	Update TCNR website.
5.5.1.3.	Establish and develop a promotion plan.
5.5.1.4.	Create a video for TCNR promotion.
5.5.1.5.	Cooperate with schools, and universities, restaurants and hotels for promoting TCNR.
Operational Objective 2	
5.5.2.	Develop a visitor management plan.

Activities	
5.5.2.1.	Conduct a survey of visitors' profiles to the reserve for both the touristic and conservation and agricultural zones.
5.5.2.2.	Impose an entrance fee to the reserve considering different age groups and packages.
5.5.2.3.	Regulate the kiosks established during summer on the sandy beach, and impose a unified design and color for all, with environmental conditions for solid waste and waste water, and carrying capacity.
5.5.2.4.	Enhance and increase the interpretative and illustrative signs across the different zones in TCNR.
5.5.2.5.	Calculate the carrying capacity for all the zones (touristic, conservation, and agriculture) and enforce it
5.5.2.6.	Regulate the activities of the tourists and swimmers in the sandy public beach outside the kiosks zone.
5.5.2.7.	Increase the control in the conservation zone to ban the entrance of the tourists in this zone.
5.5.2.8.	Develop a customer experience department within TCNR management where visitors can register any concerns, complaints, or recommendations.
5.5.2.9.	Install CCTV cameras across the main entrances and critical areas in the reserve, which facilitates the work of security rangers in detecting illegal actions or violations, and increase the number of rangers and patrolling specially during the summer season to control illegal activities of the tourists.
5.5.2.10.	Implement a feedback sheet for visitors as an evaluation process.
5.5.2.11.	Install waste bins along the sandy public beach of the touristic zone, and increase the number of cleaners during the summer season in order to reduce marine litter.
Operational Objective 3	
5.5.3. Enhance and expand on existing eco-touristic activities in TCNR.	
Activities	
5.5.3.1.	Conduct both a feasibility study and a business plan for implementing an environmentally friendly eco-camping site in the reserve.
5.5.3.2.	Invest in new eco-friendly water sports activities such as kayaking, glass-bottom kayaks, windsurfing, paddleboards.
5.5.3.3.	Mobilize staff to manage the eco-touristic activities such as the rental of snorkeling, scuba diving, kayaks, etc. and to organize these activities in the reserve.
5.5.3.4.	Develop guidelines and manuals for the use and maintenance of eco-touristic equipment owned by the reserve.
5.5.3.5.	Rehabilitate the visitor information center and equip it to host tourists, workshops, and conferences.
5.5.3.6.	Develop a mechanism of cooperation with tour and eco-tours operators on a national and international scale.
5.5.3.7.	Expand the sea turtles' exhibition center and include e-learning tools and activities for tourists.
5.5.3.8.	Cooperate with restaurants and hotels and kiosks owners and diving center for promoting TCNR.
Operational Objective 4	
5.5.4. Implement a tourism marketing strategy.	
Activities	
5.5.4.1.	Conduct and implement a marketing strategy to attract more national and international visitors/tourists, to the reserve.
5.5.4.2.	Enhance the reserve's website including visuals and a platform where visitors can book tours and activities through the website.

5.5.4.3.	Establish a local souvenir store inside the reserve to promote and sell different items carrying the reserve's logo and important species.
5.5.4.4.	Sign agreement with neighboring hotels and diving center (and add % fees as a revenue for the reserve).
5.5.4.5.	Impose on the hotels and diving center to put info on the reserve in their properties.

Operational Programme 6	
5.6. Capacity Building Management Programme	
Operational Objective 1	
5.6.1. Conduct training programmes on species conservation and scientific monitoring.	
19. N.B: Training actions were proposed according to each Operational Programme.	
Activities	
5.6.1.1.	Collaborate with biodiversity experts and research institutions on conducting training programmes for the reserve's staff, particularly for the rangers/ and volunteers from the summer kiosks owners on particular species conservation and management (e.g., vermetid reefs, <i>Cystoseira</i> forests, seagrasses, marine turtles, marine birds, cetaceans, non-indigenous species, flag species).
5.6.1.2.	Equip the management team with the needed tools to conduct scientific sampling and monitoring of marine/ terrestrial habitats and species with special interests.
5.6.1.3.	Develop ongoing support and a follow-up programme to ensure that the knowledge and skills gained through the training are implemented at the field level.
5.6.1.4.	Establishment of an evaluation system to understand the knowledge degree of the people trained and involved in the reserve activities.
5.6.1.5.	Train fishers and divers on some monitoring techniques (according to the need of the reserve).
5.6.1.6.	Establish a strategy for a long-term involvement/ and engagement of fishers and divers in the activities of the reserve.
Operational Objective 2	
5.6.2. Perform capacity building for the TCNR management team and stakeholders' engagement workshops.	
Activities	
5.6.2.1.	Conduct monthly trainings for the management team (with a special focus on reserve's laws and regulations) using existing courses run by WWF/NOAA, followed by RAC/SPA, Conservatoire du Littoral, ACCOBAMS, CaMPAM, NOAA, TNC, IUCN, MedPAN, UNDP.
5.6.2.2.	Carry on trainings on conflict resolution/ and solutions.
5.6.2.3.	Implement communication and coordination plans between the reserve's different internal and external stakeholders' groups, and the reserve team.
5.6.2.4.	Create a coordinated network of MPA managers to share knowledge, information and lessons learned across Lebanese regions and the Mediterranean.
Operational Objective 3	
5.6.3. Carry out trainings on self-financing and business plans.	

Activities	
5.6.3.1.	Consult local, regional, and international experts to conduct trainings or workshops on sustainable tourism ideas for the reserve.
5.6.3.2.	Implement the ecotourism plan based on sea turtles/ Marine and Terrestrial Habitats, and associated biodiversity.
5.6.3.3.	Involve fishers and divers within the ecotourism strategy (especially the diving ecotourism).
5.6.3.4.	Implement an ecotourism plan based on the historical monuments/ ruins under waters.

Operational Programme 7	
5.7. Community Engagement Management Programme.	
Operational Objective 1	
5.7.1. Develop a community development plan.	
Activities	
5.7.1.1.	Conduct local community public hearing consultation to gather ideas to foster engagement activities within and around the reserve in a transparent manner).
5.7.1.2.	Collaborate/ and connect with the MoT, MoC, and the MoF on community livelihood programmes.
5.7.1.3.	Increase/ and focus on the involvement of Rashidiyeh camp in TCNR activities, through organizing regular meeting for updating them on the current status/ activities/ and regulations of TCNR.
Operational Objective 2	
5.7.2. Promote income generation activities for the local community.	
Activities	
5.7.2.1.	Create a revolving fund to finance Small and Medium Enterprises (SMEs) projects leading to the alleviation of socio-economic pressures within TCNR and its surrounding community.
5.7.2.2.	Initiate and market the Bed & Breakfast concept in the city of Tyre as part of the lodging facilities and packages offered by the reserve for tourists willing to visit the city.
5.7.2.3.	Involve local women in making secondary products from agricultural harvest such as mortars, jams, herbs, sauces, etc/ and increase their role in the society.
5.7.2.4.	Establish a permanent kiosk in the agriculture zone to sell the produced secondary products with the reserve's logo, and to choose the location of the kiosk far from the water springs location in order to preserve them from any negative environmental impact.
5.7.2.5.	Organize artistic workshops for the local community especially women involving school kids to create ornaments using seashells and sell them in the reserve's souvenir shop.
5.7.2.6.	Help initiate kiosks during the summer season that prepare, cook and sell fresh daily seafood catch of commercial fish species that are harvested outside the reserve's restricted marine boundaries.
Operational Objective 3	
5.7.3. Promote the role of women in TCNR activities.	
Activities	
5.7.3.1.	Cooperate with local women for food during the organization of events (awareness, training, visits, and others) in TCNR.

5.7.3.2.	Consider gender equity during the organization of events related to TCNR.
5.7.3.3.	Offer opportunities for women to be involved in TCNR activities/ and organize regular meetings with them.
5.7.3.4.	Regularly organize meetings with women stakeholders to share solutions/ ideas/make decisions.

Operational Programme 8

5.8. Education, Awareness, and Communication Management Programme.

N.B: Education, Awareness, and Communication actions were proposed separately also according to each Operational Programme.

Operational Objective 1

5.8.1. Conduct awareness campaigns to promote sustainable fishing.

Activities

- 5.8.1.1. Implement an awareness campaign for fishers on sustainable fishing practices and techniques.
- 5.8.1.2. Investigate/ and enforce the execution of the available laws on the sustainable use of fisheries resources in Lebanon.
- 5.8.1.3. Offer workshops to promote awareness of the importance of no-take marine zone in the reserve and the spill-over effect.
- 5.8.1.4. Promote/ and offer financial incentives for fishers to help reduce by-catch of important marine species such as sea turtles.
- 5.8.1.5. Promote the sustainable use of resources derived from the wetlands.
- 5.8.1.6. Develop a study to improve the efficiency of the irrigation system used in the agriculture zone of TCNR.
- 5.8.1.7. Promote and support environmentally friendly or organic agriculture practices within the farmers' community of TCNR.

Operational Objective 2

5.8.2. Promote environmentally friendly practices across the TCNR zones to limit pollution.

Activities

- 5.8.2.1. Train local farmers to produce and package environmentally friendly products.
- 5.8.2.2. Collect agricultural run-offs and sewerage from small farmers' settlements and direct them to local treatment facilities.
- 5.8.2.3. Implement awareness campaigns for the local community and kiosks owners on solid waste management.
- 5.8.2.4. Conduct regular beach cleaning campaigns.
- 5.8.2.5. Distribute 3 compartments bins across the three zones in TCNR and along the sandy beach to separate organic, recyclables, and other waste.
- 5.8.2.6. Include small bins for cigarette butts along the sandy beach for smokers.
- 5.8.2.7. Collaborate with kiosks owners and recycling facilities in Lebanon to use recyclable disposable cutlery made from paper or decomposable material (cups, plates, forks, knives, boxes) instead of single-use plastics.
- ~~5.8.2.8.~~ Increase the number of cleaners during the summer season in the sandy public beach to reduce marine litter.
- ~~5.8.2.9.~~ Establish a specific contingency plan for TCNR in line with the National Oil Spill contingency plan.

Operational Objective 3	
5.8.3.	Develop an awareness campaign targeting behavioral change in the local community and stakeholders in Tyre.
Activities	
5.8.3.1.	Implement environmental awareness campaigns for the public regarding the values and functions of TCNR.
5.8.3.2.	Use marketing awareness materials to highlight the benefits and values of TCNR through digital media, advertisements, brochures, printouts, billboards, TV advertisements, etc.
5.8.3.3.	Involve schools and universities in the awareness programmes to increase the visibility of the reserve across educational institutions.
5.8.3.4.	Improve the website of the reserve to include more material about the reserve’s activities, services, species, and the packages the reserve offers.

Operational Programme 9	
5.9. Networking and Partnership Building Management Programme.	

Operational Objective 1	
5.9.1.	Promote stakeholders’ involvement in decision-making and management strategies of TCNR.

Activities	
5.9.1.1.	Regularly organize workshops with identified groups of users among the stakeholders to develop a strategy for achieving local involvement in TCNR management.
5.9.1.2.	Carry out participatory planning and negotiation among stakeholders to develop a strategy for achieving local involvement in TCNR management.
5.9.1.3.	Assist the municipality in developing proposals.
5.9.1.4.	Regularly organizing meeting with the main stakeholders involved in the activities of TCNR to discuss about main results/ expectations/ Gaps.
5.9.1.5.	Guarantee the involvement of Rashidiyeh community in the stakeholder’s process.

Operational Objective 2	
5.9.2.	Ensure economic viability of the nature reserve and surrounding area.

Activities	
5.9.2.1.	Develop a business plan for TCNR.
5.9.2.2.	Mobilize financial resources from private and public agencies.
5.9.2.3.	Seek funds from international and multinational agencies.
5.9.2.4.	Mobilize international and national funding sources for wetland conservation.
5.9.2.5.	Organize a yearly donor tour.
5.9.2.6.	Develop a strategy to diversify sources of funding for TCNR.
5.9.2.7.	Participate in exhibitions and yearly national and international events.
5.9.2.8.	Use the national/ regional importance of TCNR to ask funds from national and regional donors and organizations.

Operational Objective 3	
5.9.3.	Encourage and facilitates collaboration with academia in the management of TCNR.

Activities	
5.9.3.1.	Develop a cooperation mechanism with academia to include the research and monitoring requirements of TCNR in their research and internship programmes.
5.9.3.2.	Develop a yearly research agenda covering the research needs of TCNR.
5.9.3.3.	Sign agreement with universities and research centers.
5.9.3.4.	Increase the collaboration and cooperation with the universities and NGOs for guaranteeing a sustainable monitoring programme.
5.9.3.5.	Organize a TCNR week, with the participation of national/ regional experts (in many field) and students.

Operational Programme 10	
5.10.	Environmental Management Programme (Groundwater, wastewater, solid waste including marine littering, air quality)
Operational Objective 1	
5.10.1. Conserve groundwater quality in TCNR	
Activities	
5.10.1.1.	Promote the efficient and sustainable use of groundwater according to Ramsar Guidelines.
5.10.1.2.	Conduct a water budgeting analysis for the Ras Al Ain springs in collaboration with the Litani Water Authority.
5.10.1.3.	Regularly monitor the groundwater to detect any source or non-source point of pollution through sampling and testing.
5.10.1.4.	Provide farmers with alternatives to the usage of chemical pesticides and fertilizers.
5.10.1.5.	Analyze/Examine/ and regularly follow up the flow and currency of water trough national organization (e.g., Ministry of water and energy), NGO.
Operational Objective 2	
5.10.2. Manage solid waste and reduce marine littering in TCNR.	
Activities	
5.10.2.1.	Act in line with the Protocol of Barcelona for the Protection of the Mediterranean Sea Against Pollution from Land-Based Sources.
5.10.2.2.	Regularly remove garbage marine litter brought to TCNR by sea currents, in cooperation with local community, local NGOs, through projects and in cooperation with the municipality of Tyre.
5.10.2.3.	Develop a proposal for funding integrated solid waste management in TCNR.
5.10.2.4.	Forbid the use of single-use plastics within TCNR zones by taking some decisions and agreement with the union of Municipalities of Tyre.
5.10.2.5.	Offer alternative to single-use plastic to kiosks owners by collaborating with national recycling facilities to supply recyclable disposable cutlery made from paper or decomposable material (cups, plates, forks, knives, boxes).
5.10.2.6.	Increase the number of compartments bins across the reserve including organic, recyclables, and other waste, specifically in the sandy public beach.
5.10.2.7.	Distribute small bins for cigarette butts across the sandy beach and smoking stations in collaboration with kiosks owners, especially during summer.

5.10.2.8.	Collaborate with Material Recovery Facilities near Tyre to collect segregated waste from the reserve.
5.10.2.9.	Impose a penalty or violation fee for any action of marine littering or waste dumping in the reserve.
5.10.2.10.	Incentivize the visitors to recycle by installing reverse-vending machines where each plastic bottle will earn the depositor a point, and the collection of points can be redeemable against a coupon.
5.10.2.11.	Implement traditional/ developed techniques for sorting the litter mixed with the beach sand in cooperation with Tyre Municipality.
5.10.2.12.	Increase the awareness for reducing the use of plastics (especially through national/ regional/ and international projects).
5.10.2.13.	Implement awareness campaigns for the local community, and visitors (especially during summer), and kiosks owners on solid waste management.
5.10.2.14.	Increase the number of cleaners during the summer season in the sandy public beach and ensure the regular cleaning of the beach to reduce marine litter generated by the swimmers and visitors.
5.10.2.15.	Work more on the behaviors in parallel with the awareness to reduce the use of plastics.
5.10.2.16	Clean TCNR waters from ghost nets.
Operational Objective 3	
5.10.3. Reduce sewerage and wastewater effluents discharged into the sea.	
Activities	
5.10.3.1.	Participate in developing a wastewater management strategy for the city of Tyre.
5.10.3.2.	Develop proper sanitary and wastewater infrastructure in Al Rachidiyeh camp with the collaboration of the Municipality and donors such as UN-habitat-UNDP.
5.10.3.3.	Develop a proper sewage and wastewater infrastructure for the kiosks established during the summer in the sandy public beach of the reserve.
5.10.3.4.	Control pollution on the marshes in the Agricultural zone of TCNR.
5.10.3.5.	A sanitary solution is needed to fix this issue of contamination of the drinking water sources.
5.10.3.6.	A proper solution for SW management is needed for the entire Tyre district in addition to the 3 Palestinian camps (more than 58,000 Palestine refugees), plus Palestine and Syrian refugees living in the surroundings gatherings, adjacent areas and municipalities in the area. The total solid waste collected in the Palestine refugee camps is either sent to the Ain Baal treatment plant (funded by European Union and the Office of the Minister of State for Administrative Reform (OMSAR) and operated by a private company) or/and to illegal open burning and dumping sites (more than 1,000 around the country as per estimations).
5.10.3.7.	Design alternative (complementary or stand-alone) final treatment of pre-treated sewage in coastal wastewater wetlands.
Operational Objective 4	
5.10.4. Promote activities that protect the air quality in the vicinity of the reserve.	

Activities

- | | |
|-----------|--|
| 5.10.4.1. | Develop a feasibility study to promote the use of solar panels across the reserve's facilities including lighting within the peripheries of the reserve. |
| 5.10.4.2. | Offer carpooling and electric vehicles such as carts, UTV, buggies, tuk tuks for tourists which can be booked through the website of the reserve for planned visits or through a hotline handled by the reserve's management team. |
| 5.10.4.3. | Increase the plantation of trees (e.g. Gemmayz/ or other based on experts' advices) in and around the reserve. |
| 5.10.4.4. | Control fire in TCNR by implementing the patrolling strategy and system. |
| 5.10.4.5. | Cooperate with hotels and restaurant to increase the awareness on reducing air pollution. |

6 Boundaries and Zoning of Terrestrial and Marine Areas

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6.1 Units

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22. The lands constituting TCNR, amount to an area of 1.824 km² (including the land and the sand only without the water area) and is divided into three zones:

- Touristic zone: Encompasses a sandy beach open to the public for swimming, recreation, and sunbathing during the summer season, stretching from May to October.
- Conservation zone: A high conservation zone to minimize the disturbance to wildlife. This section encompasses sand dunes and archeological monuments and freshwater ponds near the seashore (during winter). The ponds hold freshwater invertebrates, reed beds, freshwater turtles, and a diverse bird population. This section is completely conserved to protect and research the marine/ terrestrial habitats and associated fauna and flora. Protection, and closing of this zone will allow endangered sea turtles to securely nest on the shore, and will guarantee the protection of sand dunes and the fauna and flora associated to this zone. However, this zone is also used as an awareness opportunity by visitors/ students/ tourists to visit the site following delimited trails and building environmentally friendly structures such as bird hides and wooden bridges.
- Agricultural and Archeological zone: This section includes the Phoenician springs of Ras Al-Ain and a large area where agriculture remains an economic livelihood from many small family farms. Ras Al-Ain (6 Km south of Tyre) has been Tyre's main source of water since the Phoenician days. Its artesian wells gush up into stone reservoirs that have been maintained through the ages. Natural discharge flows through a network of aqueducts, which partly divert the water through furrows for irrigation. Freshwater is also partially diverted to the city of Tyre for potable usage. The remaining water fraction, still the largest portion of total flow rates, flows out to sea, creating a unique freshwater-marine ecosystem.

Furthermore, TCNR includes also according to its law of establishment the marine area which comprises the territorial waters facing the shoreline of TCNR, (around 12 nautical miles, which is estimated at 125 km²), accordingly proper zoning must also be done in the marine part of TCNR with the coordination of the MoE, the APAC, and the Ministry

of Public Works and Transport (MoPWT) Given the large marine area, it is advised to divide the marine part into different zones of various uses as described in Table 6. It is also important for the MoE to consider including adjacent islands such as Al Ziri, Al Fanar and Al Jamal which are of significant ecological importance, within the boundaries of the marine zone.

Table 6 : Proposed zones of the Marine part of TCNR

Proposed Zones of the Marine Part of TCNR (Area covered: 125 km ²)	Description
- Touristic/ Recreational Marine Zone	Area where swimming and eco-friendly water sports activities are allowed such as paddle boards, kayaks, windsurfing, sailing boats, snorkeling, scuba diving and also used for ecotourism purpose (e.g. Establishment of a snorkeling trail, and diving trail).
- Scientific Marine Zone	Area reserved for monitoring sensitive and key marine ecological habitats and associated species by specialized experts, where monitoring and sampling is allowed to happen only for scientific research purposes.
- Restricted Marine Zone	Area where no activities can be undertaken, is kept an un-disturbed zone for the protection of flag and sensitive species such as <i>Cymodocea nodosa</i> / or used for high level scientific monitoring and restorations actions.

N.B: The delineation of the marine zones of TCNR is highly recommended and should be done as soon as possible. However, this step faces many obstacles:

- 1- The 12 nautical miles of the international Lebanese waters (and the conflict related to this point including the presence of block N°.10 related to oil and gas future exploration).
- 2- The agreement with the Lebanese army, the Ministry of Public Works and Transport, the Environment, and the Municipality of Tyre.
- 3- It should be noted that the National Lebanese marine zone has been recently delineated only for the south of Lebanon.

In this context, it has been proposed in this MP some guidelines for TCNR delineation waters that should be taken as a baseline for a future step.

6.2 Types of Management Zones

Each zone in TCNR has a management order, with rules and regulations governing it. The different types of management zones are the following:

1. Strictly protected zones:
 - The marshy areas in the agricultural zone, this excludes the artificial marsh that appears in winter due to the collapsed land facing the touristic sandy beach where cars park in summer.

- The ponds and the streams in the agricultural zone.
 - The sand dunes in the scientific zone.
 - The Vermetid reefs on the rocky coast in front of the Rashidiyeh camp.
 - Restricted marine zone with a high diversity of marine species (potential), especially in the scientific zone and in front of the Rashidiyeh camp.
2. Zones with limited access (after getting the authorization of the reserve):
- The excavated pond of the agricultural zone.
 - The reed beds of the scientific and agricultural zones.
 - Around the bird-watching hides in the scientific and agricultural zones.
 - The sandy beach used by marine turtles for nesting in the scientific zone.
 - Scientific marine zone (potential).
3. Zones with free access:
- The touristic recreational area where the kiosks are installed during summertime only.
 - The trails (existing or potential-unpaved tracks).
 - The cultivated lands (access allowed by farmers and landowners) in the agricultural zone.
 - The marine touristic/ recreational zone.

6.3 Buffer Zones

The buffer zone concept has been suggested to safeguard the protected areas by providing an extra layer of protection to the different zones, and as a transition zone between TCNR and the adjacent non-protected terrestrial and marine areas. It consists of areas adjacent to the protected areas' boundaries with partially restricted use, where any activity that may affect the biota should be licensed or granted permission of use by the management team. The buffer zones must be designated by the MoE once the final boundaries of the reserve (incl. marine zone) are revisited.

Two types of buffer zones should be established:

- A marine buffer zone to reduce the threats of unregulated fishing practices and high tourism.
- A terrestrial buffer zone to reduce the threats of tourism on the conservation zone, and the threat of any unregulated urban sprawl on the reserve.

It is worth noting that the division of TCNR waters needs more discussion and agreements (especially with the Ministries of Environment/ Agriculture/ Defense/ Lebanese Army/ Municipality), especially with the 12 nautical miles' critical issue and the future exploration of gas in Block 10 near TCNR.

7 Management Plan Enablers

7.1 Institutional Enablers

7.1.1. Governing Bodies and Management Authorities

The management and operation of protected areas including nature reserves is a shared responsibility between the MoE, the Appointed Protected Areas Committee (APAC), and the management teams in the field (Figure 5).

TCNR will abide by the management scheme applied to nature reserves in Lebanon, whereby the MoE appoints the APAC through a Decision from the Minister of Environment. The APAC includes representatives from concerned local authorities, local NGOs, and scientific experts. Then the APAC recruits a management team after approval of the MoE, who is responsible for the daily management of the MPA under the direct supervision of the APAC. The APAC reports to the MoE and operates under its overall supervision. The Protected Areas Framework Law No. 130/2019, granted the APAC the legal entity and the legal personality that was missing until then.

Many institutions are a fundamental part of TCNR management since each has a different role and level of responsibility. The institutional framework will help the management team address relevant stakeholders when supporting management plan activities. Other than the MoE, there are competent authorities that are involved in the MPA such as the Ministry of Public Works and Transport (MoPWT), Ministry of Defense, and Ministry of Agriculture. Table 7 lists the different authorities and governmental administrations and their role in TCNR.

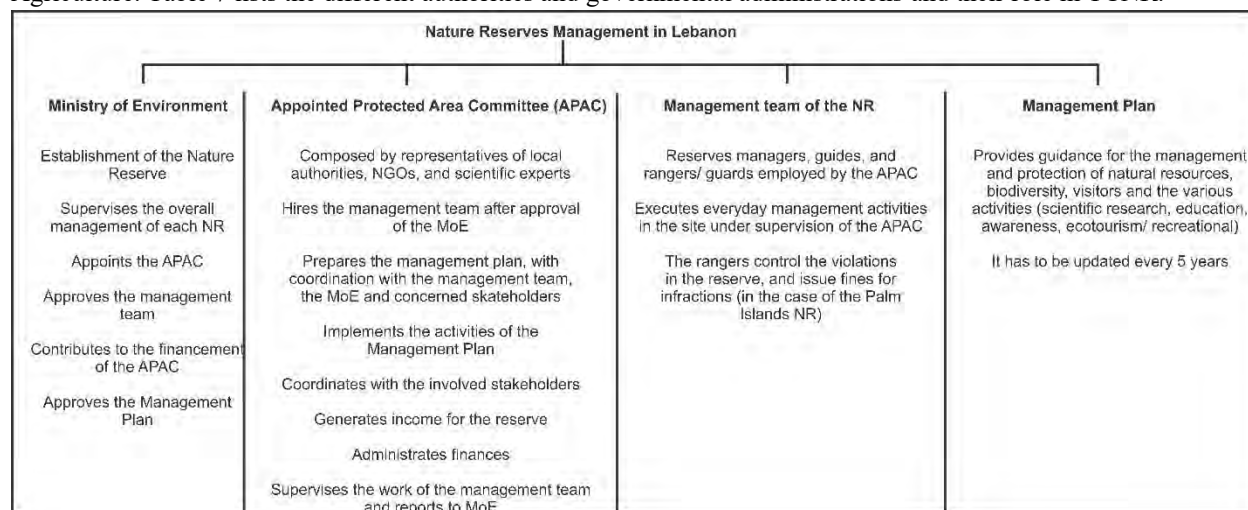


Figure 4. Nature Reserves Management in Lebanon (source: SPA/RAC and MedPAN, 2019)

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Table 7 : Governmental Authorities Relevant to TCNR Management

Governmental Authorities	Roles and Responsibilities in TCNR
Ministry of Agriculture (MoA)	Regulate and control agricultural and fishing activities in the agricultural zone and marine zone of TCNR.
Ministry of Public Works and Transport (MoPWT)	Control the implementation of legislation and rules related to regulating the speed limits of yachts, and boats near the coastal shore of TCNR.

¹⁷ SPA/RAC & MedPAN, (2019). The legal framework for marine protected area in Lebanon: Fact sheets. MedMPA network Project.

Governmental Authorities	Roles and Responsibilities in TCNR
	MoPWT has also to be consulted for any proposed zoning by the MoE and APAC of the marine part of the reserve as it is responsible for the management of territorial waters.
Municipality of Tyre	Manage the touristic zone during the summer season through an annual contract with the TCNR committee after the approval by the MoE and grant a percentage of the revenues to the APAC to be used to cover a part of the management fees of the reserve. It is also represented in the APAC, and usually its representative is the head of the APAC.
Ministry of Culture (MoC)	Responsible of the protection of the historical features inside TCNR namely the restoration of the water mill in the conservation zone, as well as the protection and maintenance of the historical wells of Ras El Ain.
Ministry of Tourism (MoT)	Promote eco-touristic activities of TCNR and help market it in its campaigns. Implement the regulations and standards related to the potential eco-camping site in TCNR and hygienic standards in the reserve (Once eco-camping is approved by MoE). Offer workshops and trainings for tourist guides, eco-tour operators, and rangers.
Ministry of Interior and Municipalities (MoIM)	Help the management team in the enforcement of laws and regulations, through the Internal Security Forces when incidents or events that can occur.
Ministry of Defense and Lebanese Army (MoD)	Control the coastline and patrol the sea for security reasons and illegal smuggling and human trafficking, making sure that such activities do not take place within the marine boundaries of TCNR. Respond to emergencies that occur on the coast and marine zone.
Ministry of Energy and Water (MoEW)	Supervise and manage the use of groundwater resources in TCNR. Support the management team in installing solar panels for their facilities.
Lebanese Petroleum Administration (LPA)	Ensure that the potential exploration and production activities of hydrocarbons located within 3 nautical miles facing the shore of TCNR (Block No.10) are in line with the TCNR management plan.
Litani River Authority (LRA)	Manage the water in Ras-Al-Ain for irrigation purposes and ensure that water is being efficiently utilized.

7.1.2. Interagency Agreements and Collaborations

Throughout its establishment, TCNR has gained a lot of attention from donors and NGOs on a regional and international level. Therefore, the management team should leverage the fact that TCNR has international recognition as a RAMSAR and SPAMI site and has unique ecosystems in terms of the sandy beach, marine zone and biodiversity,

to seek collaborations on certain activities proposed in the management plan.

Box 2: Twinning Programmes to the benefit of TCNR:

The twinning programmes between MPAs from the Mediterranean Sea is an essential step for exchanging experience and increases cooperation, collaboration, and collaboration and communication. It also helps with capacity building and filling the gaps in different sectors (in case of presence). It also helps with the efficacy implementation of the activities proposed on the MP. Therefore, enhancing the twinning programmes between TCNR and other SPAMI MPAs in the Mediterranean Sea is recommended.

MoE, through national projects/UNDP/IUCN/SPA-RAC/ENI CBC MED projects, is proposing funds for TCNR that are helpful for communication, monitoring, equipment's supply, capacity building, implementation of protection and monitoring activities related to marine

Figure 5. Reflection box related to the importance of twinning program for TCNR.

Many of the proposed activities in various management programmes will require collaborations and Memorandum of Understanding (MoUs) between different public and private institutions and parties to be efficiently and successfully implemented. Additionally, specific twinning programmes between MPAs are also important to look into. Table 8 below lists some of the interagency agreements and collaborations that TCNR management team can undertake during the 5-years management planning to enhance the monitoring, protection and conservation of TCNR and give it more visibility on a national, regional, and international level.

Table 8 : Proposed Interagency Collaborations

	Suggested Cooperation- Support
Local recycling companies (e.g., Arc-en-ciel)	<ul style="list-style-type: none"> Cooperate in the management of glass, plastic, and food waste in TCNR to reduce marine litter and encourage visitors to recycle. Recyclable waste collected can be sold to the MRF facilities or bargained against similar recyclable waste (i.e., recyclable plastic bags or containers, compost, etc.).
LTMA	<ul style="list-style-type: none"> Include TCNR’s eco-camping proposed site on the guesthouses registered with LTMA. Include TCNR as an eco-touristic stop for organized trips.
ACE	<ul style="list-style-type: none"> Geotourism.
TYROS	<ul style="list-style-type: none"> Organic agriculture.
AMWAJ and APE and ADR and Association For Preserving the Environment (APE)	<ul style="list-style-type: none"> Environmental activities (monitoring/ awareness/ cleaning campaign).
ABCL	<ul style="list-style-type: none"> Monitoring/ Protection / and Conservation of Birds and Mammals species.
SPNL	<ul style="list-style-type: none"> Protection and conservation and management of Hima and IBAs .

7.2 Regulatory Enablers

A regulatory framework is fundamental in ensuring the enforcement of laws and regulations within the reserve’s boundaries. In addition, it helps control certain activities in the reserve under the laws governing the protection and conservation of natural resources, and marine and terrestrial habitats and biodiversity. For example, managing fishing

activities within the marine zone of the reserve or regulating water sports activities. The laws and regulations governing the activities within TCNR are detailed in Section 1.2.

Some of the existing legislative laws and regulations imposed by the MoE and the MoA such as the ban of fishing activities inside TCNR will need to be revisited and updated to ensure the protection of marine habitats and species without compromising the livelihood of fishers. For example, laws or regulations to organize fishing activities have been proposed based on solicited feedback from fishers in Tyre:

“It is recommended to stop fishing season for around two months, especially during the sea turtles mating and nesting season in the marine area of TCNR protected, and to protect spawning and juvenile fish species (based on the recommendation of marine expert) and help fish stock replenish. However, such a decision must be followed by proposing alternatives for fishers, given that the majority practice fishing for a living. Proposing aquaculture of salty or sweet water artificial ponds can be an optional alternative to further explore beyond this management plan. An Environmental Impact Assessment should be done before taking and implementing any initiative within TCNR in case MoE will approve such project inside TCNR”.

Additionally, the MoE is also advised to investigate updating the reserve’s fining schemes mentioned in Article 14 of Law N°.708 states that any person who violates the rules and regulations identified by the reserve team committee is subject to a penalty ranging between 500.000 LL and 2.000.000 LL., considering the declining socio-economic conditions with the devaluation of the local currency in Lebanon.

7.3 Human Resources

The management team of the reserve should include competent staff with adequate capabilities to operate efficiently the reserve and ensure effective management planning of administrative and on-ground operational tasks. The reserve must develop a capacity-building strategy to regularly enhance the staff’s skills and support them with the required competencies and tools. Therefore, it is necessary to:

- Undertake staff workshops and trainings for all the reserve’s employees including cleaners and rangers. This will allow the staff to better handle and communicate issues related to the reserve’s activities.
- Collaborate with an external technical organization to provide the proper training for the Management Team.
- Evaluate and enhance the performance of current staff based on a Performance Management System (PMS) which includes KPIs and a scoring mechanism to assess the compliance to job description within specified resolution time for each task.
- Hire additional staff given that TCNR is currently understaffed for a relatively large protected area expanding into three different zones. Positions that can be filled are listed in Table 9 below.
- Hire this staff according to the job description set by MoE, and for the other positions that don’t have yet a precise TOR, to clearly clarify the role of each of them and to regularly evaluate the performance of the whole staff by the Manager and the APAC.

Table 9 : TCNR Proposed Staff Positions

Staff Position	Position Type	Suggested No. of Staff	Key Tasks
Administrative			
Manager/Director of TCNR	Full-time	1	Managing the daily operational activities and events in the reserve, maintaining close communication with the APAC and the municipality of Tyre, and other key stakeholders in the area. Responsible of proposing projects, strategic planning, business and financial planning in cooperation with the financial officer, and capacity building trainings. (For details, kindly refer to the job description set by MoE)
Assistant Manager	Full-time	1	Handling secretary work and assisting in the manager's duties. Helping in human resources affairs and hiring procedures. (For details kindly refer to the job description set by MoE)
Senior Accountant	Full-time	1	Keeping track of financial data, handling revenues and expenses related to the operation of the reserve. Responsible of keeping track of budgets.
Assistant Accountant /Ticketing Officer	Full-time	1	Ticket selling once an entrance fee to the reserve is established.
Communication & Outreach Expert	Full-time	1	Initiating outreach events and workshops, finding collaborations that can help boost the reserve's operations. Responsible of awareness and outreach campaigns towards TCNR conservation and protection to give visibility of the reserve at a local and national level.
Marketing and Resource Mobilization Expert	Part-time	1	Handling marketing campaigns to promote TCNR, its biodiversity richness and activities it offers, across different media platforms (billboards, official reserve's website, social media, etc.) and to give visibility of the reserve at a local and national level. Develops partnerships and mobilize resources and funding for the reserve.
Information Technology Technician	Part-time	1	Assisting in programming and IT operations and systems for the administrative office.
Non-Administrative			
Rangers/Guards	Full-time	3	Securing the different zones against any violations or vandalism activities, working in shifts day and night. Have the right of imposing fines/penalties in case of any encroachment events. (For details kindly refer to the job description set by MoE).
Guides	Full-time	2- 3	Guide visitors of TCNR and provide them with relevant information in accordance with the ecotourism activities of the reserve.

Marine and Terrestrial Biodiversity Expert	Part-time	1	Monitoring the ecological status of the marine and coastal species and key ecosystems of TCNR (i.e., sea turtles nesting, Vermetid reefs, NIS, plants, birds etc.).
Cleaners	Full-time	2- 4	Collecting waste in the touristic and conservation zones, cleaning washrooms and facilities within the reserve.
Maintenance Staff	Part-time (seasonal)	1	Helping in the refurbishment work of the reserve’s infrastructure and materials.

It is worth noting that the suggested number of personnel per job position is subject to change once the management plan is implemented. The reserve’s manager will decide on the needed staff to complete operational activities, especially that during high season (summertime) more staff is needed to handle the larger number of tourists in the different zones.

In addition, more personnel position (marine expert/ terrestrial fauna and flora expert) can be hired based on some projects. It is important to mention the important role of volunteers for implementing the activities proposed in the MP. Therefore, TCNR should work on the involvement of volunteers.

Volunteers can be divided into:

- Momentum volunteers: they are mainly formed by a local community. They can be beneficial in case of any cleaning campaign.
- Regular volunteers are considered well-trained volunteers, especially in the local community. They can be helpful when needed and in relation to the reserve need.
- Seasonal volunteers: they are considered volunteers from local to national communities. They can be helpful during seasonal monitoring activities. It is worth noting that seasonal volunteers depend on monitoring specific reserve topics.
- International volunteers: they can be beneficial for the exchange of experience and information.

7.4 Facilities and Infrastructure

7.4.1 Administrative equipment and materials

The present administrative office located in the visitor center of TCNR conservation zone requires refurbishment work to facilitate the daily administrative tasks run by the management team. New computers with updated software and programmes targeting different functions (financial tools, management tools, data collection, etc.) are essential to expedite the tasks and enhance the tracking, monitoring, and data collection of daily operational activities within the reserve. For example, it is important to put a centralized data collection system to monitor the number of visitors.

It is also important to rehabilitate the offices to include a conference or meeting space that can host workshops and trainings in the reserve, and can serve as a center for communication, public information, educational and awareness programmes.

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7.4.2 Functional equipment and materials

Many existing facilities and structures within TCNR zones are currently non-operational or need refurbishing. There have been various funding activities from international donors to help equip the reserve with the required tools and materials in the past years, such as diving gears, snorkeling equipment, a scuba safe air compressor for filling diving cylinders. TCNR has also received sea turtle monitoring equipment, as well as other needed equipment donated for the sea turtles rescue center such as freezers for necropsy, rehabilitation pools, operation board, sea water pump, multi-parameter, digital thermometers, as well as other equipment such as bicycles and diving and snorkeling equipment that can be rented out, binoculars and GPS. However, inadequate asset management of the above mentioned granted equipment are not being used (due to the knowledge gaps and no experience and no training and no regular presence of the reserve’s management team, and no presence of scientific staff) in a systematic way (e.g., diving, and snorkeling equipment, diving trails, marine turtles rescue center etc.) and the different projects’ outputs/activities are not sustained as well after the lifetime of the projects. The latter will need the right administrative and operational setup to be implemented.

Additionally, as part of the proper and efficient implementation of the proposed management plan activities, the TCNR management team, with the help of the APAC, should seek funding sources to install new infrastructure equipment, procure new materials and rehabilitate existing facilities. The proper infrastructure will promote the conservation of TCNR, improve accessibility and demarcation of the different zones, and attract more visitors. Table 10 lists key functional actions that need to be addressed within a 5 years’ timeline.

Table 10 : Proposed Infrastructure and Procurement Activities

Proposed Infrastructure and Procurement Activities	Status/ Timeline
Install proper interpretive signs located within the visitor trail and the sandy public beach, and panels and access gates.	Ongoing
Update and enhance the posters and signage of the visitor center.	Ongoing
Procure additional equipment for the sea turtles rescue center within TCNR conservation zone enabling it to become a national rescue center handling sea-turtle incidents and operating on regular basis.	Ongoing
Expand and renovate the sea turtles’ exhibition in the conservation zone and update the activities and materials.	Ongoing

Refurbish the wooden bridge connecting the sandy conservation zone to the educative trail and birds tower.	Ongoing
Install additional bird towers to better promote birdwatching activity and renovate the existing bird hide cabin.	Based on projects and funds
Rehabilitate the water mill in the agriculture zone.	Based on projects and funds
Rehabilitate the wooden esplanade in the agricultural zone and renovate the existing wooden kiosks to host activities.	Based on projects and funds
Install public toilets/ washrooms/ showers in each zone designed in 77eco-friendly way to limit pollution while maintaining proper sanitary standards (lighting on solar panels, sensor tap water sinks, air hand drying machines, etc.).	Based on projects and funds
Install closed waste bins for efficient segregation of waste (3 compartments: organic, recyclables, mixed) along the touristic sandy beach and in different areas of the conservation zone as well as the agriculture zone.	Based on projects and funds
Install solar panels for the visitor center, toilets, and other facilities requiring electricity in TCNR.	Ongoing
Purchase recreational water-based activities such as paddle boards, windsurfing, glass bottom kayaks.	During the first two years
Reduce the obstructive visual impact of infrastructure on the beach by planting tree species around delimiting the zones.	Ongoing
Reforest the agricultural roads in Ras el Ain with the suitable plant species.	Based on projects and funds
Install a marine trail for ecotourism purpose (diving trail, snorkeling trail...).	Based on projects and funds
Installing infrastructures (e.g., toilet/ trail in the conservation zone)/ and equip TCNR with material (e.g., chairs) for people with special need.	Based on projects and funds
Construct a new building for scientific purpose based on the infrastructure design proposed in the MP.	Based on projects and funds

7.5 Financial resources

It is fundamental to secure sustainable funding sources for the reserve to enable the implementation of proposed management programmes and their activities, and achieve the management plan goals. In fact, there are various activities, services, and collaborations that TCNR's management team can capitalize on to guarantee continuous and sustainable funding sources. The latter is supported by the diversity of ecosystems within TCNR and its strategic location.

Based on stakeholders' consultations and solicited feedbacks, there are two identified types of financing sources: (1) financing sources through in-house activities and services that the reserve can capitalize on, (2) direct funds and grants from local and international donors, associations, and NGOs.

Table 11 proposes financing activities relative to TCNR zones which are linked to key goals the management plan aims to achieve. It is worth noting that these financing sources will need to be backed by business studies, such as feasibility studies and cost-benefit analysis to assess their profitability to the reserve.

Table 11 : Proposed potential sources of financing for TCNR

		Goals/Objectives Directly Achieved			
TCNR Zones	Sources of Financing TCNR	Increase Education, Awareness and Communication	Enhance Networking/ Partnership	Improve Community Livelihood	Conserve Marine and Terrestrial Biodiversity
Agricultural Zone	Collaboration with farmers to host local markets events to sell seasonal harvest within the zone using recyclable/ reusable distributed at extra cost with the reserve's logo and images.	Ö	Ö	Ö	
	Picnic areas offered and organized as a sustainable eco-touristic activity involving the local community mainly women in preparing traditional food using products from the agricultural lands.	Ö	Ö	Ö	
	In-house small-scale composting facility within the agriculture zone to treat organic waste mainly putrefied crops and reuse as fertilizers for the land.			Ö	Ö
Marine Zone*	Partnership with local water-sports activity providers and scuba-diving schools in imposing an additional fee for practicing their services within the marine boundaries of the reserve.	Ö	Ö		
	Investment in snorkeling trails, glass-bottom kayaks, pedal boats, and environmentally friendly marine activities, (Collect fees for rental of these equipment including diving equipment, in addition to the collection of fees for the practice of these	Ö			

		Goals/Objectives Directly Achieved			
	ecotourism activities inside the reserve).				
	Agreement with Universities and Scientific research on projects in accordance with TCNR.		Ö		Ö
Touristic Zone*	Partnership with kiosks owners to buy primary products from TCNR farmers (e.g., fruits and vegetables).		Ö	Ö	
	Collaboration with kiosks owners to collect recyclable food waste and containers that the reserve can capitalize on by selling them to relevant waste management or material recovery facilities.	Ö	Ö		Ö
	Collaborate with industries producing eco-friendly disposable materials and agree with TCNR kiosks to use them as alternatives to plastics and food containers.	Ö	Ö		Ö
	Establishment of an eco-friendly camping site offering night observation of species, and spiritual activities such as star gazing, as well as educational workshops (e.g., cleaning up of the touristic beach, collection of coastal seashells and creating ornaments, etc.), after getting approval of MoE, and carrying out the necessary EIA studies where needed.	Ö		Ö	Ö
	Agreement with kiosks owners to reduce the use of plastic and reduce light pollution.	Ö			Ö
	<ul style="list-style-type: none"> - Collect entrance fees from the visitors and the swimmers during the summer season. - Installation of cycling trails across the zones to utilize the 				

		Goals/Objectives Directly Achieved			
	<p>owned bicycles or the rented bicycles from the reserve.</p> <ul style="list-style-type: none"> - Collect fees for renting bicycles and for practicing biking or any specific additional eco-tourism activities inside the touristic zone (other than swimming). 				
Conservation Zone*	Entrance fees to the conservation zone tailored for different age groups and institutions.				
	Regional marketing plan highlighting the biodiversity richness and activities offered within this zone (walking trails, interpretative signs, birdwatching, sea turtles' exhibition, etc.).	Ö	Ö		Ö
All Zones	Partnership with hotels and local guesthouses in Tyre to have their property listed for rental via the reserve's website as exclusive accommodations for visitors international and regional visitors.		Ö	Ö	
	Collect violation fees by the reserve's team.	Ö			Ö

***N. B:** The new draft decree which is being prepared by MoE in cooperation with the Ministry of Finance based on the Protected Areas law (number 130/2019) is defining entrance fees for each reserve and also fees for practicing the different eco-tourism activities inside the reserve (e.g., Diving, snorkeling, kayaking, and others), (implementation in process of issuance).

The management team must seek direct funds and grants from local and international donors such as:

- Governmental institutions,
- Regional and International institutions, Partners and Initiatives such as UNEP-MAP-SPA/RAC, UNDP, UN-Habitat, ACCOBAMS, IUCN, MedPAN, the MedFund, ENI CBC MED programme, etc.
- Regional and International Donors such as: the European Union, GEF, the FFEM, The Italian Cooperation, the GIZ, the US AID, etc.

There are different types of funds that can be tapped into as described in Table 12.

Table 12 : Funding modalities

Modality	Description/Benefits
Seed Capital Fund	Working capital for small projects within the reserve (e.g., acquiring small tools, raw materials, start-up expenses such as permit to operate, capital assets)
Employment Assistance Fund	Funding salaries for at least the first year including legal documents and licenses, meal and transportation allowance
Skills Training Fund	Fees for technical trainings and workshops, including training supplies, materials, and equipment, as well as certifications acquirements
Direct Cash for Infrastructure Enhancement	Short-term and long-term funding capital for capital acquisition and restoration works
Monitoring of some scientific topics and awareness based on some topics	Based on some activities related with big project/ or short contract with expert in contact with the reserve/ or through some local NGOs
Partnership	Work in partnership with Mediterranean countries on important Mediterranean topics

8 Compliance and Enforcement

8.1 Compliance Assurance

The compliance method relative to the implementation of the management plan and adherence to the laws, policies, regulations, and processes governing the marine protected area, will necessitate the following:

1. Prepare a compliance assurance checklist that includes:
 - Process review of the different projects/activities in the MP
 - Report on project status and progress: “What did we do?” “What services were provided or what was improved?” “What objective did we achieve?”
 - Identify process improvement areas
 - Create trainings to improve implementation
2. Create an annual work plan, including projects/ activities to be undertaken and budgets required.
3. Ensure compliance with laws, policies and regulations governing the MPA
4. Assess and manage the risks related to the annual work plan
5. Communicate the risks and challenges
6. Propose mitigation measures/solutions to overcome the risks

8.2 Enforcement

The diagnosis report identified enforcement as one of the main deficiencies in TCNR’s previously existing management programme. In fact, as part of the management plan, it is fundamental to implement an enforcement plan to ensure compliance with regulations across the different zones in the reserve.

To support enforcement of laws and regulations, a primary tool would be to have an ongoing effective outreach and education plan with regards to: (1) reserve’s regulations, (2) reserve’s boundaries, (3) potential ecological, touristic, and socio-economic benefits of the MPA. This will allow the local community and visitors to understand the important assets of the reserve and gain buy-ins which will eventually lead people to follow regulations voluntarily.

The enforcement plan must be articulated around three categories: (1) operational ability of the management team, (2) cooperative efforts, (3) Outreach, public awareness and education programmes. **Error! Reference source not found.**le 13 summarizes the key actions that must be taken for each category.

Table 13 : TCNR Enforcement Plan Actions

TCNR Enforcement Plan Objectives	Actions
Operational Ability	<ul style="list-style-type: none"> • Identify areas of high priority, biological sensitivity, or enforcement need • Determine MPA network enforcement needs • Hire additional enforcement officers • Evaluate potential remote observation technology and techniques • Develop a Records Management System to collect, organize, and track citation information
Cooperative efforts	<ul style="list-style-type: none"> • Maintain and enhance cooperative enforcement efforts with allied agencies • Effectively utilize judicial system resources • Develop a standardized training programme • Seek and support ongoing and enhanced MOUs
Outreach, public awareness, and education programmes	<ul style="list-style-type: none"> • Establish an MPA outreach programme • Develop outreach materials for enforcement staff to distribute • Develop standardized signage protocols • Establish an education advisory board • Hold public forums to educate specific groups

Source: Adapted from: Cravens, 2016¹⁸

In the context of TCNR, enforcement priorities are developed based on the potential for resource impact, level of use, and potential for violations mainly:

- Poaching/ destruction in the conservation area (e.g., poaching of sea turtle eggs)
- Illegal hunting activities (e.g., birds hunting)
- Illegal waste dumping on the coast and water (e.g., cigarette butts and plastic bags littering)
- Illegal fishing within the marine zone of the reserve
- Pollution of seawater and freshwater through untreated sewerage effluents
- Chemical pollution coming from the use of pesticides and herbicides

¹⁸ Cravens, A. E. (2016). Negotiation and decision making with collaborative software: how Marine Map ‘changed the game’ in California’s Marine Life Protected Act Initiative. *Environmental Management*, 57(2), 474-497.

- Trespassing protected zones and vandalism of infrastructure
- Use of horses, especially in the conservation zone of TCNR

Enforcement would be under the responsibility of the following stakeholders:

- Management staff (e.g., rangers and patrolling staff)
- Relevant government authorities (MoD, MoPWT, MoE, MoA, MoIM)
- Municipality of Tyre

26.

8.2.1 Patrolling Programmes

As part of the enforcement mechanism, patrolling programmes should be led in cooperation with the management team, Municipality, MoPWT, MoIM and the MoD. Additional qualified patrolling staff and boats must be mobilized to cover the large marine zone of TCNR. Currently there is only one patrolling boat that has been donated to TCNR for monitoring and surveillance purposes and is being operated by the Municipality of Tyre and is currently under maintenance.

Additionally, patrols should receive sufficient trainings and must be equipped with the necessary tools (e.g., GPS, binoculars, night lighting system, etc.) to efficiently exercise their task and allow them to stop illegal acts. Patrolling boats must undergo continuous maintenance to ensure their functionality, and the management team must secure the necessary quantity of diesel fuel to operate these boats.

Patrolling schedules including personnel shifts, timings and data logs of violations are necessary to keep good track records, and thereby take the necessary actions to amend or impose regulations or increase enforcement. Visible and consistent patrolling will enhance compliance. Also, increased use of cooperative agreements with other agencies and additional enforcement funding will also be necessary.

Finally, it is recommended to cooperate and share expertise with other Mediterranean MPAs, to develop the techniques of patrolling.

8.2.2 Fines structure and penalties

Enforcement of fines and penalties should happen following Article 14 of Law N°.708 (Establishment of Tyre Coast Nature Reserve), which states that any person who violates the rules and regulations identified by the reserve committee is subject to a penalty ranging between 500.000 LL and 2.000.000 LL. In cases where the damage is severe a prison sentence is imposed from one week to a month, whereas the punishment can be doubled in repeated violations.

The MoE is advised to develop a list of infringement penalties and fines for possible environmental damages that can occur within the reserve, and to propose the related draft law for endorsement. This list must be publicly announced

and visible to the visitors (i.e., can be hung at the entrance of the reserve). Table 14 represents a list of environmental violations that can be considered according to each zone of TCNR.

Table 14 : Examples of Environmental Violations by Zone

Examples of Environmental Violations
Touristic Zone
Waste littering on the sandy beach (within the sand and the water) including cigarette butts, plastic bags, food containers, and other waste
Dumping of polluted water
Poaching/ Light disturbance, especially during the sea turtles nesting season/ destruction by fire
Use of vehicles (ATV)
Camping fire, especially during the sea turtle nesting season
Conservation/ or Scientific Zone
Vandalism of infrastructure
Trespassing activities in no-go zones
Trampling on sand dunes/ Plant picking
Use of horses
Illegal fishing methods
Collecting of shells and plants
Agricultural zone
Hunting birds
Waste littering including cigarette butts, plastic bags, food containers, and other waste
Illegal fishing methods
Use the freshwater ecosystems for anthropogenic activities (cleaning clothes/ shower)
Don't respect the archaeological monuments
Use of chemicals in the agriculture

The rangers in the terrestrial zones and patrols must have the right to impose such violation fees during the violation act or if the violator has been identified with sufficient evidence. The fines and penalties will be collected by the reserve's team and used to enhance the management of the reserve.

9 Monitoring and Evaluation of the MP Effectiveness

Monitoring and evaluating the management plan's effectiveness is very important and involves assessing whether the MPA is progressing toward achieving the management plan's goals.

Monitoring, research, reporting and evaluation are used to inform adaptive management actions to improve or tailor the management plan. In fact, these processes will improve the management by learning from the programmes' actions and their effectiveness. The management plan evaluation will also allow for efficient resource allocations and building support from the local community in case active public lobbying or support is needed to handle a threat or situation related to the efficient protection of the reserve.

9.1 Research and monitoring Programmes

To gain a better understanding of the underlying biological, chemical, and physical phenomena, as well as the human dimensions (such as socioeconomic effects, and effectiveness of governance and management measures) post the implementation of the management plan, research and monitoring programmes must be implemented.

In fact, information gathered from regional and national monitoring of specific ecosystems may raise questions relevant to TCNR that can only be addressed through a programme of focused research with specialized field experts. Given that the field of marine and terrestrial ecology is a dynamic field, employing cutting-edge research tools and innovative development research activities is needed to monitor the status of ecosystems.

Conducting modeling to demonstrate that variables such as biomass, species density, species richness, and size of marine organisms, are increasing with time in no-take zones of the reserve are essential to evaluate if the objectives of the MP are being reached in the context of continuous threats (e.g., climate change, fishing pressure, water quality degradation, marine debris, non-indigenous species, and other existing and emerging issues).

It is worth noting that both research and monitoring, as well as potential development, if unregulated and unchecked, can have potential negative impacts on the marine and terrestrial environments, such as through collection of specimens or sampling.

The research and monitoring programme will also enable the following:

- Protect the structure and function of marine and terrestrial ecosystems,
- Improve native marine and terrestrial species, including those of economic value,
- Ensure minimal disturbance while allowing for sustainable opportunities for recreation,
- Promote education and research opportunities.

The research and monitoring programme should be undertaken on annual basis with reporting and publishing of monitoring results, and it will be part of the evaluation of the 5-years formal MPA management plan review. Table 15 represents a list of research that can be performed according to the zones of TCNR.

Table 15 : Proposed research actions according to TCNR zones

TCNR Zones	Research and Monitoring topic
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Agricultural Zone	Analyze water quality and chemical pollution of the springs/ marshes
	Evaluate the impact of littering/ pesticides/ herbicides/ fertilizers on the communities/ agricultural land/ and terrestrial and marine habitats and associated biodiversity
	Evaluation/ following/ Monitoring the fauna and flora associated with the freshwater/ marine ecosystems
	Effectiveness of using organic techniques and methods
	Study the ecological status of the vermetid reefs and associated biodiversity
	Study the impact of geo-tourism on the reserve
Marine Zone	Monitoring marine habitats and associated biodiversity (status) through application of ecological indices
	Monitoring the non-indigenous species (density/ abundance/ status/ impacts)
	Monitoring the water quality
	Monitoring the proliferation of harmful algae
	Restoration actions of key marine habitats (e.g. <i>Cymodocea nodosa</i> and <i>Dendropoma anguliferum</i>)
	Restoration actions of Macroalgae <i>Cystoseira</i> species and seagrass <i>Cymodocea nodosa</i>
	Study the impact of harmful algae (e.g., <i>Ostreopsis</i> sp.)
Touristic Zone	Monitoring the impact of litter
	Study the impact of human pressures on biodiversity, especially marine turtles
	Study the impact of the reserve on people behaviors (especially related to marine litter)
Conservation Zone	Monitoring of sand dunes (Biodiversity associated/ status)
	Following with the monitoring of sea turtle's activities
	Monitoring the terrestrial fauna and flora, especially plants and birds
All Zones	Awareness and education related to marine/ terrestrial habitats and associated biodiversity
	Awareness and education related to threats (especially littering)

9.2 Climate change monitoring programme

Climate change is a global environmental pressing issue known to have numerous impacts on marine resources such as hypoxia, ocean acidification, water salinity. It is also related to the rise of seawater temperature, often associated with a continuous income of non-indigenous species from the Suez Channel. It can also impact terrestrial resources such as freshwater abundance and breakouts of non-indigenous species. Therefore, climate change monitoring programme is important to potentially help buffer TCNR's marine and terrestrial resources against those impacts. Additionally, TCNR can act as "living laboratories" to support scientists and decision-makers understand differences

in ecosystems responses to climate change both within and outside the MPA. Accordingly, funding research and building partnerships with scientific groups must be done in synchronization with research centers and universities to ensure coordination and reduce duplication of efforts.

The monitoring will enable the following:

- Monthly monitoring of the sea water temperature and water salinity and nutrients
- Monthly monitoring of important coastal ecosystems (e.g. Vermetid reefs) to detect any sign of acidification/ or whitening of some marine species (Cnidaria, Macroalgae, Spongia)/ and proliferation of harmful algae
- Evaluation and following the current status of non-indigenous species within TCNR waters
- Monitoring the ecological status of the seagrass *Cymodocea nodosa*
- Always work on detecting new non-indigenous species through a participatory approach and citizen science, especially with fishers and divers
- Following the erosion of sand beach
- Regularly Monitoring flag species (especially birds/ sea turtle nests)

Finally, it is recommended to enhance the link between the reserve, national/ regional research centers, and universities to exchange techniques, research, and ideas to understand the impact of climate change on a national and regional level.

10 Reporting, Evaluation and Review Mechanism

10.1 Reporting Mechanism

The reporting mechanism to evaluate the management performance include the following steps:

1. Identify objectives
2. Define key desired outcomes and targets
3. Identify performance indicators
4. Undertake monitoring
5. Periodically assess results
6. Report findings
7. Adjust management as necessary

There are also a variety of forms and monitoring sheets that evaluates the effectiveness of the MPA operations in addition to the internal annual review and evaluation of objectives as listed in Table 16below.

Table 16 : Monitoring Forms and Tools

Form/Tool	Aim	Frequency	Evaluator	Reports to
Advanced-METT Assessment or Integrated Management Effectiveness Tool (IMET) (retain original METT questions and adds specific questions based on the status within TCNR)	Monitoring effectiveness of protected area management	1 time every 5years	Manager of TCNR	APAC MoE
Ordinary SPAMI Periodic Review – SPAMI Evaluation System	Monitoring effectiveness of protected area with SPAMI recognition criteria	1 time every 6 years	TCNR Manager SPA/BD Focal Point Marine and Terrestrial Biodiversity Expert	SPA/RAC MoE APAC
Environmental Cleanliness Monitoring Tool	Monitoring of general environmental cleanliness to support a healthy environment and to enhance visitor satisfaction (e.g., waste littering, public accessed utilities cleanliness)	Monthly	TCNR Manager Municipality of Tyre	APAC Municipality of Tyre
Visitors Satisfaction Report (Customer service feedback)	Evaluating the satisfaction, expectations and problems faced by visitors to the protected zones in TCNR	Periodically (TBD by the management team)	TCNR team	APAC Municipality of Tyre
Monitoring protected area management plan activities	Monitoring the realization of activities defined in the protected area management plans	Every year	TCNR Manager	APAC MoE
Monitoring marine and terrestrial species status	Obtaining detailed information and progress related to the target species and improving conservation priorities or measures according to the monitoring results	Seasonal	Marine and Terrestrial Biodiversity Expert	APAC MoE And the funder
Performance management system (PMS) to monitor the staff of the MPA	Monitoring the performance of the staff to determine their level of	Monthly	TCNR Manager and the president of the reserve committee	APAC

	compliance with their job description and the targets they have achieved/ or tasks they have implemented			
Evaluation of the reserve income based on a financial and business plan	Evaluation the income of the reserve through a clear and transparent system	Monthly	TCNR manager and TCNR team, especially the financial officer	APAC

10.1.1 Annual Management Plan Evaluation

TCNR goals and objectives are not static. A review of whether the MPA’s stated goals and objectives are still relevant or may need to be adjusted is an appropriate adaptive management action.

Evaluation of the management plan and its projects/activities must be conducted on an annual basis. The valuation would include the status of the project/activity as such:

- “C”: Completed
- “PC”: Partially Completed
- “NC”: Not Commenced

It will also include the financial resources or budgets used to conduct such an activity and the major constraints or challenges encountered to implement such an activity. **Error! Reference source not found.**includes an extensive list of the projects/activities as they materialize in the different programmes of this MP.

10.1.2 Annual Review

The Site manager will review the management plan of TCNR in light of new information derived from new studies and research and from the monitoring programmes. Annual reviews will determine whether the site is being managed following the plan; five-year reviews will be applied to ensure that the objectives are being achieved and remain relevant.

In addition, the Appointed Protected Area Committee will be responsible, on behalf of the Ministry of Environment, for regular review of the implementation of the management plan.

The Appointed Protected Area Committee will be required to report to the n Ministry of Environment, advising the results of their assessment of progress and making any recommendations that it sees as necessary to improve the progress in implementation.

The Appointed Protected Area Committee for the reserve, in collaboration with the Ministry of Environment will be expected to:

- Periodically meet with the Management Team to establish progress and problems being encountered in implementation of the plan.
- Periodically, inspect the reserve to observe the condition of the reserve and compliance with the management plan.
- Prepare annual reports to the Ministry of Environment, incorporating the report presented during the relevant year from the management team.
- Make recommendations to the Ministry of Environment on any changes necessary to improve the compliance with and implementation of the plan.
- Help to find some funds according to the need of the reserve, in cooperation of the Municipality of Tyre

11 Management Plan Recommendations

The success of the management plan is well connected to the people affected. In this context, it is important to highlight that no matter how strong, solid and comprehensive the management plan, and no matter how efficient and well-structured the organizational infrastructure, effective and integrated coastal zone management will not succeed and defined goals will not be attained, without the understanding, the acceptance and the cooperation of the people who are directly affected by its implementation.

Additionally, the term "conservation" is associated with "sustainable monitoring, and protection" and this cannot be achieved without continuous source of funding. Therefore, the management team should assure and secure funds through potential self-sustaining income generating activities while promoting inter-sectoral cooperation and good relationship with donors.

Consequently, it is challenging to conserve everything simultaneously and in short timeframes. Therefore, it would be ideal to select conservation targets of priority resources with attributes and metrics. The latter help monitoring and evaluating the MP for adaptive and effective planning.

Finally, it is highly recommended to ensure and enhance the cooperation between national organizations (e.g. Municipalities and Ministries), the nature reserve, the local people and the local civil society organizations. A particular attention should be further paid in the future to the participation, commitment and partnership mechanisms of the stakeholders in the management and the best way to promote the nature reserve with a particular focus on gender equity with a view to formulating future guidelines for the valorization of women's know-how and biodiversity-related practices.

12 Detailed Management Programmes

12.1. Operational Programme 1

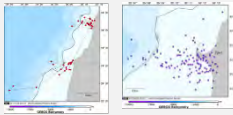
Marine and Coastal Habitats and Species Conservation Programme.

Programme #	Programme Name			
1	Marine and Coastal Habitats and Species Conservation Programme			
Operational Objective #	Objective Name	Priority Level		
1	Conserve the marine ecosystems/ habitats and associated species	High		
KPI #	Indicators	Baseline	Target 2027	
	<ul style="list-style-type: none"> Ecological status (High-Good-Moderate-Poor-Bad) of key marine ecosystems/ habitats. Number and size and density of rare, endemic, endangered, and NIS marine species. Number of stranded Cartilaginous species, Dolphins, Monk Seals. Number of studies related to Marine Habitats/ and associated biodiversity. Frequency of monitoring. Number of local community involved in the monitoring programme. 	<ul style="list-style-type: none"> Majority of local community of Tyre (around 1000 individuals), and surrounded areas (students/fisher/divers) don't have information about marine ecosystems and associated marine biodiversity (survey done for the MP), and don't know about NIS and their impacts. 605 people of Tyre (student/ Employee/ Local/ 1270 asked for awareness related to marine biodiversity and knowledge (survey done in 2022 under the framework of the Blue Tyre project). 50 Tyre fishers/ 50 and three divers/ 3, asked to be involved in the monitoring programme of TCNR, and are encouraging citizen-science use. The ecological status of the rocky and sandy beach of Tyre ranged from good to very good from 2018 until 2022 (Badreddine, 2022). 632/ 1270 local people from Tyre encourage the existence of an environmental observatory for Tyre. Number of NIS are continuously increasing in Tyre waters. 	<ul style="list-style-type: none"> 80% of marine habitats/ and associated biodiversity are known Marine Ecosystems/ Habitats are 60% protected. Increase in the number of rare, endemic, endangered species. 70% of local community (fishers and divers and volunteers) known about key marine habitats and associated biodiversity in the reserve. 50 % of local community (fishers/ divers/ students/ volunteers) are involved in the monitoring programme of marine habitats and species with special interest. Restoration actions of key marine habitats begins A marine no-take / scientific zone has been established in the reserve. Increase in the research and studies related to marine biodiversity. 	
Key Actions/Activities		Duration	Estimated Budget	Owner

<ul style="list-style-type: none"> • Update and regularly evaluate the current status of the key marine habitats (Vermetid reefs, Coralligenous assemblages, Rhodolith/ Maërl Beds, Seagrass (<i>Cymodocea nodosa</i>) meadow/ <i>Cystoseira</i> forests), and prioritize the conservation of those ecosystems. • Update the list of marine fauna and flora species, with a special focus on rare, endemic, threatened/endangered species, and prioritize the conservation of those species. • Map the distribution of the key marine ecosystems and the associated fauna and flora species, with special interest. • Develop a monitoring programme of key marine ecosystems and associated fauna/ flora species with special interest. • Establish a regular monitoring programme for NIS and define, evaluate and regular follow the status of the most invasive NIS (e.g. apply the actions and recommendations proposed in the National Action Plan for Non-Indigenous Species). • Develop a manual to monitor key marine ecosystems (Fucales, especially <i>Cystoseira</i>) species, <i>Cymodocea nodosa</i> and vermetid reefs and selected flagship (threatened, endangered, and endemic) marine species to be shared and trained to fishers and divers and volunteers (especially students). • Support the execution of the monitoring programme through the implementation of citizen-science. • Combine the monitoring programme with the appropriate actions and programmes already proposed on the National Biodiversity Strategy and Action Plan (MoE/UNEP/GEF, 2016) , the National Monitoring Programme for Marine Biodiversity in Lebanon (SPA/RAC-UN Environment/MAP, 2018a) , the National Action Plan concerning species introductions and invasive species in Lebanon (SPA/RAC-UN Environment/MAP, 2018b) , the National Action Plan for the conservation of Coralligenous Assemblages (SPA/RAC-UNEP/MAP, 2020a) , and the bibliography study done related to vermetid reefs along the Lebanese coast (SPA/RAC-UNEP/MAP, 2021a) . 	<p>Five years</p>	<p>To Be Discussed (TBD) – Based on donors/ activities/ projects/ needs/ priorities.</p>	<ul style="list-style-type: none"> • Manager of TCNR • Marine Expert
<ul style="list-style-type: none"> • Establish and apply a restoration plan and strategy of critical marine habitats (e.g. <i>Cymodocea nodosa</i>, <i>Dendropoma anguliferum</i>, when possible). • Implement a no-take scientific (i.e. Ban of fishing/ Ban all activities that disturb marine wildlife) marine zone (characterized by key marine habitats/ species) within the marine boundaries of the reserve. • Enforce the execution of laws (e.g. stop illegal fishing methods (e.g. fish blasting and poisoning and dynamites) – An important decision was already taken by the municipality of Tyr banning the use of Jet ski for the protection and conservation of sea turtles. 	<p>Key Stakeholders Involved/Benefiting</p>		
<p>Fishers/ divers/ students/ researchers/Universities/Research Centers/ National-International experts/ NGOs.</p>			
<p>Key Outcomes</p>			
<ul style="list-style-type: none"> • Data/ Researches/ Studies related to marine habitats and associated biodiversity. • Regular monitoring of key marine habitats and associated biodiversity. • Involvement of local (students/ fishers/ divers) in the monitoring/ protection/ and conservation programme. 			

<ul style="list-style-type: none"> Investigate and follow the available laws on the sustainable use of fisheries resources in Lebanon (e.g., apply the actions and recommendations proposed in the sustainable fisheries programmes and strategy for Tyre). Enhance the cooperation and coordination with Mediterranean Experts on Marine habitats and species conservation for sharing new techniques/ experience, and information/ knowledge. Create a data bank for scientific collected data within TCNR. Establish cooperation with the Ministry of Agriculture for sharing knowledge of laws and regulations related to fishing activities and share it with the local community for better application and enforcement of the existing laws/ or take new decisions allowing and encouraging protection and conservation of natural resources within TCNR. Establishment and implementation of a patrolling strategy to control and ban illegal activities in the reserve (in cooperation with the Municipality of Tyre) including resources needed for patrolling. Implement the monitoring programme of the marine mammals (Monk seals, Dolphins, and Cetaceans) in TCNR in cooperation with the National Center for Marine Sciences (NCMS) within the context of the “National monitoring. Programme for marine biodiversity in Lebanon”. Implementation within TCNR, in cooperation with the National Center for Marine Sciences (NCMS) of the “National Action Plan for the monitoring of the mammals stranding” that was developed in 2023 by the NCMS in cooperation with IUCN and ACCOBAMS. Evaluate the impact of climate change on sea waters including acidification, sea warming, proliferation of phytoplankton (especially harmful toxic algae) and on marine habitats and associated species. Apply Mediterranean indices (e.g., CARLIT index, Badreddine et al., 2018) for evaluation of the ecological status of key marine habitats. Establish a scientific observatory for analyzing data collected based on the new design of TCNR visitor center proposed in the MP (Annex 8). Establish and develop an awareness campaign focusing in increasing the knowledge/ education related to marine ecosystems and associated biodiversity within TCNR. 	<ul style="list-style-type: none"> Increase Knowledge and education related to key marine habitats and associated biodiversity. More monitoring/ protection and conservation of marine habitats and associated biodiversity. Reduce/ Control the pressures on the marine habitats and associated biodiversity. Anticipate the natural/ human pressures on the marine habitats and associated biodiversity. TCNR has its own scientific and environmental laboratory.
	Synergies with Other Programmes
	<ul style="list-style-type: none"> SPA/RAC projects and Programmes MedPAN projects and Programmes ENI CBC MED project GEF project Others National small projects ACCOBAMS projects and Programmes
	Key Assumptions and Risks
	<ul style="list-style-type: none"> Law/ Regulation enforcement. Delineation of the Marine zones of TCNR.

Programme #	Programme Name	Priority Level
1	Marine and Coastal Habitats and Species Conservation Programme	
Objective #	Objective Name	Priority Level

2	Monitor, protect and Conserve the sea turtles		High	
KPI #	Indicators	Baseline	Target 2027	
	<ul style="list-style-type: none"> Number of sea turtle's nests in TCNR Number of sea turtles in Tyre waters Number of stranded sea turtles Number of rescued sea turtles Range of human disturbance Number of studies related to marine turtles Frequency of marine turtles monitoring activities Number of local community involved in the monitoring Programme 	<ul style="list-style-type: none"> Number of sea turtles varied in TCNR from 9 in 2004 to 6 in 2022. Number of stranded sea turtles in Tyre area increased continuously. It registered 41 stranded sea turtles in 2022. Number of summer beach kioks in TCNR increase to 49 (so more light pollution). 461/ 1270 from Tyre people encouraging the improvement of sea turtle awareness (survey done in 2022 under the framework of the Blue Tyre project). Number of stranded sea turtles increased continuously due to the use of illegal fishing methods (Ali BADREDDINE. Pers. Comm. Tyre Fishers and divers). 1000/ 1500 of people found the necessity to have a sea turtle rescue center in Tyre. Two tracked sea turtles in TCNR were seen for more than six months in Tyre waters. <div style="text-align: center;">  <p>Tracking two sea turtles by satellite in 2012. © SPA/RAC-TCNR</p> <p>27.</p> </div>	<ul style="list-style-type: none"> The number of sea turtle's nests increase by 70%. The number of stranded sea turtles decreases by 60%. 60% of local community (fishers/ divers/ volunteers, especially students) are involved in the monitoring of sea turtles activities. 60% of injured sea turtles are rescued. 70% of the pressures on sea turtles are reduced. 	
Key Actions/Activities		Duration	Estimated Budget	Owner
<ul style="list-style-type: none"> Continue the work already started for the development of the sea turtle rescue center based on the new design of TCNR visitor center proposed in the MP (Annex 8). Equip the sea turtle rescue center (e.g., team/ equipment's/ integrating the genetic analyzes) and start operating it on regular basis. 		Five years	To Be Discussed (TBD) – Based on donors/ activities/ projects/ needs/ priorities	<ul style="list-style-type: none"> Manager TCNR Marine Turtle Expert
		Key Stakeholders Involved/Benefiting		

<ul style="list-style-type: none"> • Ensure a well-trained permanent staff and volunteers to start operating regularly the sea turtles rescue center. • Establish a well-trained team for monitoring sea turtle activities. • Develop the awareness campaign launched for the protection and conservation of sea turtles since 2019 (SPA/RAC-UNEP/MAP, 2020b, 2021b). • Implement the monitoring plan during the sea turtles nesting and hatching seasons (e.g., apply the actions and recommendations proposed in the Sustainable monitoring schemes in Tyre to support monitoring and conservation post-2022 (SPA/RAC-UNEP/MAP, 2021c), and in the National Action Plan for Protection and Conservation of sea turtles in Lebanon, SPA/RAC-UNEP/MAP, 2019). • Establish developed techniques for sea turtles monitoring activities (e.g., use of drones for sea turtles monitoring, satellite tracking of the sea turtles). • Study the impact of climate change on the sea turtles nesting activities. • Reduce the negative impact of local community, the touristic activities on the beach during sea turtle nesting and hatching seasons (e.g., light pollution, use of horses (especially in the scientific zone), stepping on the sand during breeding seasons). • Enforce within TCNR the execution of the decision N°.125/1 issued in 1999 of the MoA banning the taking, selling, use, or trade of marine turtles. • Establish ecotourism based on sea turtles (e.g., apply the actions and recommendations proposed in the ecotourism plan based on sea turtles for Tyre, SPA/RAC-UNEP/ MAP, 2021d). • Estimate the abundance of sea turtles in Tyre waters (including TCNR). • Map the sea turtle breeding area in Tyre waters (including TCNR). • Continue the study of the impact of marine litter on sea turtles, and develop the National Strategy for COMMON indicator CI24 (SPA/RAC-UNEP/MAP, 2021e). • Further develop the sea turtles stranding networks (already established in 2019, SPA/RAC-UNEP/ MAP, 2020c, 2021f). • Offer facilities (e.g. guesthouses, eco-camping area) for volunteers, especially during the sea turtles nesting season based on the new design of TCNR visitor center proposed in the MP (Annex 8). • Implement a strategy for more involvement of fishers and divers in the sea turtles stranding network. 	Fishers/ divers/ students/ researchers/ NGOs.
	Key Outcomes
	<ul style="list-style-type: none"> • Data/ Researches/ Studies related to sea turtles. • Regular monitoring of sea turtle's activities. • Involvement of local (students/ fishers/ divers) in the monitoring/ protection/ and conservation Programme. • Increase Knowledge and education related to sea turtles. • More monitoring/ protection and conservation of sea turtles. • Reduce/ Control the pressures on sea turtles. • Anticipate the natural/ human pressures on sea turtles.
	Synergies with Other Programmes
	<ul style="list-style-type: none"> • SPA/RAC projects and Programmes. • ENI CBC MED projects. • Small National Projects.
Key Assumptions and Risks	
<ul style="list-style-type: none"> • Increased number of tourists, especially during the summer season. • Law/ Regulation enforcement. 	

<ul style="list-style-type: none"> Encourage studies and research related to sea turtles. 	
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12.2.Operational Programme 2

Terrestrial/ Freshwater Habitats and Species Conservation Programme.

Programme #	Programme Name			
2	Terrestrial/ Freshwater Habitats and Species Conservation Programme			
Objective #	Objective Name	Priority Level		
1	Monitor, Protect and Conserve the floral species in TCNR	High		
KPI #	Indicators	Baseline	Target 2027	
	<ul style="list-style-type: none"> Number of flora species Ecological status of flora species Range of pressures Number of flora species replanted Number of studies related to flora species Frequency of monitoring flora species 	<ul style="list-style-type: none"> The list of plants and flowers within TCNR has not been updated seen 2004. It is being updated currently through the Step4Nature project (2023). The NIS plant species (especially NIS <i>Hetherotheca subaxillaris</i>) are still invaded TCNR. NIS distribution based on data of 2015. 	<ul style="list-style-type: none"> 80% of flora species in TCNR are known. 70% of the pressures on the flora species are decreased. 100% of the NIS are eradicated. 	
Key Actions/Activities		Duration	Estimated Budget	Owner
<ul style="list-style-type: none"> Update the list of flora species, with a focus on species with special interest. Develop a monitoring scheme of selected key species (threatened, endangered, and endemic, species). Develop and implement a mitigation plan on the impact of present non-indigenous species on native biota. Remove or mitigate all threats and obstacles facing the threatened terrestrial plant species in TCNR, including stepping on sand dunes, plant fixing sand, and plants collection. Develop and implement a plan to control grazing and trespassing in the reserve. Prohibit the harvest of wild plants and floral species. Reintroduce or propagate threatened key floral species in TCNR. 		Five years	To Be Discussed (TBD) – Based on donors/ activities/ projects/ needs/ priorities	<ul style="list-style-type: none"> Manager of TCNR Flora expert
		Key Stakeholders Involved/Benefiting		
		Researchers/ Flora expert/ Universities/ Rangers/ Agricultural expert.		
		Key Outcomes		
		<ul style="list-style-type: none"> Data/ Researches/ Studies related to flora. Regular monitoring of flora species with special interest. Involvement of local (students) in the monitoring/ protection/ and conservation Programme. Increase Knowledge and education related to flora species and their importance. 		

<ul style="list-style-type: none"> Develop and implement a strategy to restore and rehabilitate threatened or degraded terrestrial habitats. Establish an ecotourism plan based on terrestrial flora species (e.g., add some educative signage). Develop a long term strategy to eradicate the presence of the invasive plants. Increase the plantation of trees in and around the reserve. 	<ul style="list-style-type: none"> Reduce/ Control the pressures on the flora species (especially NIS). Anticipate the natural/ human pressures on flora species (e.g., fire, picking, stepping, and horsing).
	Synergies with Other Programmes
	National/ regional projects.
	Key Assumptions and Risks
	Big number of tourists, especially during the summer season.

Programme #	Programme Name			
2	Terrestrial/ Freshwater Habitats and Species Conservation Programme			
Objective #	Objective Name	Priority Level		
2	Conserve and protect the freshwater habitat	High		
KPI #	Indicators	Baseline	Target 2027	
	<ul style="list-style-type: none"> Number of fauna and flora species Quality of the water Number of studies related to freshwater ecosystems 	<ul style="list-style-type: none"> The list of freshwater fauna and flora has not been updated since 2004. Currently freshwater species like plants, amphibians, and birds are being updated in TCNR through the Step4Nature project (2023). 	<ul style="list-style-type: none"> 80% of species related to freshwater ecosystems are known. 60% of the freshwater ecosystem is protected. 	
Key Actions/Activities		Duration	Estimated Budget	Owner
<ul style="list-style-type: none"> Update the list of fauna and flora associated with the freshwater, with a focus on species with special interests. Develop and establish a regular monitoring Programme for freshwater fauna and flora. Install proper infrastructure to promote conservation of ponds and freshwater reservoirs and improve accessibility to these areas. Develop and implement a strategy to restore and rehabilitate threatened or degraded terrestrial habitats. Develop awareness campaigns for the conservation of freshwater habitats. Regularly monitor the freshwater quality to detect if there is pollution and its sources of pollution. 		Five years	To Be Discussed (TBD) – Based on donors/ activities/ projects/ needs/ priorities.	<ul style="list-style-type: none"> Manager of TCNR. Freshwater expert.
		Key Stakeholders Involved/Benefiting		
		Litany river authority/ Research Centre/ University/ Tyre Municipality/ NGOs/ national expert.		
		Key Outcomes		

<ul style="list-style-type: none"> Increase the awareness campaign on the importance of freshwater habitat and associated biodiversity. 	<ul style="list-style-type: none"> Data/ Researches/ Studies related to freshwater ecosystems and associated biodiversity. Regular monitoring of freshwater ecosystems and associated biodiversity. Involvement of local (students) in the monitoring/ protection/ and conservation Programme. Increase Knowledge and education related to freshwater ecosystems and associated biodiversity. Reduce/ Control the pressures on the freshwater ecosystems.
	Synergies with Other Programmes
	National/ regional projects related to the topic (wetland).
	Key Assumptions and Risks
Control of human pressure and the use of the freshwater ecosystem.	

Programme #	Programme Name			
2	Terrestrial/ Freshwater Habitats and Species Conservation Programme			
Objective #	Objective Name	Priority Level		
3	Conserve the avifauna population in TCNR	High		
KPI #	Indicators	Baseline	Target 2027	
	<ul style="list-style-type: none"> Number of bird species Number of hunted birds Number of NI bird species Number of studies related to bird Frequency of monitoring bird species 	<ul style="list-style-type: none"> 50 % of birds species are well known by the local and Tyre area. Hunting birds is still present in TCNR, especially from Rachidiyeh camp. Fire (bad impact on birds) still not controlled in TCNR. NIS Bird species is still invaded and increase in number in TCNR. 	<ul style="list-style-type: none"> 80% of birds species are well known by the community. Hunting activities decrease by 60%. 60 % of NI bird species are eradicated. Classification of TCNR as IBA 	
Key Actions/Activities		Duration	Estimated Budget	Owner

<ul style="list-style-type: none"> Update the list of bird's species, with focus on species with special interest. Implement the monitoring protocol for the birds' species in TCNR within the context of the "National monitoring programme for marine biodiversity in Lebanon" and develop a manual for their monitoring in the reserve. Develop a bird guide for TCNR in Arabic and English. Maintain the bird observation tower to promote conservation of birds and bird-watching in TCNR. Ban bird hunting and effectively monitor and control bird-hunting activities. Develop awareness campaigns for the conservation of different types of bird species, highlighting their ecological and socio-economic importance. Develop and implement a strategy for conservation and to restore and rehabilitate threatened or degraded habitats. Prepare the classification file of TCNR as IBA and submit it to Birdlife International Develop a long term strategy to eradicate the presence of the Non-Indigenous Birds Species. 	Five years.	To Be Discussed (TBD) – Based on donors/ activities/ projects/ needs/ priorities.	<ul style="list-style-type: none"> Manager of TCNR. Bird expert.
	Key Stakeholders Involved/Benefiting		
	Universities/ Students/ Local people/ Experts/ NGOs.		
	Key Outcomes		
	<ul style="list-style-type: none"> Data/ Researches/ Studies related to birds. Regular monitoring of birds. Involvement of local (students) in the monitoring/ protection/ and conservation Programme. Increase Knowledge and education related to birds. Classification of TCNR as IBA Reduce and control the human pressure on birds species. 		
	Synergies with Other Programmes		
	National/ Regional projects related to the topic.		
	Key Assumptions and Risks		
<ul style="list-style-type: none"> Weak response from Rashidiyeh camp. Hunting pressures 			

Programme #	Programme Name		
2	Terrestrial/ Freshwater Habitats and Species Conservation Programme		
Objective #	Objective Name	Priority Level	
4	Conserve the sand dune habitat in TCNR	High	
KPI #	Indicators	Baseline	Target 2027
	<ul style="list-style-type: none"> Ecological status of the sand dunes Number of species associated to sand dunes 	No study has been done on sand dune/ or related to the biodiversity associated to the sand dunes. Assessment of the biodiversity related to the sand	<ul style="list-style-type: none"> All sand dunes within TCNR are protected. 80% of species associated with sand dunes are known.

		dunes is being done currently through the Step4Nature project (2023).	
Key Actions/Activities		Duration	Estimated Budget
<ul style="list-style-type: none"> Implement a methodology for sand dune monitoring, stabilization and regeneration using experts in this field. Control trespassing, horsing, drifting, and grazing activities in this habitat, and the impact of marine litter on this habitat and the associated biodiversity. Develop awareness campaigns for increasing the knowledge and the conservation of sand dunes, highlighting their ecological and socio-economic importance, enhancing their protection and conservation. Monitor the invasive plant species detected in the sand dunes (i.e., camphorweed plants belonging to <i>Heterotheca subaxillaris</i> species) and enact an eradication plan. Fence the sand dunes ecosystems within the scientific zone of TCNR, taking into consideration the movement of the wildlife associated with the sand dunes. 		Five years.	To Be Discussed (TBD) – Based on donors/ activities/ projects/ needs/ priorities.
		Key Stakeholders Involved/Benefiting	
		University/ Students/ Volunteers/ Experts/ NGOs.	
		Key Outcomes	
		<ul style="list-style-type: none"> Data/ Researches/ Studies related to sand dunes. Closing the area of sand dunes. 	
		Synergies with Other Programmes	
		National/ Regional projects related to the topic.	
		Key Assumptions and Risks	
		Control of human pressures.	

Programme #	Programme Name		
2	Terrestrial, and Freshwater Habitats and Species Conservation Programme		
Objective #	Objective Name	Priority Level	
5	Restore and rehabilitate the natural flow of Ras Al Ain Estuary to the sea	High	
KPI #	Indicators	Baseline	Target 2027
	<ul style="list-style-type: none"> Flow currency Quality of the water Range of human pressures 	TCNR is not controlling the use of Ras-Al Ain ponds within its area.	<ul style="list-style-type: none"> 70% of human pressures are decreased. 60% of the natural flow are controlled by the reserve.

Key Actions/Activities	Duration	Estimated Budget	Owner
<ul style="list-style-type: none"> Conduct a study to estimate the minimum flow required to maintain a healthy estuarine ecosystem. Reduce and monitor the impact of anthropogenic activities on the estuary. Ensure, in the whole water basin, good water quality through sustainable monitoring and removal of pollution at source in case of presence of pollution. Reduce anthropogenic pressures and especially the impact of Marine Litter. Ban the use of pesticides and herbicides and replace it with the application of an integrated pest management. Increase the visibility and ecotourism importance of the area. 	Five years	To Be Discussed (TBD) – Based on donors/ activities/ projects/ needs/ priorities.	<ul style="list-style-type: none"> Manager of TCNR. Hydrology expert.
	Key Stakeholders Involved/Benefiting		
	Litani River Authority/ Municipality of Tyre/ Experts.		
	Key Outcomes		
	Ras-Al Ain ponds are controlled by TCNR.		
	Synergies with Other Programmes		
	National/ Regional projects related to the topic.		
	Key Assumptions and Risks		
	Acceptance of local community.		


Programme #	Programme Name		
2	Terrestrial/ Freshwater Habitats and Species Conservation Programme		
Objective #	Objective Name	Priority Level	
6	Conserve the sandy beach of TCNR	High	
KPI #	Indicators	Baseline	Target 2027
	<ul style="list-style-type: none"> Number of beach visitors Pollution frequency Sand erosion 	<ul style="list-style-type: none"> The erosion of sea water on the sandy beach of TCNR is increased. The number of tourists still increasing, especially during summer. Marine litter is increasing. 	<ul style="list-style-type: none"> TCNR sandy beach are fully controlled. 70% of the human pressures are decreased. Marine littering is decreased
Key Actions/Activities	Duration	Estimated Budget	Owner

<ul style="list-style-type: none"> • Develop an action plan for sand protection from erosion and pollution. • Apply a strict ban on access to marine turtle nesting areas. • By applying the carrying capacity principle, reduce the negative impact of tourists' activities on the beach during the summer. • Reduce littering, especially from the tourists specially during the summer season, • Establish and adopt a strategy to reduce marine litter. 	Five years	To Be Discussed (TBD) – Based on donors/ activities/ projects/ needs/ priorities	<ul style="list-style-type: none"> • Manager of TCNR. • Integrated Coastal Management expert.
	Key Stakeholders Involved/Benefiting		
	Municipality of Tyre/ University/ Students/ kiosks owners.		
	Key Outcomes		
	The conservation zone of TCNR is totally closed.		
	Synergies with Other Programmes		
	National/ Regional projects related to the topic.		
	Key Assumptions and Risks		
Rashidiyeh camp acceptance of closing TCNR conservation zone.			

12.3.Operation Programme 3

Cultural Heritage and Archeological Sites Management Programme.

Programme #	Programme Name			
3	Cultural Heritage and Archeological Sites Management Programme			
Objective #	Objective Name	Priority Level		
1	Access to information	High		
KPI #	Indicators	Baseline	Target 2027	
	<ul style="list-style-type: none"> • Number of visitors • Number of panels • Number of communication tools and kits 	<ul style="list-style-type: none"> • No signage in TCNR • No valorization of Cultural Heritage and Archeological within TCNR 	<ul style="list-style-type: none"> - Increase the number of visitors by 70% - Cultural and archeological heritage in TCNR valorized and promoted 	
Key Actions/Activities		Duration	Estimated Budget	Owner

<ul style="list-style-type: none"> Erect panels of interpretation with information on history, archeology and other cultural features of the reserve with QR codes. N.B: This activity is currently ongoing and under implementation through the BIOCONNECT project. Ensure guided tours to cultural and historical sites of the reserve. Produce awareness materials about the cultural and historical sites within TCNR. 	Five years	To Be Discussed (TBD) – Based on donors/ activities/ projects/ needs/ priorities	<ul style="list-style-type: none"> Manager of TCNR Ecotourism/ archaeological experts
	Key Stakeholders Involved/Benefiting		
	Tyre Municipality-NGOs-Director of Tyre Archeology at DGoA		
	Key Outcomes		
	The archaeological site within TCNR is well valorized and protected		
	Synergies with Other Programmes		
	Programmes related to Ecotourism activities		
	Key Assumptions and Risks		
Funds			
Programme #	Programme Name		
3	Cultural Heritage and Archeological Sites Management Programme		
Objective #	Objective Name	Priority Level	
2	Searching and discovering of archaeological and historic sites within the reserve	High	
KPI #	Indicators	Baseline	Target 2027
	Number of archaeological and historic monuments and sites discovered	<p>There is a new archaeological monument discovered recently within the TCNR conservation zone.</p> 	70 % of TCNR area are investigated by archeologist

		Photos of the new archaeological monuments in TCNR conservation zone.	
Key Actions/Activities		Duration	Estimated Budget
<ul style="list-style-type: none"> Continue the research of archaeological and historic monuments and sites within TCNR. Rehabilitate and maintain the discovered archaeological and historic monuments in the scientific zone of TCNR in cooperation with the Directorate General of Antiquities and following the archeological and environmental guidelines. 		Five years	To Be Discussed (TBD) – Based on donors/ activities/ projects/ needs/ priorities
		Owner	
		<ul style="list-style-type: none"> Manager of TCNR Archaeological experts 	
		Key Stakeholders Involved/Benefiting	
		Tyre Municipality-NGOs-Director of Tyre Archaeology at the DGoA	
		Key Outcomes	
		Most of the archaeological monuments within TCNR are discovered.	
		Synergies with Other Programmes	
		Programmes related to Archaeology	
		Key Assumptions and Risks	
		Funds	

Programme #	Programme Name		
3	Cultural Heritage and Archeological Sites Management Programme		
Objective #	Objective Name	Priority Level	
3	Restore and rehabilitate the artesian wells and the surrounding area	High	
KPI #	Indicators	Baseline	Target 2027

	<ul style="list-style-type: none"> Consummation of water Quality of water Number of visitors Number of agricultural land using Ras-Al Ain springs 	<ul style="list-style-type: none"> No data related to Ras-Al Ain artesian wells and the surrounding area. The real history of the area is not well known. 	<ul style="list-style-type: none"> The historical study of Ras-Al Ain is well known. 70 % of the artesian wells are controlled and well maintained. 	
Key Actions/Activities		Duration	Estimated Budget	Owner
<ul style="list-style-type: none"> Develop a complete historical study and literature review of the site. Evaluate, Organize, Resettle, and control all illegal housing activities (especially the use of spring waters) in the area that can threaten the functionality of the artesian well by offering them other good options for living taking into consideration the historical and ecological values of the area. Develop a landscape master plan for the agriculture zone. Implement the landscape master plan in the agriculture zone. Develop an administrative coordination mechanism among all the stakeholders concerned with Ras Al Ain (i.e., South Lebanon Water and Wastewater Establishment, Department of Antiquities, Litani Water Authority, Council for Development and Reconstruction, Ministry of Environment, and the APAC). Regularly evaluate / and guarantee the efficient use of the water provided by the springs in cooperation with Litany river authority and Lebanese water authority in the south of Lebanon. Maintain the good water quality of the springs through a watershed protection plan to be developed in cooperation with the water establishment and MoE. Rehabilitate and maintain the infrastructure of the artesian wells and springs waters. Develop and implement a strategy to avoid the loss of excess water from the springs. Develop and implement an ecotourism (e.g. geotourism) strategy based on the cultural, historic, and archaeological importance of Ras-Al-Ain. 		Five years	To Be Discussed (TBD) – Based on donors/ activities/ projects/ needs/ priorities	<ul style="list-style-type: none"> Manager of TCNR Archaeological experts Hydrology expert
Key Stakeholders Involved/Benefiting				
Tyre Municipality-NGOs-Director of Tyre Archaeology at DGoA-Hydrology center of research- Researchers-Students				
Key Outcomes				
The artesian wells within the agricultural area of TCNR are well known, valorized, well used, not polluted, and protected.				
Synergies with Other Programmes				
Programmes related to Geotourism-Ecotourism-History-Archaeology-Hydrology				
Key Assumptions and Risks				
Funds				

Programme #	Programme Name		
3	Cultural Heritage and Archeological Sites Management Programme		
Objective #	Objective Name	Priority Level	
4	Restore and rehabilitate the old water mill	High	
KPI #	Indicators	Baseline	Target 2025

	<ul style="list-style-type: none"> • Structural situation of the old water mill • Number of land irrigated by the water mill 	No data about the old water mill except some story related to the history of the area.	The water mill is rehabilitated and well maintained and ready to be used as an historical and archaeological monument inside the reserve.	
Key Actions/Activities		Duration	Estimated Budget	Owner
<ul style="list-style-type: none"> • Seek financial resources to rehabilitate and restore the water mill and the house in Ras Al Ain. • Utilize the water mill for agricultural purposes such as grinding flour or (buy/ sell) agriculture products. • Conduct a feasibility study to transform the water mill house into a facility (either a visitor center in the agriculture zone or a place for farmers to meet/rest). • Understand the value of the water mill as an historic and archeological sites (valorization). • Use the water mill (after its transformation to an important historical and touristic site) as an ecotourism tool. 		Five years	To Be Discussed (TBD) – Based on donors/ activities/ projects/ needs/ priorities	<ul style="list-style-type: none"> • Manager of TCNR • Archaeological experts • Hydrology expert • Ecotourism expert
		Key Stakeholders Involved/Benefiting		
		Litany river authority-Tyre Municipality-NGOs-Director of Tyre Archaeology at DGoA-Hydrology center of research-Researchers-Students		
		Key Outcomes		
		The water mill of Ras-Al Ain is well maintained, and valorized, and well used, and protected.		
		Synergies with Other Programmes		
		Programmes related to Geotourism-Ecotourism-History-Archaeology-Hydrology		
		Key Assumptions and Risks		
		Funds		

12.4.Operational Programme 4
Livelihood Management Programme.

Programme #	Programme Name
4	Livelihood Management Programme

Objective #	Objective Name	Priority Level		
1	Engage the fishers' community in monitoring and safeguarding the reserve's marine biodiversity while improving their living conditions.	High		
KPI #	Indicators	Baseline	Target 2027	
KPI.1	<ul style="list-style-type: none"> Fisher value = (Harvest x Average price of fish) – Harvest Costs. CPUE (Catch per unit of effort) in Kgs/hour = Average. catch per fishing trip / Number of hours per trip. 	<ul style="list-style-type: none"> Conflict within the fishers' syndicate in Tyre. Low involvement of fishers in the activities of TCNR. 	<ul style="list-style-type: none"> 40% of fishers are directly involved in the activities of TCNR. 60% of Tyre fishers use legal nets and respect the law of fishing. 	
KPI.2	<ul style="list-style-type: none"> Number of fishers involved in the activities of the reserve. Evaluation of the by-catch. Number of stranded marine species. Number of educated fishers. Degree of cooperation between TCNR and fishers. Number of fishers participating in the decision of TCNR. Number of fishing boats and touristic boats. Number of women involved in the fishing activities. Number of studies based on citizen-science. 	<ul style="list-style-type: none"> Low cooperation between fishers and TCNR activities. Low enforcement of laws and regulations related to fisher. Low respect of fishers to laws and regulation. No clear patrolling system and strategy for TCNR. Low tourism activities with fishers. 	<ul style="list-style-type: none"> 60% of Tyre fishers are educated and trained on legal fishing techniques. 60% of fishers in Tyre cooperate with TCNR. 40% of the by-catch is controlled by TCNR. Fisher syndicate is well connected to TCNR. 	
Key Actions/Activities		Duration	Estimated Budget	Owner
<ul style="list-style-type: none"> Encourage the establishment of a pilot project on sustainable fishing in Tyre and work for its implementation after consultation with the Ministry of Agriculture. Help the fishers with legal fishing nets and the proper fishing equipment (when possible through national/ regional projects) after consultation with the Ministry of Agriculture. Conduct a marine census study on the fish stock of juvenile commercial fish species and their seasonality within/ and outside the reserve. Promote financial incentives for fishers to help reduce by-catch of important marine species such as sea turtles and dolphins and cartilaginous species. Offer regularly workshops to promote awareness of the importance of no-take marine zone in the reserve and the spill-over effect. Engage fishers from the local community in attending progress meetings held by TCNR management. Regularly train and increase the capacity of fishers/ and involve them in the monitoring activities of the reserve (increase the citizen-science). Increase the knowledge and education of fishers (as a tourism promotion way and tool). 		Five years	To Be Discussed (TBD) – Based on donors/ activities/ projects/ needs/ priorities	<ul style="list-style-type: none"> Manager of TCNR. Marine expert.
Key Stakeholders Involved/Benefiting				
Fishers-Ministry of Agriculture-TCNR team-Municipality of Tyre-Lebanese Army-Researchers-Students-Universities-Research centres.				
Key Outcomes				
Fishers from Tyre are well connected with TCNR activities, and help for the integration of the MP activities of the reserve.				
Synergies with Other Programmes				
EU Funding Programmes				
IUCN Programmes				

<ul style="list-style-type: none"> Enforce the execution of national laws protecting and conserving the natural resources, and especially marine species. This step will guarantee to increase the abundance and size of marine species, and to establish the balance between fishers and environment (as an important objective of TCNR). Establish a long-term cooperation with fisher's syndicate. Encourage the establishment of the pescatourism activities. Create a group of fishers only working with the reserve. Empower fisher women and increase their involvement in the activities of the reserve. 	SPA/ RAC Programmes
	Twinning Programmes with other MPAs
	National and regional Projects
Key Assumptions and Risks	
Application of laws and regulations.	

Programme #	Programme Name			
4	Livelihood Management Programme			
Objective #	Objective Name	Priority Level		
2	Improve the added value of the agricultural practices through direct intervention with Ras Al-Ain farmers.	High		
KPI #	Indicators	Baseline	Target 2027	
	<ul style="list-style-type: none"> Number of farmers involved in the activities of TCNR. Number of farmers using organic agriculture. Level of pesticide and herbicide. Number of certificates given. 	No link and cooperation between TCNR and farmers within the agricultural zone of TCNR.	<ul style="list-style-type: none"> 50 % of the agricultural land is controlled by TCNR. 50 % of the farmers are cooperating with TCNR. Baseline for the establishment of farmer market. The use of pesticide and herbicide is reduced by 10 %. 10 % of the agricultural land can be considered as organic. 	
Key Actions/Activities		Duration	Estimated Budget	Owner
<ul style="list-style-type: none"> Establish an agro-tourism plan in the Ras Al-Ain Area. Implement a pilot plan for organic farming in a demonstration plot. Develop an integrated pest management strategy for the agricultural areas in the reserve. Train local farmers to produce and package environmentally friendly products/ and implicate them to the reserve projects/ and activities. Create retail outlets for the agricultural products of the site (e.g., collaboration with kiosks owners for selling primary products, creating organic market days in the touristic zone (when possible)) 		Five years	To Be Discussed (TBD) – Based on donors/ activities/ projects/ needs/ priorities.	<ul style="list-style-type: none"> Manager of TCNR. Agricultural engineer.
		Key Stakeholders Involved/Benefiting		
		Farmers- Ministry of Agriculture-NGOs-Municipality of Tyre		
		Key Outcomes		

<ul style="list-style-type: none"> • Create a certification system to ensure that products reach reliably high standards and access wider markets. • Construct a packaging center for all the products and crops in TCNR with the reserve's logo. • Create a cultural kitchen kiosk in the touristic zone selling mortar or products from the seasonal agriculture harvest of the reserve engaging local women in the production. • Assess market functioning and prices to maintain competitive production. • Promote the production of compost from rotten or unsold agriculture products to be used as natural fertilizers. • Encourage the rural tourism / agro-tourism. 	The agricultural zone in TCNR is well organized and controlled by TCNR and respects the environmental rules of an MPA.
	Synergies with Other Programmes
	Programme related to agriculture topics.
	Key Assumptions and Risks
	<ul style="list-style-type: none"> • Conflict with farmers. • Conflict with Rashidiyeh camp. • Respect of guidelines and laws by farmers.

Programme #	Programme Name			
4	Livelihood Management Programme			
Objective #	Objective Name	Priority Level		
3	Revive traditional knowledge and indigenous practices of the local community in and around the site.	High		
KPI #	Indicators	Baseline	Target 2027	
	Number of local practices.	No baseline	<ul style="list-style-type: none"> • 30% of indigenous practices are reused in TCNR. • 20% of local women are involved in some activities related to TCNR (especially food/ indigenous practices). 	
Key Actions/Activities		Duration	Estimated Budget	Owner
<ul style="list-style-type: none"> • Conduct a thorough survey to identify all traditional knowledge and indigenous practices of the local communities in the conservation of TCNR. • Develop a proper marketing strategy to promote the identified practices and the knowledge for income generation. • Encourage local food by involving local women in the tourist strategy. 		Five years	To Be Discussed (TBD) – Based on donors/ activities/ projects/ needs/ priorities.	<ul style="list-style-type: none"> • Manager of TCNR.
		Key Stakeholders Involved/Benefiting		
		Local community (mainly women)-Municipality of Tyre		
		Key Outcomes		
		TCNR is an opportunity for local community, especially women.		
		TCNR is an unique national example for local traditional practices		

	Synergies with Other Programmes
	-
	Key Assumptions and Risks
	Traditions issues-Some traditions in south Lebanon do not accept the idea that women work.

12.5.Operational Programme 5


Tourism and Visitor Management Programme.

Programme #	Programme Name			
5	Tourism and Visitor Management Programme			
Objective #	Objective Name	Priority Level		
1	Development of a visibility and a communication strategy for TCNR	High		
KPI #	Indicators	Baseline	Target 2027	
	Number of visitors in TCNR and website followers/ interactions.	<ul style="list-style-type: none"> TCNR visibility increase by 40% in 2022 due to the high number of activities and workshops done during this period. TCNR gain its presence in Tyre. 	TCNR visibility increase by 70%	
Key Actions/Activities		Duration	Estimated Budget	Owner
<ul style="list-style-type: none"> Create a specific communication sign (e.g. emblem) for TCNR. Update TCNR website. Establish and develop a promotion plan. Create a video for TCNR promotion. Cooperate with schools, and universities, restaurants and hotels for promoting TCNR. 		Five years	To Be Discussed (TBD) – Based on donors/ activities/ projects/ needs/ priorities.	<ul style="list-style-type: none"> Manager of TCNR. Communication expert. 30.
Key Stakeholders Involved/Benefiting				

	Designer-Communication expert-TCNR-Municipality of Tyre.
	Key Outcomes
	TCNR has a clear communication plan and strategy.
	Synergies with Other Programmes
	-
	Key Assumptions and Risks
No Assumptions and Risks.	

Programme #	Programme Name			
5	Tourism and Visitor Management Programme			
Objective #	Objective Name	Priority Level		
2	Develop a visitor management plan	High		
KPI #	Indicators	Baseline	Target 2027	
	<ul style="list-style-type: none"> Number of visitors Number of signage Revenues/ income 	<ul style="list-style-type: none"> In 2022, the number of visitors (national/ international) for TCNR increased by 50 %. The number of tourists estimated during 2022 summer is 800,000 people. 	<ul style="list-style-type: none"> Number of visitors increase by 70% Incomes increase by 30% 	
Key Actions/Activities		Duration	Estimated Budget	Owner
<ul style="list-style-type: none"> Conduct a survey of visitors' profiles to the reserve for both the touristic and conservation and agricultural zones. Impose an entrance fee to the reserve considering different age groups and packages, and fees for practicing specific marine ecotourism activities in TCNR (diving, snorkeling, surfing, kayaks...). 		Five years	To Be Discussed (TBD) – Based on donors/ activities/ projects/ needs/ priorities.	<ul style="list-style-type: none"> Manager of TCNR. Communication expert. Ecotourism expert 31.

<ul style="list-style-type: none"> Enhance and increase the interpretative and illustrative signs across the different zones in TCNR. Calculate the carrying capacity for all the zones (touristic, conservation, and agriculture) and enforce it Develop a customer experience department within TCNR management where visitors can register any concerns, complaints, or recommendations. Install CCTV cameras across the main entrances and critical areas in the reserve, which facilitates the work of security rangers in detecting illegal actions or violations. Implement a feedback sheet for visitors as an evaluation process. 			
	Key Stakeholders Involved/Benefiting		
	Tourists-Kioks/ restaurant/hotels owners-Local Community-Municipality of Tyre		
	Key Outcomes		
	<ul style="list-style-type: none"> TCNR is a beautiful and environmental touristic site. TCNR benefits from visitors on the right way. Tourists and visitors to the sandy beach in summer know that it is a part of the MPA and not a public beach 		
	Synergies with Other Programmes		
	-		
Key Assumptions and Risks			
No Assumptions and Risks			

Programme #	Programme Name		
5	Tourism and Visitor Management Programme		
Objective #	Objective Name	Priority Level	
3	Enhance and expand on existing eco-touristic activities in TCNR	High	
KPI #	Indicators	Baseline	Target 2027
	<ul style="list-style-type: none"> Number of visitors. Number of activities based on ecotourism. Incomes. 	<ul style="list-style-type: none"> The snorkeling trail establishes in 2015-2016 gives good results but no follow up. <p>Photos of the snorkeling trails</p>  <p>©TCNR</p>	<ul style="list-style-type: none"> Number of visitors increase by 70% Incomes increase by 30% Snorkeling and diving trails are operational Incomes are generated from rental of equipment for ecotourism activities (diving, snorkeling and others) and from the fees collected from the visitors to practice these activities in TCNR

		<ul style="list-style-type: none"> Equipment for snorkeling and diving in TCNR are available (diving suits, etc...) but are not being rented for visitors, and TCNR is not managing these activities 	
Key Actions/Activities		Duration	Estimated Budget
<ul style="list-style-type: none"> Conduct both a feasibility study and a business plan for implementing an environmentally friendly eco-camping site in the reserve. Invest in new eco-friendly water sports activities such as kayaking, glass-bottom kayaks, windsurfing, paddleboards. Mobilize staff to manage the eco-touristic activities such as the rental of snorkeling, scuba diving, kayaks, etc. Collect fees from visitors to practice these eco-touristic activities inside TCNR. Develop guidelines and manuals for the use and maintenance of eco-touristic equipment owned by the reserve. Rehabilitate the visitor information center and equip it to host tourists, workshops, and conferences. Develop a mechanism of cooperation with tour and eco-tours operators on a national and international scale. Expand the sea turtles' exhibition center and include e-learning tools and activities for tourists. Cooperate with restaurants and hotels and kiosks owners and diving center for promoting TCNR. 		Five years	To Be Discussed (TBD) – Based on donors/ activities/ projects/ needs/ priorities.
		Owner	
		<ul style="list-style-type: none"> Manager of TCNR. Communication expert. Ecotourism expert. 	
		32.	
		Key Stakeholders Involved/Benefiting	
		Key Outcomes	
		<ul style="list-style-type: none"> TCNR is a beautiful and is an environmental touristic site. The values of TCNR are used in the right and environmental way. TCNR benefits from visitors on the right way. TCNR generates its independent incomes from ecotourism activities. 	
		Synergies with Other Programmes	
		-	
		Key Assumptions and Risks	
		No risks and assumptions	

Programme #	Programme Name	
5	Tourism and Visitor Management Programme	
Objective #	Objective Name	Priority Level
4	Implement a tourism marketing strategy	High

KPI #	Indicators	Baseline	Target 2027	
	<ul style="list-style-type: none"> Number of visitors Revenues/ incomes 	See Programme 5 and Objective 3	<ul style="list-style-type: none"> Number of visitors increase by 70% Incomes increase by 30% 	
Key Actions/Activities		Duration	Estimated Budget	Owner
<ul style="list-style-type: none"> Conduct and implement a marketing strategy to attract more national and international visitors/tourists, to the reserve. Enhance the reserve's website including visuals and a platform where visitors can book tours and activities through the website. Establish a local souvenir store inside the reserve to promote and sell different items carrying the reserve's logo and important species. Sign an agreement with neighboring hotels and diving center (and add % fees as a revenue for the reserve). Impose on the hotels and diving center to put info on the reserve in their properties. 		Five years	To Be Discussed (TBD) – Based on donors/ activities/ projects/ needs/ priorities.	<ul style="list-style-type: none"> Manager of TCNR. Communication expert. Ecotourism expert. 33.
		Key Stakeholders Involved/Benefiting		
		See Programme 5 and Objective 3		
		Key Outcomes		
		See Programme 5 and Objective 3		
		Synergies with Other Programmes		
		See Programme 5 and Objective 3		
		Key Assumptions and Risks		
		See Programme 5 and Objective 3		

12.6. Operational Programme 6

Capacity Building Management Programme

Programme #	Programme Name				
6	Capacity Building Management Programme				
Objective #	Objective Name	Priority Level			
1	Conduct training Programmes on species conservation and scientific monitoring	High			
KPI #	Indicators	Baseline	Target 2027		
	Number of trained people involved in the activity of the reserve.	TCNR starts involving volunteers in its activities and monitoring Programme.	<ul style="list-style-type: none"> 70% of the people involved in the activities of the reserve are well trained. TCNR has its own monitoring Programme and strategy 		
Key Actions/Activities		Duration	Estimated Budget	Owner	
<ul style="list-style-type: none"> Collaborate with biodiversity experts and research institutions on conducting training Programmes for the reserve's staff, particularly for the rangers/ and volunteer's/ kiosks owners and scientific coordinators on particular species' conservation and management (e.g., vermetid reefs, <i>Cystoseira</i> forests, seagrasses, marine turtles, marine birds, cetaceans, non-indigenous species, flag species). Equip the management team with the needed tools to conduct scientific sampling and monitoring of marine/ terrestrial habitats and species with special interests. Develop ongoing support and a follow-up Programme to ensure that the knowledge and skills gained through the training are implemented at the field level. Establishment of an evaluation system to understand the knowledge degree of the people trained, and involved in the reserve activities. Train fishers and divers on some monitoring techniques (according to the need of the reserve). Establish a strategy for a long-term involvement of fishers and divers in the activities of the reserve. 		Five years	To Be Discussed (TBD) – Based on donors/ activities/ projects/ needs/ priorities.	<ul style="list-style-type: none"> Manager of TCNR. Marine expert. 	
		Key Stakeholders Involved/Benefiting			
		Farmers-Divers-Volunteers-Students-Research Centers-Universities.			
		Key Outcomes			
		TCNR has its own regular monitoring Programme with a well-trained team of staff and volunteers.			
		Synergies with Other Programmes			
		Programmes related to monitoring/ protecting and conserving the biodiversity			
		Key Assumptions and Risks			
		No Assumptions and Risks.			

Programme #	Programme Name			
6	Capacity Building Management Programme			
Objective #	Objective Name	Priority Level		
2	Perform capacity building for the TCNR management team and stakeholders' engagement workshops	High		
KPI #	Indicators	Baseline	Target 2027	
	Number of stakeholders involved in the activity of TCNR		TCNR has a fixed number of stakeholders.	
Key Actions/Activities		Duration	Estimated Budget	Owner
<ul style="list-style-type: none"> Conduct monthly trainings for the management team (with a special focus on the reserve laws and regulations) using existing courses run by WWF/NOAA, followed by RAC/SPA, Conservatoire du Littoral, ACCOBAMS, CaMPAM, NOAA, TNC, IUCN, MedPAN, UNDP. Carry on trainings on conflict resolution/ and solutions. Implement communication and coordination plans between the reserve's different internal and external stakeholders' groups, and the reserve team. Create a coordinated network of MPA managers to share knowledge, information and lessons learned across Lebanese regions and the Mediterranean. 		Five years	To Be Discussed (TBD) – Based on donors/ activities/ projects/ needs/ priorities.	<ul style="list-style-type: none"> Manager of TCNR. Marine expert. 35.
		Key Stakeholders Involved/Benefiting		
		Local communities are involved in the decision of TCNR.		
		Key Outcomes		
		TCNR has its own regular monitoring Programme with a well-trained team of staff and volunteers.		
		Synergies with Other Programmes		
		-		
		Key Assumptions and Risks		
No Assumptions and Risks.				

Programme #	Programme Name			
6	Capacity Building Management Programme			
Objective #	Objective Name	Priority Level		
3	Carry out trainings on self-financing and business plans	High		
KPI #	Indicators	Baseline	Target 2027	
	Number of fishers/ divers involved in the activities of TCNR Number of training and workshop done in relation to the activities of TCNR	An eco-tourism strategy based on sea turtles has been implemented for TCNR in 2020 Project MEET	<ul style="list-style-type: none"> 40% of fishers are involved in the activities of TCNR TCNR have its own agreement with local fishers and divers TCNR is an opportunity for sharing information and knowledge and experience for local and national community 	
Key Actions/Activities		Duration	Estimated Budget	Owner
<ul style="list-style-type: none"> Consult local, regional experts to conduct trainings or workshops on sustainable tourism ideas for the reserve. Implement the ecotourism plan based on sea turtles/ Marine and Terrestrial Habitats, and associated biodiversity. Involve fishers and divers within the ecotourism strategy (especially diving ecotourism). Implement an ecotourism plan based on the historical monuments/ ruins under waters. 		Five years	To Be Discussed (TBD) – Based on donors/ activities/ projects/ needs/ priorities.	<ul style="list-style-type: none"> Manager of TCNR. Marine expert. Fauna and Flora experts Birds expert Ecotourism expert
		Key Stakeholders Involved/Benefiting		
		Local community (student/ divers/ fishers/ farmers)		
		Key Outcomes		
		TCNR with its clear ecotourism strategy is a good MPA example TCNR is a center of information/ education/ and knowledge		
		Synergies with Other Programmes		
		-		
		Key Assumptions and Risks		
		No Assumptions and Risks		

12.7. Operational Programme7

Community Engagement Management Programme.

Programme #	Programme Name						
7	Community Engagement Management Programme						
Objective #	Objective Name			Priority Level			
1	Develop a community development plan			High			
KPI #	Indicators	Baseline	Target 2027				
	<ul style="list-style-type: none"> • Number of local people involved in decision-making related to TCNR • Income fees • Number of projects 	No baseline	All stakeholders are involved in TCNR decision.				
Key Actions/Activities		Duration	Estimated Budget	Owner			
<ul style="list-style-type: none"> • Conduct local community public hearing consultation to gather ideas to foster engagement activities within and around the reserve (in a transparent manner). • Collaborate/ and connect with the MoT, MoC, and the MoF on community livelihood Programmes. • Increase/ and focus on the involvement of Rashidiyeh camp in TCNR activities, through organizing regular meetings for updating them on the current status/ activities/ regulations of TCNR. 		Five years	To Be Discussed (TBD) – Based on donors/ activities/ projects/ needs/ priorities.	<ul style="list-style-type: none"> • Manager of TCNR. • Marine expert. • Socio-economic expert 			
				Key Stakeholders Involved/Benefiting			
				All stakeholders			
				Key Outcomes			
				TCNR has a well-established and developed plan for the involvement of stakeholders.			
				Synergies with Other Programmes			
				-			
				Key Assumptions and Risks			
No Assumptions and Risks							

Programme #	Programme Name				
7	Community Engagement Management Programme				
Objective #	Objective Name	Priority Level			
2	Promote income generation activities for the local community	High			
KPI #	Indicators	Baseline	Target 2027		
	<ul style="list-style-type: none"> Number of local community involved in the activities of TCNR Number of contributions coming from the local community 	No Baseline	60 % of local community are integrated in TCNR activities		
Key Actions/Activities		Duration	Estimated Budget	Owner	
<ul style="list-style-type: none"> Create a revolving fund to finance Small and Medium Enterprises (SMEs) projects leading to the alleviation of socio-economic pressures within TCNR and its surrounding community. Initiate and market the Bed & Breakfast concept in the city of Tyre as part of the lodging facilities and packages offered by the reserve for tourists willing to visit the city. Involve local women in making secondary products from agricultural harvest such as mortars, jams, herbs, sauces, etc/ and increase their role in the society. Establish a permanent kiosk in the agriculture zone to sell the produced secondary products with the reserve's logo, and to choose the location of the kiosk far from the water springs location in order to preserve them from any negative environmental impact. Organize artistic workshops for the local community especially women involving school kids to create ornaments using seashells and sell them in the reserve's souvenir shop. Help initiate kiosks during the summer season that prepare, cook and sell fresh daily seafood catch of commercial fish species that are harvested outside the reserve's restricted marine boundaries. 		Five years	To be discussed	Manager of TCNR	
		Key Stakeholders Involved/Benefiting			
		Local community			
		Key Outcomes			
		TCNR is an opportunity for all stakeholders.			
		TCNR provides jobs for all stakeholders.			
		Synergies with Other Programmes			
		-			
Key Assumptions and Risks					
		No Assumptions and Risks			

Programme #	Programme Name
7	Community Engagement Management Programme

Objective #	Objective Name	Priority Level		
3	Promote the role of women in TCNR activities	High		
KPI #	Indicators	Baseline	Target 2027	
	<ul style="list-style-type: none"> Number of women involved in the activities of TCNR 	Based on some ongoing activities in TCNR, women start to be involved in the activities of TCNR.	Local women will be involved in TCNR activities by 50%.	
Key Actions/Activities		Duration	Estimated Budget	Owner
<ul style="list-style-type: none"> Cooperate with local women for food during the organization of events (awareness, training, visits, and others) in TCNR. Consider gender equity during the organization of events related to TCNR. Offer opportunities for women to be involved in TCNR activities/ and organize regular meetings with them. Regularly organize a meeting with women stakeholders to share solutions/ ideas/make decisions. 		Five years	To be discussed	Manager of TCNR
		Key Stakeholders Involved/Benefiting		
		Local women		
		Key Outcomes		
		TCNR is an example and unique MPA enhancing the role of women.		
		Synergies with Other Programmes		
		-		
		Key Assumptions and Risks		
No Assumptions and Risks				

12.8. Operational Programme 8

Education, Awareness, and Communication Management Programme.

Programme #	Programme Name
8	Education, Awareness, and Communication Management Programme

Objective #	Objective Name	Priority Level		
1	Conduct awareness campaigns to promote sustainable fishing	High		
KPI #	Indicators	Baseline	Target 2027	
	<ul style="list-style-type: none"> Number of awareness campaign Number of workshops Number of trained participants 	-	50% of laws and regulations are applied in TCNR	
Key Actions/Activities		Duration	Estimated Budget	Owner
<ul style="list-style-type: none"> Implement an awareness campaign for fishers on sustainable fishing practices and techniques. Investigate/ and enforce the execution of the available laws on the sustainable use of fisheries resources in Lebanon. Offer workshops to promote awareness of the importance of no-take marine zone in the reserve and the spill-over effect. Promote/ and offer financial incentives for fishers to help reduce by-catch of important marine species such as sea turtles. Promote the sustainable use of resources derived from the wetlands. Develop a study to improve the efficiency of the irrigation system used in the agriculture zone of TCNR. Promote and support environmentally friendly or organic agriculture practices within the farmers' community of TCNR. 		Five years	To be discussed	Manager of TCNR
		Key Stakeholders Involved/Benefiting		
		Fishers		
		Key Outcomes		
		<ul style="list-style-type: none"> Majority of fishers are involved in TCNR activities. Majority of fishers have a good knowledge about Tyre and TCNR waters and values. 		
		Synergies with Other Programmes		
		-		
		Key Assumptions and Risks		
No Assumptions and Risks				

Programme #	Programme Name		
8	Education, Awareness, and Communication Management Programme		
Objective #	Objective Name	Priority Level	
2	Promote environmentally friendly practices across the TCNR zones to limit pollution.	High	
KPI #	Indicators	Baseline	Target 2027

Key Actions/Activities		Duration	Estimated Budget	Owner	
<ul style="list-style-type: none"> • Train local farmers to produce and package environmentally friendly products. • Collect agricultural run-offs and sewage from small farmers' settlements and direct them to local treatment facilities. • Implement awareness campaigns for the local community on solid waste management. • Conduct regular beach cleaning campaigns. • Distribute 3 compartments bins across the three zones in TCNR and along the sandy beach to separate organic, recyclables, and other waste. • Include small bins for cigarette butts along the sandy beach for smokers. • Collaborate with kiosks owners and recycling facilities in Lebanon to use recyclable disposable cutlery made from paper or decomposable material (cups, plates, forks, knives, boxes) instead of single-use plastics. • Increase the number of cleaners during the summer season in the sandy public beach to reduce marine litter. • Establish a specific contingency plan for TCNR in line with the National Oil Spill Contingency Plan. 					
		Key Stakeholders Involved/Benefiting			
		Key Outcomes			
		Synergies with Other Programmes			
		Key Assumptions and Risks			

Programme #	Programme Name		
8	Education, Awareness, and Communication Management Programme		
Objective #	Objective Name	Priority Level	
3	Develop an awareness campaign targeting behavior change in the local community and stakeholders in Tyre	High	
KPI #	Indicators	Baseline	Target 2027

Key Actions/Activities	Duration	Estimated Budget	Owner
<ul style="list-style-type: none"> Implement environmental awareness campaigns for the public regarding the values and functions of TCNR. Use marketing awareness materials to highlight the benefits and values of TCNR through digital media, advertisements, brochures, printouts, billboards, TV advertisements, etc. Involve schools and universities in the awareness programmes to increase the visibility of the reserve across educational institutions Improve the website of the reserve to include more material about the reserve's activities, services, species, and the packages the reserve offers. 			
	Key Stakeholders Involved/Benefiting		
	Key Outcomes		
	Synergies with Other Programmes		
	Key Assumptions and Risks		

12.9. Operational Programme 9

Networking and Partnership Building Management Programme.

Programme #	Programme Name		
9	Networking and Partnership Building Management Programme		
Objective #	Objective Name	Priority Level	
1	Promote stakeholders' involvement in decision-making and management strategies of TCNR	High	
KPI #	Indicators	Baseline	Target 2027
	<ul style="list-style-type: none"> Number of stakeholders involves in TCNR decisions Number of workshop 	TCNR is well connected to local communities through the MP	TCNR has a fix stakeholders to take decision

Key Actions/Activities	Duration	Estimated Budget	Owner
<ul style="list-style-type: none"> Regularly organize workshops with identified groups of users among the stakeholders to develop a strategy for achieving local involvement in TCNR management. Carry out participatory planning and negotiation among stakeholders to develop a strategy for achieving local involvement in TCNR management Assist the municipality in developing proposals. Regularly organize meetings with the main stakeholders involved in the activities of TCNR to discuss about main results/ expectations/ Gaps. Guarantee the involvement of Rashidiyeh community in the stakeholder's process. 	Five years	To Be Discussed (TBD) – Based on donors/ activities/ projects/ needs/ priorities	<ul style="list-style-type: none"> Manager of TCNR
	Key Stakeholders Involved/Benefiting		
	APAC team-TCNR team		
	Key Outcomes		
	TCNR is an opportunity for local community		
	Synergies with Other Programmes		
	-		
	Key Assumptions and Risks		
	No Assumptions and Risks		

Programme #	Programme Name		
9	Networking and Partnership Building Management Programme		
Objective #	Objective Name	Priority Level	
2	Ensure economic viability of the nature reserve and surrounding area	High	
KPI #	Indicators	Baseline	Target 2027
	<ul style="list-style-type: none"> Number of projects within TCNR Outcomes from the projects Sustainability of the projects 	No business plan and strategy for TCNR	TCNR has a clear business strategy
Key Actions/Activities	Duration	Estimated Budget	Owner

<ul style="list-style-type: none"> Develop a business plan for TCNR. Mobilize financial resources from private and public agencies. Seek funds from international and multinational agencies. Mobilize international and national funding sources for wetland conservation. Organize a yearly donor tour. Develop a strategy to diversify sources of funding for TCNR. Participate in exhibitions and yearly national and international events. Use the national/ regional importance and needs of TCNR to ask funds from national and regional donors and organizations. <p>37.</p>	Five years	To Be Discussed (TBD) – Based on donors/ activities/ projects/ needs/ priorities	<ul style="list-style-type: none"> Manager of TCNR Socio-Economic expert Financial expert
	Key Stakeholders Involved/Benefiting		
	Municipality of Tyre- Financial expert		
	Key Outcomes		
	TCNR has many projects according to the needs and gain the trust of many donors		
	Synergies with Other Programmes		
	-		
	Key Assumptions and Risks		
No Assumptions and Risks			

Programme #	Programme Name			
9	Networking and Partnership Building Management Programme			
Objective #	Objective Name	Priority Level		
3	Encourage and facilitates collaboration with academia in the management of TCNR	High		
KPI #	Indicators	Baseline	Target 2027	
Key Actions/Activities		Duration	Estimated Budget	Owner
<ul style="list-style-type: none"> Develop a cooperation mechanism with academia to include the research and monitoring requirements of TCNR in their research and internship Programmes Develop a yearly research agenda covering the research needs of TCNR. 				
		Key Stakeholders Involved/Benefiting		

<ul style="list-style-type: none"> • Sign agreement with universities and research centers. • Increase the collaboration and cooperation with the universities and NGOs for guaranteeing a sustainable monitoring Programme. • Organize a TCNR week, with the participation of national/ regional experts (in many field) and students. 	
	Key Outcomes
	Synergies with Other Programmes
	Key Assumptions and Risks

12.10. Operational Programme 10

Environmental Management Programme.

Programme #	Programme Name			
10	Environmental Management Programme (wastewater, solid waste including marine littering, air quality)			
Objective #	Objective Name	Priority Level		
1	Conserve groundwater quality in TCNR	High		
KPI #	Indicators	Baseline	Target 2027	
	<ul style="list-style-type: none"> • Water quality • Degree of pesticides and fertilizers 		<ul style="list-style-type: none"> • Ground water quality in TCNR is in good status. • TCNR is conserving its position as Ramsar site. • The use of pesticides and fertilizers decreases by 30%. 	
Key Actions/Activities		Duration	Estimated Budget	Owner
<ul style="list-style-type: none"> • Promote the efficient and sustainable use of groundwater according to Ramsar Guidelines • Conduct a water budgeting analysis for the Ras Al Ain springs in collaboration with the Litani Water Authority 		Five years		
		Key Stakeholders Involved/Benefiting		

<ul style="list-style-type: none"> Regularly monitor the groundwater to detect any source or non-source point of pollution through sampling and testing Provide farmers with alternatives to the usage of chemical pesticides and fertilizers Analyze/Exanimate/ and regularly follow up the flow and currency of water through national organizations (e.g., Ministry of water and energy), NGO. 	Farmers-Ministry of Energy and Waters- Litani Water Authority-Municipality of Tyre- Local Community of Rachidiyeh Camp- Local Community of Tyre
	Key Outcomes
	Synergies with Other Programmes
	Key Assumptions and Risks

Programme #	Programme Name			
10	Environmental Management Programme (wastewater, solid waste including marine littering, air quality)			
Objective #	Objective Name	Priority Level		
2	Manage solid waste and reduce marine littering in TCNR	High		
KPI #	Indicators	Baseline	Target 2025	
	<ul style="list-style-type: none"> Number/size of litter on the beach Number of bins Degree of single-use plastics Recycled solid waste Number of ghostnets in TCNR waters 	<ul style="list-style-type: none"> TCNR is highly polluted by smoke filters. TCNR waters are also polluted by macro/ micro litter. TCNR waters are highly polluted by ghostnets. Restaurants, hotels, Kioks owners (in the summer season) are still using plastic. 	<ul style="list-style-type: none"> 50% of kiosks within TCNR are involved in the mitigation action of single use plastic. The litter (especially the marine zone) decreased by 30% in TCNR. 50% of visitors are involved in the recycled techniques of solid waste. 	
Key Actions/Activities		Duration	Estimated Budget	Owner

<ul style="list-style-type: none"> Act in line with the Protocol of Barcelona for the Protection of the Mediterranean Sea Against Pollution from Land-Based Sources. Regularly remove garbage marine litter brought to TCNR by sea currents, in cooperation with local community, local NGOs, through projects and in cooperation with the municipality of Tyre. Develop a proposal for funding integrated solid waste management in TCNR. Forbid the use of single-use plastics within TCNR zones by taking some decisions and agreement with the union of Municipalities of Tyre. Offer alternative to single-use plastic to kiosks owners by collaborating with national recycling facilities to supply recyclable disposable cutlery made from paper or decomposable material (cups, plates, forks, knives, boxes). Increase the number of compartments bins across the reserve including organic, recyclables, and other waste. Distribute small bins for cigarette butts across the sandy beach and smoking stations in collaboration with kiosks owners, especially during summer. Collaborate with Material Recovery Facilities near Tyre to collect segregated waste from the reserve. Impose a penalty or violation fee for any action of marine littering or waste dumping in the reserve. Incentivize the visitors to recycle by installing reverse-vending machines where each plastic bottle will earn the depositor a point, and the collection of points can be redeemable against a coupon. Implement techniques for sorting the litter mixed with the beach sand in cooperation with Tyre Municipality. Increase the awareness for reducing the use of plastics (especially through national/ regional/ and international projects). Implement awareness campaigns for the local community, and visitors (especially during summer) on solid waste management. Work more on the behaviors in parallel with the awareness to reduce the use of plastics. Clean TCNR waters from ghostnets. 	Five years	To Be Discussed (TBD) – Based on donors/ activities/ projects/ needs/ priorities	<ul style="list-style-type: none"> Manager of TCNR Environment expert Marine litter expert
	Key Stakeholders Involved/Benefiting		
	Municipality of Tyre- Local Community of Rachidiyeh Camp- Local Community of Tyre-NGOs		
	Key Outcomes		
	TCNR is regularly a clean area, especially free of litter.		
	Synergies with Other Programmes		
	EU projects (MedMarineLitter-Plastic Buster CAP)		
Key Assumptions and Risks			
<ul style="list-style-type: none"> Funds Acceptance of the local community 			

Programme #	Programme Name		
10	Environmental Management Programme (wastewater, solid waste including marine littering, air quality)		
Objective #	Objective Name	Priority Level	
3	Reduce sewerage and wastewater effluents discharged into the sea	High	
KPI #	Indicators	Baseline	Target 2025

	<ul style="list-style-type: none"> Quality of the wastewater Active pumping station 	<ul style="list-style-type: none"> The main infrastructure issues are: (i) pumping station no. 1 is not operational and (ii) pumping station no. 2 was never constructed. The two pumping stations have been financed by KfW but work has been stopped as the municipal wastewater treatment plant is not yet operational and because of population's resistance regarding the location of the second pumping station. The applications of improved sanitation technologies and environmental concepts will make greater Rashidiyeh area a pilot spot for transferring the success of newly introduced concepts to other camps and Lebanese regions. The composting of SW is not welcomed because of previous experience of bad compost quality that was obtained at the Ain Baal SW treatment plant (SWTP) and the huge area needed for long composting period. It is maybe also because the operators of SWTPs are not doing proper job and the result leads to production of compost of bad quality. The composting processes need adaptations to obtain high quality end products. There is also the importance of short term interim solutions for organic solid waste management, taking into consideration the specific situation of the Lebanese context in terms of regulations, institutional setting, available structures as well as previous and current lessons learnt with technologies and practices in Lebanon in the fields of sewage, sludge treatment and solid waste treatment. Budgetary aspects in relation to the introduction and operation of any technologies should be carefully considered. 	Waste-to-Value - Integrated Sustainable Sanitation in Tyre - Rashidiyeh	
Key Actions/Activities		Duration	Estimated Budget	Owner
<ul style="list-style-type: none"> Participate in developing a wastewater management strategy for the city of Tyre. Develop proper sanitary and wastewater infrastructure in Al Rachidiyeh camp with the collaboration of the Municipality and donors such as UN-habitat-UNDP. Control pollution on the marshes in the Agricultural zone of TCNR. A sanitary solution is needed to fix this issue of contamination of the drinking water sources. 		Five years	To Be Discussed (TBD) – Based on donors/ activities/ projects/ needs/ priorities	<ul style="list-style-type: none"> Manager of TCNR Environment expert
Key Stakeholders Involved/Benefiting				
Municipality of Tyre- Local Community of Rashidiyeh Camp- Local Community of Tyre				
Key Outcomes				

<ul style="list-style-type: none"> A proper solution for SW management is needed for the entire Tyre district in addition to the 3 Palestinian camps (more than 58,000 Palestine refugees), plus Palestine and Syrian refugees living in the surroundings gatherings, adjacent areas and municipalities in the area. The total solid waste collected in the Palestine refugee camps is either sent to the Ain Baal treatment plant (funded by European Union and the Office of the Minister of State for Administrative Reform (OMSAR) and operated by a private company) or/and to illegal open burning and dumping sites (more than 1,000 around the country as per estimations). Design alternative (complementary or stand-alone) final treatment of pre-treated sewage in coastal wastewater wetlands. 	<ul style="list-style-type: none"> Improved sanitation coverage Waste water Management
	Synergies with Other Programmes
	-
	Key Assumptions and Risks
	Funds

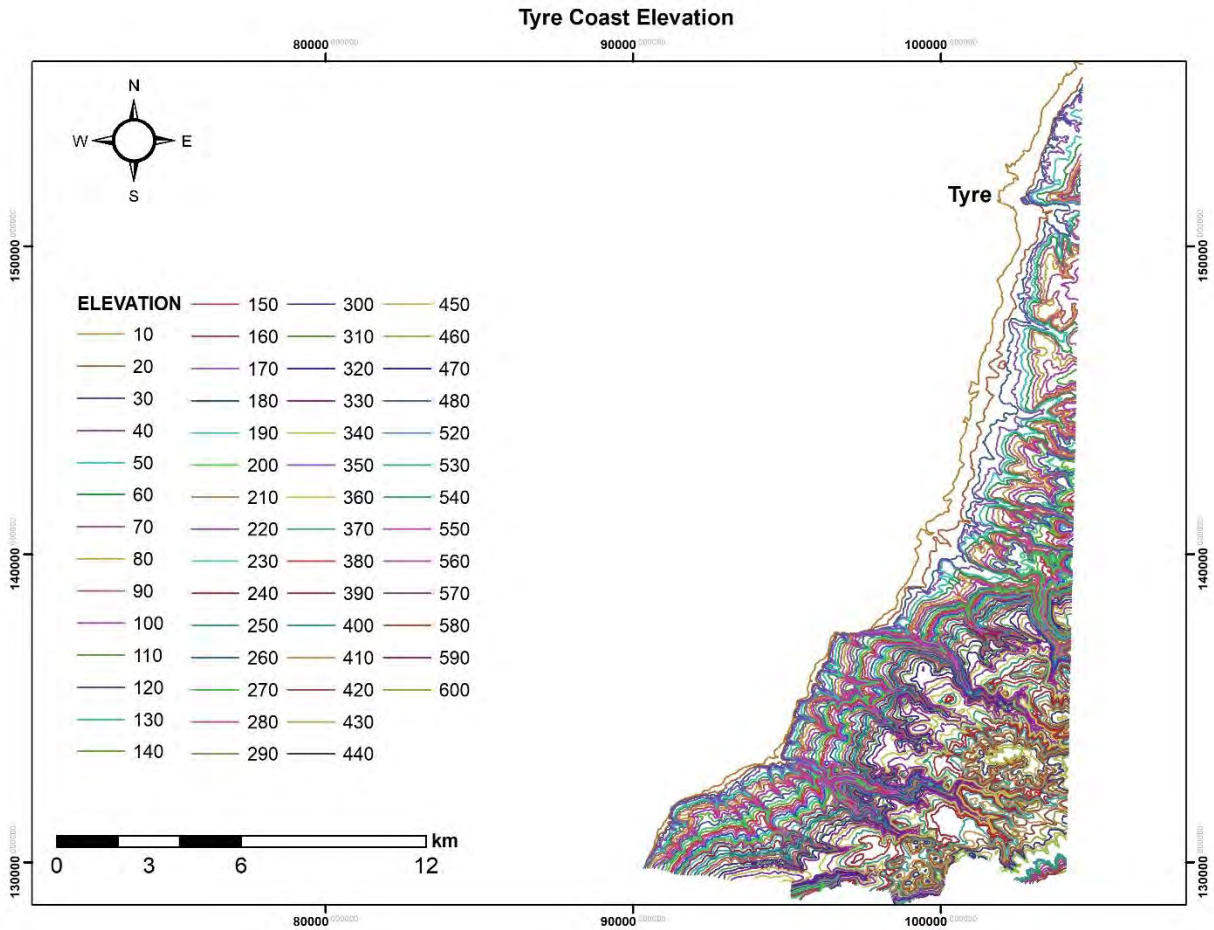
Programme #	Programme Name			
10	Environmental Management Programme (wastewater, solid waste including marine littering, air quality)			
Objective #	Objective Name	Priority Level		
4	Promote activities that protect the air quality in the vicinity of the reserve	High		
KPI #	Indicators	Baseline	Target 2027	
	<ul style="list-style-type: none"> Number of Solar panels Number of carpooling and electric vehicles Number of trees Percentage of fire Data coming from the patrolling system 	<ul style="list-style-type: none"> TCNR visitor center is equipped by a solar system. Gemmayz trees are planted within the Conservation zone of TCNR. 	<ul style="list-style-type: none"> Reduce fire within TCNR TCNR is listed on the Green List by IUCN 	
Key Actions/Activities		Duration	Estimated Budget	Owner
<ul style="list-style-type: none"> Develop a feasibility study to promote the use of solar panels across the reserve's facilities including lighting within the peripheries of the reserve. Offer carpooling and electric vehicles such as carts, buggies, UTV, tuk tuks for tourists which can be booked through the website of the reserve for planned visits or through a hotline handled by the reserve's management team. (while taking into consideration, that some vehicles cannot be allowed on the sand in order to avoid any environmental damages) 		Five years	To Be Discussed (TBD) – Based on donors/ activities/ projects/ needs/ priorities	<ul style="list-style-type: none"> Manager of TCNR Environment expert
		Key Stakeholders Involved/Benefiting		
		Municipality of Tyre- Local Community of Rachidiyeh Camp- Local Community of Tyre-Union of Municipality of Tyre-Hotels-Restaurant		

<ul style="list-style-type: none"> • Increase the plantation of trees (e.g. Gemmayz/ or other based on experts' advices) in and around the reserve. • Control fire in TCNR by implementing the patrolling strategy and system. • Cooperate with hotels and restaurants to increase the awareness on reducing air pollution. 	Key Outcomes
	<ul style="list-style-type: none"> • TCNR is well protected and controlled by a well-established patrolling system. • TCNR is considered as an example for air quality.
	Synergies with Other Programmes
	SPA/RAC projects MedPAN projects UNERWA projects UNDP projects UN Habitats Project
	Key Assumptions and Risks
	Funds for equipment and infrastructure

13 Annexes

Annex 1

Map showing the elevation of Tyre and TCNR from the sea waters © Raghda Saad.



Annex 2

TCNR Law

LAW No. 708

Establishment of Tyre Beach nature reserve In Jaftalak-Ras El-Ain ȳ Tyre estate area

The Parliament approved,
And,
The President of the Republic published the following legal text:

Article One: A nature reserve is established on the lands that are owned by the Government in the area called "Jaftalak Ras El-Ain" located in the real estate of Tyre, on the following land plots: 60-61-62-63-64-(Springs of Ras El-Ain) 65-66-67-68-69-70-71-72-73-1203-1205-1206-1209-1517-1531-1532-1538-1539-1540-1547-1548-1553-1554-1555-1936-56-1507-1576-1577-1578-1579-1580-1581-1582-1583-1584-1585-1586-1587-1599-1600-1601-1602-1603-1616-1617-1618-1619-1620-1631-1632-1633-1634-1635.

The total surface of these plots is: /3883.253.00/m² (three million and eight hundred eighty three thousand and two hundred fifty square meters).

The Municipality of Tyre manages (invests in) the zone IE according to the classification of the Directorate of Urban Planning, provided that the approval of both the Ministry of Environment and the Tyre Reserve Committee is secured.

In addition to the above-mentioned plots, the reserve includes the sandy beach that is facing the plots as well as the correspondent territorial waters.

Article Two: the objectives of the reserve are:

First, To conserve the environment (nature, fauna, flora) that could host and protect within the reserve fauna and flora, including the terrestrial and marine plants, animals and birds in way to ensure their protection from extinction, and to restore a sustainable and renewable environmental ecosystem and to benefit from it for scientific purposes.

Second, to conserve the natural wealth and resources including the beaches, soil, ecosystem and freshwater sources in a way to ensure its protection from natural factors and human use, to properly manage it, maintain it and to benefit from it for environmental and sound organized visits and tourism activities that are not disruptive with the objectives of conservation and sustainability.

Article Three: The reserve components

The reserve is composed into sections of various uses and it is split into three parts:

- 1- The parts, which are totally protected, like the fishes and marine animals habitats, breeding points of marine turtles that are threatened as well as those of birds and marine and terrestrial flora.
- 2- The parts allocated to public use such as swimming and entertainment.
- 3- The parts allocated for living hood usage of local communities and these parts include the areas reserved for local cultivation and usage that do not constitute a direct or indirect damage on the reserve and its resources.

Article 4- the reserve is subject to the jurisdiction of the Ministry of Environment, and a common coordination shall be ensured among the reserve committee, the National Council for Scientific Research, the concerned institutions involved in the matters of protected areas, the Ministry of Environment and the environmental NGOs.

Article Five- for the purpose of the reserve management, the minister of the environment appoints a committee of five volunteer members for a duration of five years, that are

representative of: the municipal council and the Qaemmaqam (commissioner district) in Tyre (2 members), 2 NGO representatives, one of the Ministry of Agriculture.

Article Seven- In order to establish and manage the reserve, the appropriate finance shall be secured from the ministries and institutions mentioned in Article Four, as well as from the municipality, UNDP and other international agencies concerned with protected areas, donations and various activities.

Article Seven- the reserve will be subject to a reforestation programme based on the guidance of experts in botany, taxonomy and endemic plants in order to conserve the natural flora habitat and its sustainability.

Article Eight- the living organisms including inland and marine animals, birds, fishes, reptiles, etc. shall be proliferated to create a wealthy and sustainable natural environment.

Article Nine- to establish botanical gardens, aquarium and zoos.

Article ten- it is restricted to carry out any action/activity that is not mentioned in the Article three, and which might lead to damages in the reserve. The Committee has the right to assess this damage and persecute legally the responsible for this damage.

Article eleven- it is forbidden to access the parts (sections) of the strictly reserved area except by the management team, scientists, and researchers carrying out scientific studies.

Article twelve- the management team defines the entry and exit points of the reserve as well as the procedures adopted for the management of the reserve according to the requirements of the different parts (sections) mentioned in Article three.

Article thirteen- the management team committee appoints the reserve guards and trains them on how to protect, maintain and apply the articles mentioned in this law.

Article Fourteen- any person who violates the rules and regulations identified by the reserve team committee is required to subject to a penalty ranging between 500.000 LL and 2.000.000 LL. If this violation leads to a serious damage in the reserve, then the person is subject to prison from one week to a month, and in case of repeated violations the punishment is doubled between two weeks to two months. The returns from violations go to the benefit of the reserve team committee that shall use them to a better reserve management.

Article Fifteen- the operational laws and regulations of Lebanon are used to apply the protection of the reserve.

Baabda, 5-11-1998
Rafic El-Hariri

Annex 3

Regional Laws and their Relevance to TCNR Management Plan

Law/Decree	Brief Description	Relevance to the Management Plan
Law N°. 444/ 02 (Code of Environment)	<p>Protection, conservation, and management of nature and biodiversity:</p> <p>Article 30 strictly forbids all discharges, immersions, or burning in the Lebanese territorial waters of every material that may directly or indirectly affect: (1) human health or natural marine resources, (2) activities and marine creatures, including shipping, fishing, flora, and seaweed, (3) the quality of marine water, (4) the entertainment value and tourism possibilities of the sea and the Lebanese coast.</p> <p>Article 31 requires a permit for discharge to sea.¹⁹</p> <p>Article 44 requires a permit for the import, handling, or disposal of dangerous/ hazardous chemicals.²⁰</p>	It applies to TCNR given that it is a marine coastal nature reserve with rich biodiversity of species that requires protection, conservation, and management
Law N°. 508/ 04	Hunting law regulating hunting practices in Lebanon in terms of season, amount, and type of game birds/animals allowed during the hunting season, along with a permitting system based on hunting tests. This law also prohibits all year long the hunting of protected species and also the hunting practices in specific areas including protected areas and their surroundings.	TCNR consists of an important area for migratory birds, as well as coastal and marine animals that require protection
Decree N°. 8213 dated 24/5/2012	Related to the “Strategic Environmental Assessment for Proposed Policies and Plans and Programmes in the Public Sector” or SEA decree.	Various proposed projects and plans in the management plan would require environmental assessment studies prior to their implementation
Decree N°. 8633 dated 7/8/2012	Related to the “Fundamentals of Environmental Impact Assessment” or EIA decree, all major development, infrastructure, and industrial projects are ⁹ subject to EIA or IEE studies which aim to assess the effects of these projects on the environment including their effects on biodiversity, to promote conservation activities and set mitigation measures to prevent the damage of the surrounding environment by these projects before receiving approval.	

¹⁹Application decree not issued yet, approvals provided by the MoE through the EIA process

²⁰Application decree not issued yet, approvals provided by the MoE through the EIA process

Law N°. 77/2018	Water resources law aims to organize, develop, and protect water resources. It also aims to promote sustainability by strengthening water establishments.	Relates to the marine and natural ponds in TCNR
Decree N°. 3989/2016	Designation of an Environmental Police Department within the Ministry of Environment to regulate environmental crimes and enforce penalties; and specification of their organization and mandates.	Related to the patrolling and law enforcement needed for TCNR
Law N°. 80/2018	Integrated Solid Waste Management law setting integrated solid waste management principles. It provides guidelines for the management of non-hazardous waste and hazardous waste.	Related to the management of solid waste and litter problem within TCNR
Law N°. 130/2019	Protected areas law classifies the categories of protected areas, setting the requirements for their establishment, including supervision and management requirements, and setting the conditions for allowing zoning within protected areas.	Related to the governance structure of TCNR

Annex 4

International Conventions and Agreement

International Conventions/Agreements	Adoption/Ratification Year
Barcelona Convention	Adopted in 1976 Adhered to on 16/10/2008 through Law N°. 34
UNESCO Convention on the Protection of Cultural and Natural Heritage	Adhered to on 30/10/1990 through Law N°. 19
Convention on Biological Diversity (CBD)	Signed in 1992 and ratified on 11/8/1994 through Law N°. 360
United Nations Convention on the Law of the Sea (UNCLOS)	Signed and ratified by the GoL in 1995
Ramsar Convention on Wetlands of International Importance	Adhered to on 23/2/1999 through Law N°. 23
African-Eurasian Migratory Water Birds Agreement (AEWA)	Ratified on 13/6/2002 through Law N°. 412
Agreement on Conservation of Cetaceans of the Black Sea, the Mediterranean Sea, and Contiguous Atlantic area (ACCOBAMS)	Adhered to on 5/2/2004 through Law N°. 571
Protocols of the Barcelona Convention - Protocol on Specially Protected Areas (SPA)	Ratified on 22/02/1994 through Law N°. 292
IMO MARPOL 73/78	

Protection of the Underwater Cultural Heritage	
IMO International Convention ²¹	
International Trade in Endangered Species of Wild Fauna and Flora (CITES)	Ratified by Lebanon through Law N°. 233 dated 22/10/2012
Migratory Species (UNEP/CMS)	Ratified by Lebanon through Law N°412 dated 13/06/2002
Mediterranean Action Plan of the United Nations Environment Programmeme (UNEP)	Signed and ratified in 1975

²¹Civil Liability for oil pollution damage (CLC)

Oil Pollution Preparedness, Response, and Co-operation (OPRC)

Civil Liability for Bunker Oil Pollution Damage (BUNKER)

Maritime Claims (LLMC) - Not been ratified by Lebanon

Annex 5

TCNR stakeholders according to their organizations/ MPA zones of influence/ Responsibilities, engagement and its level within the MPA

Annex 5 presents the list of stakeholders consulted during both focused and public consultation meetings. It also pinpoints the responsibility of each stakeholder within TCNR and the future engagements or opportunities that the stakeholder can offer. The level of engagement for each stakeholder is scaled from 1 (high engagement), 2 (medium engagement), to 3 (low engagement).

Organizations	MPA Zones of Influence	Responsibilities within the MPA	Engagement Opportunities with the MPA	Level of Engagement
GOVERNMENTAL STAKEHOLDERS				
Ministry of Environment	Establishment, and Management	<ul style="list-style-type: none"> - Classifies and supervises the protected area - Supervises the overall management of the reserve - Appoints the APAC - Approves the Management team - Contributes to financing the APAC - Approves the Management Plan 	<ul style="list-style-type: none"> - Supporting financially some activities within the MPA - Supporting the studies within the MPA by engaging national experts - Supporting the implementation of some significant infrastructure works - Setting and modifying legal regulations to enhance the MPA's management 	1
Ministry of Agriculture	Marine and Agriculture Zone	<ul style="list-style-type: none"> - Implements legislations related to fisheries and fishing activities - Implements legislation related to the agriculture activities within TCNR 	<ul style="list-style-type: none"> - Controlling the fishing methods, and has the mandate to stop fishing violations. - Finding a balance between the need of the fishers, and the protection and conservation of fish species, while offering proper training, workshops, and incentives 	1

Organizations	MPA Zones of Influence	Responsibilities within the MPA	Engagement Opportunities with the MPA	Level of Engagement
			<ul style="list-style-type: none"> - Modifying the laws that prohibit the use of pesticides in the agricultural activities 	
Municipality of Tyre	All Zones	<ul style="list-style-type: none"> - Responsible for all infrastructure-related projects in Tyre city (e.g., construction, rehabilitation, and maintenance of local roads, public transport, water supply, etc.) 38. - Responsible for managing waste in TCNR during the touristic season in summer: regular cleaning of the reserve from marine litter from the tourists, and management of sewerage facilities from the beach kiosks - Responsible for the investment in the touristic area of TCNR (through a contract with the APAC after approval of MoE), accordingly collects rentals from beach kiosks and parking during summer - Contributes 50% of the revenues collected from managing the parking and renting kiosks during the summer season in TCNR to the reserve's APAC and management team - Provides patrolling services to stop any violation/ or illegal practices within TCNR including fishing activities 	<ul style="list-style-type: none"> - Enforcing the regulations and legislation - Helping the MPA in the application of some activities carried out by regional projects - Offering financial support - Working on capacity-building activities that benefit the reserve which involves the local community 	1

Organizations	MPA Zones of Influence	Responsibilities within the MPA	Engagement Opportunities with the MPA	Level of Engagement
Ministry of Tourism	Touristic Zone	<ul style="list-style-type: none"> - Regulates and promotes tourism in Lebanon and eco-tourism in protected areas - Puts standards for service providers (accommodation, restaurants, activities handling businesses, hygiene, prices, etc.) - Helps in tourism project development 	<ul style="list-style-type: none"> - Promoting ecotourism activities within TCNR reserve 	2
Ministry of Culture	Agriculture Zone	<ul style="list-style-type: none"> - Protects all archeological and historical sites, including that of Ras Al Ain 	<ul style="list-style-type: none"> - Valorization of the cultural and heritage significance of TCNR and, promote it across its platform and Programmes 	2
Ministry of Public Works and Transport (MoPWT)	Marine Zone	<ul style="list-style-type: none"> - Responsible for the entire coast - Provides permits for construction in the public domain - Controls the law enforcement related to the transport and marine public properties 	<ul style="list-style-type: none"> - Helping in enforcing the zoning of the marine area within TCNR once approved by the MoE 	2
Ministry of Defense	Marine Zone	<ul style="list-style-type: none"> - Patrols and controls violations in Tyre marine areas within the common marine chamber 	<ul style="list-style-type: none"> - Prohibiting illegal practices within the TCNR marine area by enforcing the laws and regulations set by the MoE and the MoA - Helping the municipality to implement the laws and regulations 	1
Ministry of Interior and Municipalities Lebanon (MoIM)	Marine Zone	<ul style="list-style-type: none"> - Patrols and controls violations in Tyre marine areas within the Lebanese marine common control room which includes representatives from the General Security Directorate, General Directorate of Internal Security, Lebanese Army, Lebanese State Security, General Directorate of Customs, Ministry of Public Works and Transportation, and the Ministry of Environment 		2

Organizations	MPA Zones of Influence	Responsibilities within the MPA	Engagement Opportunities with the MPA	Level of Engagement
Ministry of Energy and Water	Agriculture Zone	- Supervises and manages the use of groundwater resources in TCNR	- Helping the Municipality to regulate the irrigation system in the agriculture zone 39. - Helping in efficiently developing sewerage treatment facilities near the reserve	2
MANAGEMENT STAKEHOLDERS				
APAC	Entire MPA	- Prepares the Management plan in coordination with the MoE and concerned stakeholder - Supervises the overall local management of the reserve - Coordinates with the involved stakeholders - Implements the activities of the Management Plan - Administrative finance - Hires the management team of the reserve after approval of MoE and supervises their work and reports to MoE	- Supervising, and supporting the execution of regulations and laws within TCNR 40. - Generating income for the reserve from different donors and through income-generating activities 41. - Supporting financially through regional and/or international projects	1
Management Team (TCNR team)	Entire MPA	- Responsible for the daily management activities in the reserve under the supervision of the APAC	- Generating, with the APAC, income for the reserve from different donors and through income-generating activities - Promoting environmentally friendly activities	1
DIRECT USERS				

Organizations	MPA Zones of Influence	Responsibilities within the MPA	Engagement Opportunities with the MPA	Level of Engagement
Farmers	Agriculture Zone	<ul style="list-style-type: none"> - Use the marine zone for fishing and recreational activities 42. - Use the agriculture zone for farming 43. - Use the coastal zone for recreational and touristic activities 	<ul style="list-style-type: none"> - Promoting eco-tourism to increase revenues and interest in the area - Helping in the conservation and protection of the flag species within TCNR - Promoting sustainable agriculture and organic farming in the agriculture zone of TCNR - Increasing environmental awareness activities 	1
Fishers	Marine Zone			
Recreational Activities Providers (e.g., Water sports activity)	Touristic Zone			
Local Community of Rachidiyeh Camp	Sandy Beach - All zones			
Local Community of Tyre	Touristic, Conservation, and Marine Zones			
National and International Visitors/customers	Touristic and Conservation Zones			
INDIRECT USERS				
Kiosks Owners	Touristic Zone	- Exploitation of the touristic zone of TCNR	- Promoting ecotourism to increase revenues and interest in the area	1
Beach Resorts Owners	Touristic Zones			
Hospitality Industry (e.g., B&B, hotels, restaurants, etc.)	All Zones	- No direct responsibilities within TCNR	- Promoting the existence of an MPA in the city and its importance to create shared economic values for both the reserve and their businesses	1

Organizations	MPA Zones of Influence	Responsibilities within the MPA	Engagement Opportunities with the MPA	Level of Engagement
NGOs	All Zones	<ul style="list-style-type: none"> - Provide awareness Programmes, capacity-building Programmes, and other types of engagement activities 	<ul style="list-style-type: none"> - Supporting and promoting environmental awareness activities and workshops 	1
EDUCATIONAL AND SCIENTIFIC COMMUNITY				
Lebanese University & Private Universities Research Centers National Experts Schools (students)	All Scientific Zones in both conservation and marine zones	<ul style="list-style-type: none"> - Provide scientific data related to the water quality and sediments and terrestrial/ marine and coastal biodiversity - Monitor the marine and coastal environment - Define the main threats to ecosystems and associated biodiversity - Provide recommendations for better protection and conservation of key species associated with the MPA 	<ul style="list-style-type: none"> - Providing important scientific data to help monitor the marine and terrestrial resources and species - Supporting and promoting environmental awareness activities and workshops 	1
OTHERS				
International/ Regional organizations	All Zones	<ul style="list-style-type: none"> - Offer financial support for various projects in the reserve - Ensure a risk-free exploration of gas and oil reserves within the marine waters of the reserve 	<ul style="list-style-type: none"> - Promoting and financing capacity-building workshops and other activities/infrastructure/equipment in the reserve 	1
Lebanese Petroleum Administration (LPA)	Marine Zone	<ul style="list-style-type: none"> - Training of the Management Team 	<ul style="list-style-type: none"> - Assuring exploration activities that will not harm the marine environment within TCNR 	3

Organizations	MPA Zones of Influence	Responsibilities within the MPA	Engagement Opportunities with the MPA	Level of Engagement
Litani River Authority	Agriculture Zone	- Manage the water in Ras-Al-Ain	<ul style="list-style-type: none"> - Controlling the water quality 44. - Assuring the good practices and uses of the water 	2

Annex6

List of activities (workshops/ meeting/ exchange) done in TCNR (through ongoing projects/ or others/ or for the purpose of the MP) since the launching of the MP project

Date	Activities	Relevance to TCNR MP	Project
3 March 2022	Workshop to discuss the diagnostic report submitted for the purpose of the actual MP	Share and discuss ideas with national stakeholders for the redaction of MP, guaranteeing the involvement of stakeholder in TCNR MP	IMAP-MPA/ SPA-RAC project
26 April 2022	Visit of Parc Naturel de Camargue (team and experts) to TCNR	<ul style="list-style-type: none"> • Discussion on the effectiveness of the MP • Discussion on the good way to evaluate the activities of the MP • Discussion on actions related to consider the area of TCNR as a biosphere • Discussion on the necessity to launch the agro ecological activities within TCNR • Importance to valorize the archaeological sites in Tyre, including TCNR and focus on the ecotourism activities 	This visit has been done within a twinning between the Union of Municipality of Tyre and Region PACA France
6 May 2022	Meeting in TCNR with farmers for the purpose of the MP	<ul style="list-style-type: none"> • Importance to reduce the use of pesticides and herbicides • Importance to reduce the use of plastics • Importance to open a local market for farmers of the agricultural zone of TCNR • Importance to establish a plan encouraging organic agriculture • Importance to fight against disease attacking the plant • Importance to control the area through a strategy organizing the farmers 	IMAP-MPA/ SPA-RAC project
11 May 2022	Visit of Kas-Gekova MPA-Turkey to TCNR	<ul style="list-style-type: none"> • Importance to establish the pescatourism in Tyre • Importance to establish a good and effective patrolling Programme • Importance of demarcation, especially TCNR waters • Importance of a signage system 	Visit for the establishment of a twinning Programme between the two MPAs (Kas-Gekova) and TCNR through IUCN project
12 May 2022	Meeting in TCNR with the presence of ACE NGO and MoE and local stakeholders (farmer/ fisher/ kiosk owner) in TCNR	<ul style="list-style-type: none"> • Importance to designate TCNR as Green area • Importance to fight against plastic and reduce human pressures, especially during summer • Importance of capacity building for TCNR team • Importance of volunteers for TCNR • Importance of scientific equipment for TCNR 	Visit for launching the Bioconnect project

		<ul style="list-style-type: none"> • Importance of rehabilitation the infrastructure within TCNR 	
16 May 2022	Workshop with the presence of local stakeholders	<ul style="list-style-type: none"> • Importance to valorize the natural/ ecological/ historical/ socio-economical values of TCNR • Importance to open and offer opportunities to work within TCNR • Importance to share activities and projects to local stakeholders 	Workshop done under the framework of ENSERES project that TCNR is a partner
8 June 2022	Visit of Parc Natural of Medes team- Spain to TCNR and workshop with the presence of local stakeholders and MP team	<ul style="list-style-type: none"> • Importance of ecotourism activities related to the archaeological monuments on the land and water • Importance of the involvement of hotels/ restaurant/ and kiosks owners on the activities of TCNR and promote TCNR • Importance of cooperation with local divers/ and fishers for increasing the ecotourism actions • Importance of the establishment of an ecotourism strategy for TCNR • Importance of the establishment of a communication strategy for TCNR • Increase the visibility of TCNR 	Visit to establish a twinning program with Parc of Medes and TCNR (SPA/RAC) and under the framework of the ENSERES project
20 And 21 July 2022	Visit of Expert from MedCities and University of Malaga and workshop with the presence of local stakeholder	<ul style="list-style-type: none"> • Importance of capacity building according to the need of the reserve • Importance to establish a biodiversity platform for TCNR • Importance to monitor the impact of litter • Importance to reduce the use of plastics • Importance to establish a financial and business strategy for TCNR • Importance to participate to regional events related to Mediterranean MPAs and presents the challenges • Importance of the establishment of citizen-science for scientific purpose 	Visit and workshop done under the framework of the ENSERES project (TCNR is a partner)
13 August 2022	Meeting with ACE NGO/ Litany Authority in TCNR for the purpose of the MP and visit Rashidiyeh camp and meeting with local people in Rashidiyeh camp	<ul style="list-style-type: none"> • Importance of valorizing the archaeological and historical sites of Ras-Al Ain • Importance of the establishment of a geotourism strategy • Importance to study the water quality/ flow currency/ Hydrology of Ras-Al Ain ponds and aqueducts • Importance of rehabilitation of the water mill in Ras-Al Ain • Importance of integration of Rashidiyeh camp in the activities of TCNR • Focus on the awareness in Rashidiyeh camp 	IMAP-MPA/ SPA-RAC project

1 September 2022	Meeting with President of Municipality of Tyre and President of TCNR APAC	<ul style="list-style-type: none"> • Necessity to have a new infrastructure of the visitor center, including an eco-camping sites/ laboratory/ meeting room/ diving sites • Necessity to focus on the capacity building • Necessity of sustainable funds • Necessity to eradicate the invasion of some plants • Necessity to fight against the pressure coming from Rashidiyeh camp • Necessity to fund income for the reserve through ecotourism activities • Necessity to valorize the values of the reserve through a communication strategy 	IMAP-MPA/ SPA-RAC project
12 and 15 September 2022	Meeting with Tyre fishers and local communities (squads/ volunteers) for the purpose of the MP	<ul style="list-style-type: none"> • Importance to focus on citizen-science • Importance to develop the fish market in Tyre • Importance to involve fishers in the activities of TCNR • Establishment of the pescaturism • Help fishers with equipment and materials and tools guaranteeing the application of rules • Find solution for NIS (especially pufferfis) • Increase the knowledge within the fishers (laws/ regulations/ marine biodiversity/ activities) • Increase the link with MoA/ Lebanese army • Necessity to organize a TCNR week (with the presence of national/ regional expert) for students/ volunteers • Necessity to announce the need for volunteers, especially during the sea turtles nesting seasons 	IMAP-MPA/ SPA-RAC project
17 September 2022	Workshop with the presence of local stakeholders	<ul style="list-style-type: none"> • Importance to monitor, protection and conservation of sea turtles • Importance to develop the sea turtle rescue center • Importance of the awareness campaign to sensibelize on the protection of marine litter • Importance of involvement of volunteers/ fishers/ divers on sea turtles' activities • Importance of studies related to sea turtles • Importance to close the conservation zone of TCNR • Importance of signage to protect sea turtles • Importance to reduce the pressures (especially light disturbance) during the sea turtle nesting season • Importance to enforce the execution of laws and regulation protection sea turtles • Importance to clean TCNR waters from the ghost nets 	Workshop under the framework of the project MedMARine Litter-SPA/RAC

		<ul style="list-style-type: none"> Importance to cooperate with Tyre Municipality to stop some actions (e.g. no jet ski within TCNR waters) 	
18 October 2022	Workshop to discuss the finding of new archaeological monuments within TCNR with the presence of local stakeholders and international expert	<ul style="list-style-type: none"> Importance to continue the research of new monuments within Tyre, and TCNR Importance to complete the history of Tyre Necessity to establish a tourist strategy for Tyre and TCNR Necessity to cooperate with the Ministry of Culture and Tourism 	Project related with Dr. Ali Daoud (Director of Tyre archaeological site)
30 December 2022	Workshop to establish a coastal cities network to reduce the use of plastics	<ul style="list-style-type: none"> Stop the use of single plastic Focus on the awareness and behavior to reduce the impact of marine litter Importance to work more with kids/ students to fight against plastic Increase the links between Coastal Municipalities through an efficacy networks to take regulations and policies to fight against Plastics 	This workshop has been done under the frame work of the COMMON project, as TCNR is a partner

Annex 7

List of stakeholders consulted for the purpose of the MP

Name	Organization
Ms. Lara Samaha	Ministry of Environment
Ms. Salam Jabour Mr. Ali Nassar Mr. Hasan Ayad	Ministry of Agriculture
Mr. Hasan Dbouk Mr. Ahmad Faraj Mr. Hasan Srouer Ms. Kawthar Kteish	Municipality of Tyre
Mr. Pascal Abdallah Ms. Petra Obeid	Ministry of Tourism
Mr. Ali Daoud	Ministry of Culture

Mr. Mourtada Mhanna (Union of Municipality of Tyre -Director) Mr. Ali Ezzedine (Municipality of Abbasiyeh and President of Abbasiyeh Coast Nature Reserve) Mr. Hasan Hammoud (Bourj el SHeMali) Mr. Mohammad CheMali (Alaylé)	Union of Municipality of Tyre
Mr. Ali Matar (president of Zahrani Union)	Union of Municipality of Zahrani
Mr. Hasan Dbouk Mr. Mohamad Daher Ms. Salam Jabour	APAC
Ms. Nabigha Dakik Mr. Hasan Hamza Mr. Wassim Nouiri Mr. Mounir Karanbash Mr. Riyad Hammoud Mr. Mohammad Saklawi	Management Team (TCNR team)
Mr. Hamza Issa Mr. Ali Dbouk Mr. Majed Hammoud	Farmers
Mr. Majed Baweb Mr. Sami Rizk Mr. Georges taza Mr. Ali BARAKAT	Fishers
Mr. Bachir Barkouch Mr. Youssef Jundi Mr. Hussein Nourreddine	Recreational Activities Providers (e.g., Water sports activity)
Key persons of Rashidiyeh camp	Local Community of Rachidiyeh Camp
Mr. Hussein Ghaddar Mr. Abed Ammar Ms. Dalia Baraket (Designer)	Local Community of Tyre

Ms. Aya Saleh (Designer) Ms. Fadya Joumaa	
Mr Mortada Mhanna Ms. Dania Faran	Kiosks Owners
Mr Halim Hadad (Rest House Hotel) Mr. Zouheir Halawi (Al fanar) Platinum hotel Al Jawad restaurant Phenicien Restaurant Al Marsa Restaurant Dar Alma Hotel	Hospitality Industry (e.g., B&B, hotels, restaurants, etc.)
Rotary Club ACE organization Tyros Organization Amwaj Organization ADR organization Association Culture and Development-Tyre (Mr. Mounir Badawi)	NGOs
Mr. Khalil Rammal (student) Ms. Bariaa Mcheik (Student)	Lebanese University & Private Universities
National Center for Marine Sciences	Research Centers
Mr. Raghda Saad (ICZM expert) Mr. Sherif Joumaa (CNRS) Mr. Milad Fakhri (CNRS) Mr. Ghazi Bitar (Lebanese University) Ms. Marie Abboud Abi Saab	National Experts
Official school of Tyre	Schools (students)
CTM organization Kas-Gekova MPA team Parc de Camargue MPA team	International/ Regional organizations

President of the Municipality of Medes Island MPA Medes Island MPA team Oristano MPA team SPA/RAC team IUCN team Un Habitat Team UNDP team	
Mr. Walid Nasr	Lebanese Petroleum Administration (LPA)
Mr. Ali Daoud Mr. Ali Badawe	Litani River Authority

Annex8

Design of the proposed new visitor center of TCNR (© Union of the Municipality of Tyre)

4 Bungalows
- Made from wood
- Can be removed or displaced

Oasis
- Green area in the sand
- Planted with vegetation from the reserve

Camping Site
- Dedicated area for camping and awareness campaigns
- Area with a wooden fence

Services Building
- Contains public toilets & showers for the camping zone

Offices And rescue center Building
- Contains 2 offices and 1 storage Room
- Rescue center for sea turtles with an indoor and outdoor ponds

Existing building
Reference for old building
Demarcate new scope

Wood (Height 20 cm)

LEBANESE REPUBLIC
MINISTRY OF INTERIOR & MUNICIPALITIES
UNION OF TYR REGION MUNICIPALITIES
PROJECT: ANNER FOR THE NATURAL RESERVE BUILDING
SCALE: 1/3000
LEGEND:
DATE: 1
PAGE NUMBER: 3
SIGNATURE:

visitor center

project

rescue center & small camping site

LEBANESE REPUBLIC
MINISTRY OF INTERIOR & MUNICIPALITIES
UNION OF TYR REGION MUNICIPALITIES
PROJECT: ANNER FOR THE NATURAL RESERVE BUILDING
SCALE: 1/500
LEGEND:
DATE: 1
PAGE NUMBER: 2
SIGNATURE:

Concept

visitor center
rescue center
camping zone for the natural reserve

separation between rescue center & camping zone
link between existing and new project
services zones for the natural reserve

Site

Natural reserve
Existing Building of the natural reserve

Additional Buildings

1 rescue center for turtles
2 offices
1 storage room
4 Bungalows
Small Camping site

LEBANESE REPUBLIC
MINISTRY OF INTERIOR & MUNICIPALITIES
UNION OF TYR REGION MUNICIPALITIES
PROJECT: ANNER FOR THE NATURAL RESERVE BUILDING
SCALE:
LEGEND:
DATE: 1
PAGE NUMBER: 1
SIGNATURE:

Section A-A

Section B-B

Section C-C

plan

LEBANESE REPUBLIC
MINISTRY OF INTERIOR & MUNICIPALITIES
UNION OF TYR REGION MUNICIPALITIES
PROJECT: ANNER FOR THE NATURAL RESERVE BUILDING
SCALE: 1/300
LEGEND: SECTIONS
DATE: 1
PAGE NUMBER: 5
SIGNATURE:

Annex9

Eco-Camping Specifications proposals (by Pascal Abdallah)

Eco-Camping Specifications:

The establishment of the eco-camping requires the prior approval of the MoE, and an EIA study which should be approved by MoE. Therefore, the following is only a proposal for the Eco-Camping and its specifications.

Location:

The area chosen for installation of the eco-camping facility is located between the touristic zone and the conservation zone. It is actually at the southernmost side of the touristic zone, just bordering the north side of the conservation zone.

It is important to understand that the major visitors' attendance to the TCNR is taking place in the touristic zone, and the main leisure activity is swimming, where 50 kiosks managed by the municipality are installed to serve the daily visitors with sunshades, food and fresh water.

This type of activity is considered as mass tourism even if we consider some standards, such as:

- Limited number of kiosks (it has been reduced from 100 to 50)
- Well organized parking lot
- dumped out sewage water from specific septic tanks
- Only day use (limited night presence)

The future steps that could be undertaken to improve these services in this zone, and to make them eco-friendlier are to:

- Limit the number of kiosks to 25 or better change the approach of the service offered here, by replacing the individual kiosks with a centralized food court and shower area.
- Limit the parking lot capacity consequently
- Reduce noise generation
- Use solar system for electricity and water heating
- Try to install a healthier food circle
- Install sorting and recycling circles

- Use eco-friendlier material for the construction of the kiosks (or the centralized unit proposed in this study)

Parking:

The visitors will be using the same existing parking lot of the touristic zone. So there is no need to lose more natural sand space for the sake of tourism.

Total capacity:

The total capacity of the eco-camping is 50 pax, or a total of 15 tents of different sizes.

The visitor is not allowed to bring in his own tent, as it is preferable to introduce a specific type of tents in esthetical harmony.

Types of tents:

Bamboo style tents covered with cotton fabric. No concrete is allowed. All the installations should be able to dismantle totally without any traces left on the ground, except the main multipurpose element.

- 4 tents with a capacity of 1 double bed each = 8 pax (area: 12 m² each)
- 5 tents with a capacity of 2 separated beds each = 10 pax (12 m² each)
- 16 tents with a capacity of 2 mattresses each = 32 pax (8 m² each)

Facilities of the eco-camping:

- 1 big tent area for food service, buffet style with benches – [100 m²]
- 2 separated recreation areas: one with bone fire place in the middle, and the other one for meditation. Note that fire should be put out at 11pm. – [1500 m²]
- 1 playground for volleyball and other team games. This area could be rented by groups from outside the camp. – [200 m²]
- 1 multipurpose concrete building for: kitchen, storage, laundry, electricity room (batteries of solar system ...), toilets and showers with 8 toilets (4 for men and 4 other for women), in addition to 8 showers (4 for men and 4 for women) - [100 m²]. We propose that all healthy food selection of the limited choice menu be catered among local inhabitants. The kitchen is meant for food setting and dishes cleaning only, not for cooking.
- 1 office: this unit is not included in this study, as it is appropriate to use the nearby offices of the TCNR to fulfill the management of the eco-camping site.
- 1 shop for selling some food, souvenirs, beach equipment, etc... - [25 m²]
- Dumping station for used water – [100 m²]

Total area of the eco-camping:

The total area of the eco-camping including all the listed units above, with the free areas, but excluding the parking and the office is approximately: 3 500 m² to 5 000 m².

Total cost:

The total cost of the camping including the construction of all the units and the tents, excluding the purchase of the land, is = 300,000 USD approximately.

Eco-Camping Best Practice:

The following concise 'Best Practice' approach will be developed into an Eco-labeling manual for campsites which intends to reduce their impact on the environment. It is a long process that allows campsites to have better services, especially when integrated into a protected area.

The main criteria are:

A – Energy

A1 – Producing electricity from renewable energy (such as solar or wind)

A2 – Lighting from renewable energy

A3 - Heating and Air conditioning from renewable energy

A4 – Led lights and bulbs

A5 – Automatic sensors for light switch off, and heating/air conditioning switch off systems

A6 – Boiler energy efficient equipment

B – Water

B1 – Quantity of water used for cleaning

B2 – Water saving WC flushing equipment

B3 – Waste water disposal (Septic tank, ...)

B4 – Water for Washing machines (towels and sheets washing frequency)

B5 – Use of rain water

B6 – Automatic irrigation system for outdoor areas

B7 – Water consumption efficient dish washing machine

B8 – Shower timer and water flow (to reduce visitor water quantity use)

C – Chemicals use

C1 – Reduction of chemical products for general cleaning (Disinfectants)

C2 – Reduction of chemical products for dish washing

C3 – Reduction of chemical products for shower and hand washing

D – Waste

D1 – Waste sorting (Adequate process and containers ...)

D2 – Reducing the use of plastic cups and dishes

D3 – Composting process of organic waste

D4 – Reducing paper use

E – Management

E1 – Legal compliance

E2 – Maintenance

E3 – Smoke free camping areas

E4 – Organic food products

E5 – Educational approach for environmental awareness

E6 – Landscaping and esthetical aspects



Mediterranean
Action Plan
Barcelona
Convention



*The Mediterranean
Biodiversity
Centre*

Specially Protected Areas Regional Activity Centre (SPA/RAC)

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